

SECURITIES AND EXCHANGE COMMISSION

FORM 10-K405

Annual report pursuant to section 13 and 15(d), Regulation S-K Item 405

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FILER

BROWN & SHARPE MANUFACTURING CO /DE/

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SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

ANNUAL REPORT

PURSUANT TO SECTION 13 OR 15(d) OF

THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 1998 Commission file number 1-5881

BROWN & SHARPE MANUFACTURING COMPANY

(Exact name of Registrant as specified in its charter)

DELAWARE

050113140

(State or other jurisdiction of
incorporation of organization)

(I.R.S. Employer
Identification No.)

PRECISION PARK, 200 FRENCHTOWN ROAD, NORTH KINGSTOWN, RHODE ISLAND 02852

(Address of principal executive offices and zip code)

Registrant's telephone number, including area code 401-886-2000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class -----	Name of each exchange on which registered -----
CLASS A COMMON STOCK-PAR VALUE \$1.00	NEW YORK STOCK EXCHANGE
PREFERRED STOCK PURCHASE RIGHTS	NEW YORK STOCK EXCHANGE

Securities registered pursuant to Section 12 (g) of the Act:

CLASS B COMMON STOCK - PAR VALUE \$1.00

(Title of Class)

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No .

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K ((S) 229.405) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. [X]

The aggregate market value (as calculated under the rules) of the voting common stock held by non-affiliates of the Registrant was approximately \$88,400,000 as of March 12, 1999.

There were 12,965,649 Shares of Class A Common Stock and 506,796 Shares of Class B Common Stock, each having a par value of \$1.00 per share, outstanding as of March 12, 1999.

DOCUMENTS INCORPORATED BY REFERENCE

The following documents have been incorporated by reference in the following parts of the Form 10-K: (1) Definitive Proxy Statement for the April 30, 1999 Annual Meeting incorporated by reference (to the extent specified) in Part III.

Portions of the Annual Report for the year ended December 31, 1998 are incorporated by reference into Parts I and II.

BROWN & SHARPE MANUFACTURING COMPANY

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PART I

ITEM 1 - BUSINESS

General

The Company, which was founded in 1833, is a leading designer, manufacturer, and marketer of metrology products worldwide under numerous internationally recognized brand names. Metrology is the science of the physical measurement of objects using various precision instruments and equipment. The Company's high precision products measure physical dimensions of, and inspect and verify conformance to specifications of, components and products and are used in manufacturing, quality control, and product development operations. The Company's product line ranges from hand tools and instruments to customized computer-controlled metrology systems which integrate hardware and software and are augmented by service, training, and aftermarket support. The Company markets its metrology products and services in North America, Europe, Asia, South America, and the Middle East. Important end user markets for the Company's products include the automotive, aerospace, industrial machinery, electronics, and computer industries, and the Company's customers include Ford Motor Co., Daimler Chrysler, Toyota, General Motors, BMW, Boeing Co., Eastman Kodak Co. Inc., International Business Machines Corp., Hewlett-Packard Co., General Electric Co., Caterpillar Inc., United Technologies Corp., Motorola Inc., Phillips, Samsung, and Xerox Corp.

The Company's operations are conducted through three management units: Measuring Systems, Precision Measuring Instruments, and Custom Metrology.

- . The Measuring Systems Group, which accounted for approximately 71% of the Company's sales in 1998, manufactures and markets a wide range of manual and computer-controlled, high precision CMMs including "in-process" measuring systems under the Brown & Sharpe and DEA brand names. The Company believes it is the worldwide market leader for CMMs as measured by net sales and installed base. The Company believes it has an installed base of over 22,400 CMMs worldwide.
- . The Precision Measuring Instruments Division, which accounted for approximately 26% of the Company's sales in 1998, manufactures a wide range of mechanical and electronic measuring and inspection tools (including height gauges, calipers, dial indicators, micrometers, and gauge blocks) which are marketed under the Brown & Sharpe, Tesa, Etalon, Interapid, Standard Gage, Select Gauge, Mauser, Mercer, Compac, and Roch brand names through more than 450 distributors and catalog houses

worldwide.

- . The Custom Metrology Division designs and engineers specialty products and systems that provide customized solutions for unique measurement or inspection problems primarily utilizing non-contact technology. Technologies and custom applications developed by the CM Division with customer funding have been directly applied to the design of standard products or systems.

Repositioning Initiatives

Over the past several years, the Company has undertaken a series of divestitures, acquisitions and other strategic initiatives which have repositioned the Company from its historical origins as a machine tool manufacturer into a leader in the field of metrology. These repositioning initiatives included:

- . Divestiture of Non-Core Operations. The divestiture of non-strategic operations, including the machine tool, pump and hydraulics businesses, and Technicomp, Inc. during 1997, which enabled the Company to focus on its core metrology technologies and market distribution strengths.
- . Strategic Metrology Acquisitions. Strategic acquisitions which enabled the Company to increase greatly the breadth of its metrology product offering and the strength of its distribution system. These acquisitions included the 1994 acquisitions of DEA, Roch and certain intellectual property and assets of Metronic Ltd. During 1997, the Company acquired the remaining 50% of its equity investee ASI, which develops measurement software and provides training and services and other aftermarket support to manufacturing industries, and a 50% ownership position in Metroptic Technologies Limited, a joint venture located in Israel developing non-contact sensor technologies.
- . Rationalization and Consolidation of Operations. Lowering the Company's overhead cost structure by reducing duplicative functions and associated headcount and by consolidating and rationalizing the Company's manufacturing facilities and operations, which enabled the Company to increase productivity and efficiency.
- . Reorganization Plan. In the fourth quarter of 1997, management implemented a Reorganization Plan ("the Plan") which included business processing reengineering at certain of its European sites, as well as selected product rationalization in preparation for new product introductions. In addition, the MSG's marketing and service organization was also reorganized. The Plan provided for a workforce reduction of 159 persons, primarily in its European operations. The Plan also provided for inventory adjustments and the write-down of fixed assets and certain intangible assets. (See Management's Discussion and Analysis of Financial Condition and Results of Operations.)

Business Strategy

The Company is implementing its strategy based on the following elements:

- . Continue Cost Improvements. The Company intends to continue to implement measures designed to reduce its product costs through: (i) standardizing product designs worldwide; (ii) increasing the cost-effectiveness of product designs; (iii) outsourcing components and products; (iv) increasing supplier partnering; and (v) focusing on core manufacturing

processes. The Company also intends to streamline its sales, marketing, and general and administrative processes in an effort to reduce selling, general and administrative expenses as a percentage of sales.

- . Develop New Products and End User Markets. The Company's goal is to increase net sales by expanding penetration of served industrial end user markets and by capitalizing on high growth end user markets such as the electronics, computer, and medical industries where metrology needs are growing rapidly. To expand in these high growth industries, the Company intends to focus on development of software and emerging non-contact metrology technologies through continued internal development and through strategic acquisitions and technical partnerships. To expand its penetration of served industrial end user markets, the Company expects to continue the introduction of new metrology systems utilizing both contact and non-contact technologies, and to develop sensors and other sophisticated products that can be imbedded in a variety of manufacturing processes. The Company plans to form technical and commercial alliances with manufacturers of process equipment to provide enhanced combined manufacturing systems utilizing the Company's sensors and other products.
- . Enhance Existing and Develop New Software. The Company intends to emphasize research and development of software systems and applications designed to meet the evolving metrology needs of its end users. To that end, the Company intends to leverage off its software development team of software and applications engineers and technicians in the following four areas: (i) metrology software for inspection and verification of piece-part integrity and conformance to design specifications; (ii) process control software designed to detect and correct drifts in part tolerances before the manufacturing process produces scrap or improperly configured components; (iii) enhanced management information systems that report statistical and quality information from the manufacturing process; and (iv) new software that will link the Company's CMMs and, therefore, the manufacturing process with computer-aided engineering and manufacturing systems that will provide the means for real-time feedback, analysis and, ultimately, control of manufacturing to design specifications. The Company believes that its existing library of metrology software, together with newly developed software, should enable it to respond to the growing demand in manufacturing for on-line inspection and verification. The Company also believes that its experience with CMM software and manufacturing processes is critical to the successful development of software that is linked with computer aided engineering systems. To meet the needs of this growth market, the Company formed Brown & Sharpe Information Systems, Inc. (BSIS) in 1997. This new subsidiary, with a common Corporate vision, combines all the Company's software development expertise under one roof. The Company's objective is to develop the next generation of open architecture measurement software having more power and ease of use than any product on the market. Incorporating the most accurate metrology algorithms in the world, this new software will work effortlessly with CAD/CAM systems to facilitate the inspection process. It will also provide the user with powerful analysis tools to ensure overall process control.
- . Leverage Worldwide Distribution Capability. Through its acquisitions, Brown & Sharpe has expanded its product lines and strengthened its marketing and distribution capabilities in Europe, South America, the Middle East, India, and China. The Company plans to continue to strengthen and expand its worldwide distribution capability, principally by continuing to rationalize its existing distribution network and by opening new demonstration centers and adding direct sales capacity and distributors where cost effective. The Company also intends to capitalize

on the strength of its global distribution network by increasing the number of Company-designed and third-party sourced products sold through its distribution channels in an effort to increase gross profit without a corresponding increase in selling, general and administrative expenses.

- . Increase Aftermarket Sales and Services. The Company intends to increase its focus on higher margin aftermarket sales and services, including consulting services, calibration and rebuilding of CMMs, software upgrades, and parts sales. The Company believes that the worldwide installed base of CMMs, estimated at over 67,000 (including 22,400 of the Company's CMMs), creates a significant demand for such aftermarket services.

The Company believes that the level of customer service it provides, as measured by third-party surveys of its customers, is superior to that of its principal competitors, and expects to further strengthen its customer relationships through enhanced aftermarket support and increased partnering efforts. The Company's sales attributable to aftermarket sales and service in 1998 were estimated to be approximately 29% of MS Group net sales for the same period.

Metrology Industry

General

Metrology products and systems range from hand tools for simple measuring tasks to complex integrated systems of hardware and software that can measure, digitize, inspect, and verify manufactured parts and components to exacting specifications. Manufacturers depend upon metrology hardware and software products to monitor consistent product conformance to their exacting specifications, thereby improving the reliability, fit, and finish of their products. In addition to these quality and performance benefits, metrology products help manufacturers lower costs by reducing errors, scrap, rework and warranty expense, improving the manufacturing process, lowering throughput time, increasing capacity, and reducing work-in-progress inventories. In recent years, manufacturers have accelerated the integration of quality control functions directly into the production process by incorporating the use of metrology products on the factory floor. In addition, manufacturers are demanding more precise, capable, and flexible metrology systems as their products become smaller, more complex and/or must meet more

stringent quality and safety standards. Their exacting product specifications often require measurement to an accuracy of less than one micron (one millionth of a meter or approximately 1/100th of the thickness of a human hair) or, in some special cases, measurement of nanometers (one billionth of a meter or the unit of measurement for the wavelength of light). Increasingly, metrology systems must incorporate a mix of traditional contact and newer non-contact technologies because of reduced part sizes and the great diversity of new materials used in manufactured products. Metrology systems are purchased by customers regardless of their need for additional production capacity because of ever-increasing quality requirements and the need to reduce product costs.

Metrology products serve a broad range of measurement requirements. The simplest metrology products include devices such as calipers, dial gauges, micrometers, surface plates, and height gauges. These are generally inexpensive hand-held tools that measure in one dimension to within an accuracy of between two and 25 microns (80 millionths and 1/100th of an inch). Fixed gauges are often more expensive devices that inspect and verify in one to three dimensions to within an accuracy of between one and 25 microns and are typically used where manufacturers need to measure a single, uniform product at a high rate of speed. Fixed gauges tend to make simple, comparative measurements of products in a

manufacturing process. CMMs are more sophisticated, complex machines that use a variety of technologies to measure in three dimensions to an accuracy of between 0.5 and 100 microns. These technologies range from advanced probes that physically "contact" the product being measured to highly sophisticated non-contact vision, optical, laser and scanning probes that collect precise data without touching the product being measured. While some CMMs are manually operated, most are now controlled by software systems that not only compare the product to a manufacturer's CAD/CAM models, but also provide the manufacturer with dimensions of the product to be converted into the CAD/CAM model. CMMs are highly flexible machines that can measure different products for a manufacturer without re-tooling or other significant changes as opposed to fixed gauges that may require expensive and time-consuming retooling. The price points of metrology products range from \$100 for a caliper to over \$1.5 million for a sophisticated CMM such as those used to measure car and truck bodies.

Markets

Participants in the metrology industry generally compete in one or more of six broad product areas: (i) simple and relatively inexpensive tools that measure in one dimension, such as calipers, dial gauges, micrometers, surface plates, and transfer gauges; (ii) digital electronic height gauges of varying accuracies and sizes; (iii) sophisticated special purpose metrology systems including fixed gauges; (iv) general purpose and application-specific CMMs; (v) alternative technologies such as vision tunnels or surface finish and geometry measurement; and (vi) customized metrology solutions to specific metrology problems. The Company competes in all of the foregoing product areas other than fixed gauges and most of the alternative technologies.

Sales of simple metrology products and less sophisticated height gauges are driven by price, brand, product innovation, ease of purchase, and effectiveness of distribution. Products in this category are generally hand-held or relatively small devices that permit a manufacturer to make measurements in one or occasionally two dimensions. These products are generally inexpensive, providing a cost-effective solution to simple metrology problems where the industrial customer does not need the increased capabilities of fixed gauges, CMMs or certain other sophisticated metrology systems. However, simple metrology products are generally limited in terms of accuracy, flexibility and/or their ability to collect data. Further, they are dependent upon skilled operators. The market for simple metrology products is fragmented, with many regional suppliers. End user markets for these products include most basic industries, including the automotive, construction, industrial machinery, appliance, and farm equipment industries.

Sales of fixed gauges have traditionally been driven by manufacturers' needs for one, two, or three dimensional metrology on the factory floor. Products in this category, typically more expensive than simple metrology products, compete directly with CMMs regarding inspection and verification of manufactured parts. Fixed gauge systems are frequently a more expensive investment than comparable CMM systems, but for the specific purpose intended, may be less expensive over the long run. Fixed

gauges can range from simple one dimensional tools to semi- and fully-automatic three dimensional factory floor systems that quickly compare production parts to "master parts." However, because these gauge systems are "fixed," they are inherently inflexible. The fixed gauge must be reworked or a new gauge designed and built every time manufacturers make dimensional changes in the part being measured. The trend of the industry is away from fixed gauges and toward flexible gauges because of the need to make costly changes to fixed gauges when the part they measure changes.

Sales of CMMs and more sophisticated height gauges are driven by manufacturers'

needs for high accuracy, flexibility, speed, and information. Products in this category, while typically more expensive than simple metrology products and some fixed gauges, are generally more versatile machines that can measure, digitize, inspect, and verify diverse manufactured parts. The accelerating use of more sophisticated software has played an important role in the evolution of CMMs in response to the marketplace. Improved software and linkage to CAD/CAM and network technologies enable CMMs both to compensate automatically for the position of the piece to be measured, eliminating the need for the time consuming manual positioning necessary with less advanced metrology products, such as surface plate gauges, and also to relay information to the manufacturer's CAD/CAM model to facilitate production process adjustments. Although CMM-type software can be added to on-machine gauging and a small percentage of fixed gauges, CMMs are easier to use, more flexible, and generally provide more analytical information than most products using competing technologies. Presently, CMMs are installed at sites ranging from highly controlled laboratory sites to hostile, factory floor industrial settings, and can measure objects ranging in size from a semiconductor chip to an aircraft exterior, and can provide accuracies with tolerances of 0.5 to 100 microns. CMMs can achieve this through contact or non-contact probing methods, depending upon the manufacturer's needs. The market for CMMs is dominated by five competitors, including the Company.

Sales of customized metrology products are driven by specific needs in specific industries and, in Brown & Sharpe's case, tend to focus on emerging metrology technologies. Generally, custom metrology challenges arise where existing metrology products and systems cannot adequately address a narrow yet important manufacturing task. This product category requires research, development, and innovation and often includes the development of new applications for optical, laser, and scanning sensor probes.

MS Group

The MS Group, the largest of Brown & Sharpe's three units, accounted for approximately 71% of Brown & Sharpe's sales in 1998. The MS Group is headquartered in North Kingstown, Rhode Island and manufactures and markets CMMs. MS Group products sold under the Brown & Sharpe name are manufactured at the Company's North Kingstown, Rhode Island; Wetzlar, Germany; and Turin, Italy facilities. The primary end user markets for the Company's CMM products include the automotive (including automotive suppliers), heavy transport, aerospace, electronics, computer, industrial machinery, and medical industries.

MS Group products range from small, manually operated CMMs to large, high speed, high precision automatic CMMs. In addition to these standard and custom-configured CMMs, Brown & Sharpe also produces and sells high-speed process control systems. The smallest machines can measure in a volume up to 400 x 350 x 300 mm and are priced at approximately \$10 thousand, while the larger, high speed, high accuracy CMMs with integrated software systems can cost over \$1.5 million. The MS Group also provides laser scanning and optically based measuring machinery from microscopes to vision systems.

The Company believes that its "user-friendly" CMM application software gives it a competitive advantage in the marketplace for CMMs. These proprietary software products provide the MS Group's customers with an understandable, icon-based inspection analysis capability, graphical user interfaces and outputs, and the capability to network with manufacturing systems. The MS Group also provides its customers with special software and systems that integrate the MS Group's products with the customer's host information and communications network. In addition to sales of CMMs, the MS Group provides aftermarket sales and service, including calibration and rebuilding of CMMs, software upgrades and parts

sales, for Brown & Sharpe CMMs and competing CMMs. The Company's sales attributable to aftermarket sales and services in 1998 were estimated to be approximately 29% of MS Group sales for the same period. See Footnote 12 to the Consolidated Financial Statements, which are incorporated by reference, for financial information related to this business segment.

PMI Division

The principal products of Brown & Sharpe's PMI Division are precision measuring tools and related instruments such as micrometers, dial indicators, calipers, electronic height gauges, and gauge blocks. PMI Division products accounted for approximately 26% of Brown & Sharpe's sales in 1998. The PMI Division's products have broader applications and lower unit list prices (with a range of \$100 to approximately \$13 thousand) than the prices of the MS Group's products. These tools and instruments typically measure in one or two dimensions, and are often used in comparative measuring where an unknown part or dimension is compared to a previously measured part or dimension. Some PMI Division products also include systems and application software for measuring and statistical process control. The Company believes that the primary end user markets for the products of Brown & Sharpe's PMI Division are the automotive, aerospace, metal processing, and defense industries, although Brown & Sharpe's PMI Division products are used in virtually all types of industrial settings. Brown & Sharpe's PMI Division is headquartered in Renens, Switzerland, and its products are manufactured at its plants in Rolle and Renens, Switzerland; Poughkeepsie, New York; Leicester, St. Albans, and Plymouth, England; and Luneville, France. The Company also purchases components and products from third parties located in various countries. See Footnote 12 to the Consolidated Financial Statements, which are incorporated by reference, for financial information related to this business segment.

CM Division

The CM Division is an engineering division headquartered in Telford, England. The CM Division designs and engineers specialty products primarily utilizing non-contact technologies. Recent examples of CM Division products include a system for measuring the thickness and shape of the metal top of a beverage can and the depth and contour of the groove scored around the can's pop-up tab, so that the manufacturer could ensure the consistency with which the can could be opened without rupture by the end user, and an automatic multi-sensor (laser scanning, laser ranging, optical, and tactile) system to measure, inspect and verify the ceramic substrates on which semiconductors are placed. The CM Division also manufactures a range of CNC optical measuring machines for shaft type components. In 1997, the Company formed a joint venture company to develop the next generation of non-contact sensing technologies and products. This company, Metroptic Technologies Limited, is headquartered in Israel. Products using the new sensors will be designed and manufactured initially at the Company's Custom Metrology facility in Telford, England and sold under the Brown & Sharpe brand name. Currently, Metroptic is working on sensors designed for inspection of turbine engine blades and electronic components—two growth markets for measurement and inspection. This sensor technology is also scaleable for use in the measurement of complex contours in the aerospace and automotive industries. Prices for CM Division products range from approximately \$20 thousand to \$1.0 million.

The primary end user markets for the custom-designed products of the CM Division are package and can manufacturing, oil drilling, standards laboratories, semiconductors, aerospace and defense. Sales of these products typically involve a close, highly technical relationship with the customer. This direct relationship with the customer is reinforced by strong and continuing efforts to

provide superior customer service through ongoing customer training and technical support.

The Company believes that the CM Division provides it with cost-effective access to emerging applications and technologies as the technologies and custom applications developed by the CM Division with customer funding have been directly applied to the design of standard products or systems distributed by the MS Group or the PMI Division. See Footnote 12 to the Consolidated Financial Statements, which are incorporated by reference, for financial information related to this business segment.

Sales and Distribution

The MS Group distributes its products primarily through a 100-person worldwide sales force directly to U.S. and European customers, and utilizes a network of independent agents and distributors to cover the Pacific Rim, South American, and African markets. The typical MS Group sales process involves lengthy, technical, one-on-one discussions between the salesperson or the distributor/sales agent and customer and is often part of a competitive bid process. As an important part of its marketing and distribution strategy, Brown & Sharpe provides in-depth training to its customers at 20 support and demonstration centers located throughout the United States, Europe, and Asia. The Company's direct sales force also provides the Company with important opportunities to cross-sell the products of its PMI and CM Divisions.

In contrast to the MS Group, the PMI Division generally distributes its products through international import companies, regional distributors, and catalog houses throughout the world. As of December 31, 1998, the PMI Division utilized in excess of 80 major distributors located in over 40 countries to market its products. The Company believes that the PMI Division's established distribution network provides it with a competitive advantage and intends to capitalize on this network to increase sales of internally developed and third-party products.

The CM Division primarily designs and manufactures products and services in response to specific customer inquiries. The CM Division maintains a staff of approximately 4 sales/project engineers to respond to customer inquiries, and, upon receipt of an order, to develop tailored solutions and manage projects to completion. The CM Division typically targets sales to end user markets with a small number of participants in which the Company has little or no competition. As a result, the Company believes that the CM Division benefits from comparatively lower selling expenses.

The Company has no single customer which accounts for 10% or more of its consolidated net sales; however, several well recognized major automotive manufacturers (without regard to their suppliers) account for a significant portion of the Company's net sales. The loss of a few of these major customers would have a substantial effect upon the Company.

Engineering and Product Development

Brown & Sharpe's commercial success is dependent upon its ability to develop products, enhancements, and applications that meet changing customer metrology needs and anticipate and respond to technological changes. Brown & Sharpe designs, develops, and refines its products internally through engineering departments within its product groups and divisions. When it is more cost-effective to do so, Brown & Sharpe purchases product designs or portions of product designs from engineering subcontractors or acquires rights to such designs through licensing arrangements. Brown & Sharpe also benefits from research and development efforts which are subsidized by customer funds and, in

certain countries, by government research grants. Brown & Sharpe research, development and manufacturing engineering activities are conducted in the United States, Italy, France, Switzerland, Germany, the United Kingdom, and Lithuania.

Brown & Sharpe derived substantial sales in 1998 from the sale of products that it introduced after 1993. Brown & Sharpe has introduced at least one major new product every year since 1987. The Company's current design and engineering focus is the continued integration of Roch technologies with Brown & Sharpe's previously existing technologies, software development, and non-contact metrology products. In 1998, Brown & Sharpe invested \$17.8 million, or 5.3% of its net sales during that period in product design and manufacturing engineering. In 1996 and 1997, Brown & Sharpe expended \$13.9 million and \$15.8 million, respectively, for product design, development, refinement, and manufacturing engineering.

Foreign Operations

Brown & Sharpe manufactures and sells substantial amounts of its metrology products in foreign countries. As of December 31, 1998, approximately 68% (based on book values) of the Company's

assets, 58% of the Company's sales (based on customer location) and 68% of its employees were located outside the United States. The Company's manufacturing operations are located in Italy, Switzerland, Germany, England, and France, as well as in the United States, and Brown & Sharpe's products are sold in over 60 countries worldwide. See Footnote 12 to the Consolidated Financial Statements, which are incorporated by reference, for financial information related to foreign operations.

Raw Materials and Sources of Supply

Brown & Sharpe purchases raw materials, supplies, and other components from a variety of suppliers, and considers its sources of supply to be adequate. At times, the Company depends upon various sole sources of supply for certain components used by the Company (generally of items designed by Brown & Sharpe), but has not experienced any significant difficulty in meeting delivery obligations because of its reliance on such a supplier. In addition, the Company currently purchases substantially all of its externally sourced low to medium accuracy electronic touch trigger sensor probes and heads from a publicly held United Kingdom company which is the dominant supplier of such sensor probes to CMM manufacturers. No alternative supplier for this class of electronic sensor probes, which are a key component of substantially all of the Company's lower accuracy CMMs, is currently available and developing an alternative source for the probes and heads could take more than a year. Brown & Sharpe continues to explore means of lowering production costs through selective outsourcing in situations where Brown & Sharpe can achieve its high quality standards via subcontractors.

Patents, Licenses, Trademarks, and Proprietary Information

The Company's business is not significantly affected by or dependent upon the procurement or maintenance of patents covering the Company's products. Nevertheless, the Company pursues, where appropriate, patent protection for inventions, developments and improvements relating to its products both in the United States and abroad. In addition, the Company relies on a combination of copyrights, trade secret law and contracts to protect its proprietary information (principally related to its software and software development). Despite these precautions, it may be possible to copy or otherwise obtain and

use the Company's proprietary information without authorization. In addition, effective copyright and trade secret protection may be unavailable or limited in certain foreign countries.

Brown & Sharpe and its subsidiaries own, or have the right to use, a number of trademarks which they believe are valuable in promoting the sale of certain of their principal products. The Company and its subsidiaries have registered, or have applied to register, the trademarks owned by them in the United States and in some foreign countries. In addition, the Company uses the Mauser brand name under royalty-free license agreements entered into in connection with the Company's acquisition of these product lines. The license expires in 1999. The Company believes it will be able to negotiate satisfactory extensions of this license prior to its expiration and/or that the failure to renew this license would not have a material adverse effect on the Company.

Environmental Matters -----

The Company is not significantly affected by compliance with rules and regulations promulgated under environmental laws since its manufacturing processes do not produce, as a by-product, material amounts of waste, water discharges, or air emissions deemed hazardous under such laws. However, the Company is subject from time to time to environmental claims. See Note 15, "Contingencies" of Notes to Consolidated Financial Statements in Item 8 of this Annual Report.

Employees -----

At December 31, 1998, Brown & Sharpe had 2,359 employees, (as compared with 2,409 at December 31, 1997), including approximately 1,601 employees located outside the United States. Brown & Sharpe considers its relations with its employees to be good, although there can be no assurance that Brown & Sharpe's cost-cutting efforts or other factors will not cause a deterioration in these relations.

Approximately 508 of Brown & Sharpe's employees located at sites in the United States, Italy, Switzerland, England, and France are covered by collective bargaining agreements which expire at various times between December 31, 1998 and June 30, 1999. Brown & Sharpe expects that these collective bargaining agreements will be renegotiated successfully prior to their expiration. However, there can be no assurance that successor collective bargaining agreements will be successfully negotiated, that negotiations will not result in work stoppages, or that a work stoppage would not materially interfere with Brown & Sharpe's ability to produce the products manufactured at the affected location.

In addition to the collective bargaining agreements that cover workers at certain of Brown & Sharpe's foreign subsidiaries, it is customary for these employees to be represented by various works or shop councils. These councils are governed by applicable labor laws and are comprised of members who are elected or appointed by the work force. Except for the top level of management, these councils represent the entire work force at their location in its dealings with senior management on matters affecting the work force or arising under the relevant labor contracts in effect at the location.

The following table sets forth the location of Brown & Sharpe's employees as of December 31, 1998:

<TABLE>
<CAPTION>

Country -----	Employees (1) -----
<S>	<C>
France.....	198
Germany.....	210
Italy.....	400
Japan.....	23
Spain.....	18
Switzerland.....	386
United Kingdom.....	362
Mexico.....	4
United States.....	758

TOTAL.....	2,359
	=====

</TABLE>

(1) Part-time employees are included on a full-time equivalent basis.

Competition -----

The Company's MS Group currently has four principal direct domestic and foreign competitors, some of which are owned by entities that have greater financial and other resources than the Company. The MS Group also faces indirect competition from other types of metrology firms such as manufacturers of fixed gauging systems. The primary industries to which the MS Group sells its products are characterized by a relatively small number of large participants with significant purchasing power. In addition, the MS Group generally sells its products through a competitive bid process in which at least one and frequently several of the Company's competitors have submitted competing bids. As a result, the Company experiences severe pricing competition in connection with sales by its MS Group which can have an adverse impact on the Company's net sales and margins. During periods when the metrology industry suffers from over capacity, downward pricing pressure experienced by the MS Group is likely to be more intense and the Company's margins may be more severely impacted. In addition, certain of the Company's competitors that have access to greater financial resources may be able to withstand such pricing pressure more effectively than the Company. The MS Group competes with Mitutoyo/MTI Corp., a subsidiary of Mitutoyo Solsakusho Co. Ltd., a Japan-based company, which is the largest supplier of metrology equipment and products worldwide. In addition to Mitutoyo, the MS Group's main competitors are Carl Zeiss, Inc., a subsidiary of Carl Zeiss-Stiftung AG, the Sheffield Measurement Division of Giddings & Lewis, Inc., and LK Tool Co. Ltd.

The market for the PMI Division's products is fragmented and the PMI Division competes with a large number of competitors, including the market leader in this area, primarily on the basis of the strength of its third party distribution network, price, and product innovation. New competitors from emerging industrialized countries with lower cost products than the Company's represent a significant competitive challenge to the Company. As a result, the PMI Division's continued success and profitability will be

dependent on its ability to continue to develop cost-effective and innovative products. The primary competitors of the PMI Division are Mitutoyo, L.S. Starrett Co., and Federal Products Co. (Inc.), a subsidiary of Esterline Technologies Corporation.

To date, the CM Division has sold its custom solutions to markets in which there is little or no effective competition in custom metrology systems. However, in certain niche markets where the Company does not generally sell, Marposs S.p.A., an Italian company, provides custom metrology products.

Backlog

The Company's backlog of product orders was approximately \$72 million at year-end 1998, compared to approximately \$68 million and \$66 million at year-end 1997 and 1996, respectively.

All of the orders included in the Company's year-end 1998 backlog were requested to be filled and completed within one year and are, subject to possible customer cancellation, expected to be completed in 1999.

Significant Customers

The Company has no single customer which accounts for 10% or more of its consolidated net sales; however, several well recognized major automotive manufacturers (without regard to their suppliers) account for a significant portion of the Company's net sales. The loss of a few of these major customers would have a substantial effect upon the Company.

Working Capital

A substantial amount of working capital investment in inventory and accounts receivable is required to operate the Company's businesses. Working capital was approximately \$111.8 million at year-end 1998 compared to approximately \$109.7 million at year-end 1997. See the discussion of working capital in "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Item 7 of this Annual Report.

Segment Information

(Dollars in thousands)

The Company operates exclusively in the Metrology Business. See Note 1 for a further description of the Company's business. Sales to unaffiliated customers from Europe are defined as sales of products that are primarily assembled in a foreign country. Refer to "Financial Information by Business Segment and Geographic Area" included in Footnote 12 of the Company's 1998 Annual Report, filed as an exhibit hereto, which is incorporated by reference.

ITEM 2 - PROPERTIES

The following table sets forth certain information concerning Brown & Sharpe's major operating facilities:

<TABLE>

<CAPTION>

Location	Owned/ Leased	Principal Use	Approximate Square Footage
-----	-----	-----	-----
<S>	<C>	<C>	<C>
United States			
N. Kingstown, Rhode Island	Owned	Manufacturing, Engineering, Sales, and Administration	348,000 (1)
Poughkeepsie, New York	Owned	Manufacturing	58,000
Wixom, Michigan	Leased	Sales and Administration	37,600

</TABLE>

<TABLE>
<CAPTION>

Location -----	Owned/ Leased -----	Principal Use -----	Approximate Square Footage -----
<S>	<C>	<C>	<C>
Italy			
Grugliasco	Leased	Assembly	107,000 (2)
Moncalieri	Leased	Manufacturing	70,000 (2)
Switzerland			
Renens	Owned	Manufacturing, Engineering, Sales, and Administration	139,000
Rolle	Owned	Manufacturing	51,000
Germany			
Wetzlar	Owned	Manufacturing, Engineering, Sales, and Administration	280,000
Ludwigsburg	Leased	Sales	15,000 (2)
United Kingdom			
St. Albans	Owned	Manufacturing and Sales	36,000
Telford	Owned	Manufacturing, Engineering, Sales, and Administration	32,000
Leicester	Owned	Manufacturing	14,000
Torpoint	Leased	Manufacturing, Sales, and Administration	5,000 (2)
France			
Luneville	Leased	Manufacturing, Engineering, and Sales	77,100 (2)
Villebon	Leased	Sales	18,000 (2)
Spain			
Barcelona	Leased	Sales	9,000 (2)

</TABLE>

(1) Excludes approximately 412,000 square feet leased to unrelated parties.

(2) The leases in Grugliasco, Ludwigsburg, Torpoint, Luneville, Villebon and Barcelona expire on December 31, 2002, September 30, 2003, August 18, 2001, March 23, 2003, October 20, 2001, and July 31, 2008, respectively.

In addition, Brown & Sharpe leases smaller sales offices located in the United States, Europe, and Asia. In the opinion of management, Brown & Sharpe's properties are in good condition and adequate for Brown & Sharpe's business as presently conducted.

ITEM 3 - LEGAL PROCEEDINGS

Other Environmental Matters

The nature of the Company's current operations are not significantly affected by environmental laws, rules and regulations. However, because the Company and its subsidiaries and predecessors have conducted heavy manufacturing operations in the past, sometimes at facilities which have been divested or sold and often in locations at which or adjacent to which, other industrial operations were conducted, from time to time the Company is subject to environmental claims. As with any such operations that involve the use, generation, and management of

hazardous materials, it is possible that practices, including practices that were deemed acceptable by regulatory authorities in the past, may have created conditions which could give rise to liability under current or future environmental laws. Because the law in this area is developing rapidly, including in many European countries, and such environmental laws

are subject to amendment and widely varying degrees of enforcement, the Company may be subject to, and cannot predict with any certainty the nature and amount of, potential environmental liability related to these operations or locations that it may face in the future.

Litigation

Refer to Note 15 "Contingencies" of Notes to Consolidated Financial Statements incorporated by reference in Item 8 of this Annual Report.

ITEM 4A EXECUTIVE OFFICERS OF THE REGISTRANT

The following table summarizes information regarding Executive Officers of the Company as of March 1, 1999:

<TABLE>

Name	Age	Positions Held During the Last Five Years
----	---	-----
<S>	<C>	<C>
Frank T. Curtin	64	President & Chief Executive Officer and a Director of the Company since May 2, 1995; from 1992 to May 1995, Vice President, National Center for Manufacturing Sciences, a research and development organization, Ann Arbor, MI.
Andrew C. Genor	56	Vice President & Chief Financial Officer since December 1, 1998; previously Chief Financial Officer, Safety First from May 1998 through September 1998; previously Vice President, Chief Financial Officer & Treasurer, Wyman-Gordon Company from November 1994 through March 1998.
Charles A. Junkunc	56	Executive Vice President, Strategic Planning since December 1, 1998; previously Vice President & Chief Financial Officer since May 1, 1992.
Antonio Aparicio	48	Vice President & General Manager--Precision Measuring Instruments since September 1991.
Marcus Burton	40	Vice President & General Manager--Custom Metrology Division since January 1997; previously Director of Strategic Planning--Brown & Sharpe Manufacturing Co. since July 1995; Managing Director--Thomas Mercer Ltd. (a subsidiary) since June 1992.
Philip James	57	Group Vice President--Measuring Systems since September 1997; previously Executive Vice President--International, Ingersoll Milling Machine Company since November 1993.
Edward D. DiLuigi	52	Vice President & General Manager--Measuring Systems U.S.A. since June 1997; previously General Manager, UNC Airwork, Aircraft Engine Services Division since July 1995; previously Vice President of Operations, UNC Airwork since August 1992.

Vice President & General Manager--Brown & Sharpe DEA S.p.A. since February 1998; previously Group Chief Executive, Automotive Products Group Limited since 1995; previously Chief Executive Clutch Division BBA PLC since 1991.

</TABLE>

<TABLE>

<CAPTION>

Name	Age	Positions Held During the Last Five Years
----	---	-----
<S>	<C>	<C>
Christopher J. Garcia	42	Vice President--Software Product Development since January 1998; previously Vice President--Marketing since November 1996; previously Vice President--Business Development since January 1991; Vice President--Research and Development of Valisys Corporation since June 1994; previously Vice President--Marketing of Valisys Corporation since June 1990.
Alfred J. Corso	62	Controller and Principal Accounting Officer since June 1, 1995; previously Partner with Ernst & Young LLP.

</TABLE>

To the best of the knowledge of the Registrant, none of the Executive Officers has any family relationships with any of the others. Each Executive Officer holds office until the first meeting of the Board of Directors following the next Annual Stockholders' meeting and until his successor is elected or appointed and qualified, unless he dies, resigns, is removed or replaced.

PART II

ITEM 5 - MARKET FOR REGISTRANT'S COMMON STOCK AND RELATED STOCKHOLDER

MATTERS

Refer to "Common Stock Market Prices and Dividends" included on Page F-32 of the Company's 1998 Annual Report, filed as an exhibit hereto, which is incorporated by reference.

ITEM 6 - SELECTED FINANCIAL DATA

Refer to "Selected Financial Data" on Page F-2 of the Company's 1998 Annual Report, filed as an exhibit hereto, which is incorporated herein by reference.

ITEM 7 - MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION

AND RESULTS OF OPERATIONS

Refer to "Management Discussion and Analysis of Financial Condition and Results of Operations" on Pages F-3 through F-11 of the Company's 1998 Annual Report, filed as an exhibit hereto, which is incorporated herein by reference.

ITEM 7A - QUALITATIVE AND QUANTITATIVE DISCLOSURES ABOUT MARKET RISK

Refer to "Qualitative and Quantitative Disclosures About Market Risk" on Pages F-8 through F-9 of the Company's 1998 Annual Report, filed as an exhibit hereto, which is incorporated herein by reference.

ITEM 8 - FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Refer to Consolidated Financial Statements and Report of Independent Auditors on Pages F-12 through F-30 of the Company's 1998 Annual Report, filed as an exhibit hereto, which are incorporated herein by reference.

ITEM 9 - CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING

AND FINANCIAL DISCLOSURE

None.

PART III

ITEM 10 - DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT

Refer to "Information With Respect to Nominees and Other Directors Continuing in Office" on Pages 2 and 3 in the Company's definitive Proxy Statement for the April 30, 1999 Annual Meeting which is incorporated herein by reference.

ITEM 11 - MANAGEMENT REMUNERATION AND TRANSACTIONS

Refer to "Executive Compensation" on Page 12 in the Company's Definitive Proxy Statement for the April 30, 1999 Annual Meeting which is incorporated herein by reference.

ITEM 12 - SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

Refer to "Principal Shareholders" and "Stock Ownership of Directors and Officers" on Pages 5-8 in the Company's Definitive Proxy Statement for the April 30, 1999 Annual Meeting which are incorporated herein by reference.

PART IV

ITEM 14 - EXHIBITS, FINANCIAL STATEMENT SCHEDULES, AND REPORTS ON FORM 8-K

(a) (1) and (2) List of Financial Statements and Financial Statement Schedules

The following consolidated financial statements of Brown & Sharpe Manufacturing Co., Inc. and subsidiaries, included in the annual report of the registrant to its shareholders for the year ended December 31, 1998, are incorporated by reference in Item 8:

Consolidated Balance Sheets--December 31, 1998 and 1997

Consolidated Statements of Operations--Years ended December 31, 1998, 1997, and 1996

Consolidated Statements of Shareowners' Equity--Years ended December 31, 1998, 1997, and 1996

Consolidated Statements of Cash Flows--Years ended December 31, 1998, 1997, and 1996

Notes to Consolidated Financial Statements--December 31, 1998

The following consolidated financial statement schedule of Brown & Sharpe Manufacturing Co., Inc. and subsidiaries is included in Item 14(d):

Schedule II Valuation and Qualifying Accounts

All other schedules for which provision is made in the applicable accounting regulation of the Securities and Exchange Commission are not required under the related instructions or are inapplicable and therefore have been omitted.

(3) The response to this portion of Item 14 is submitted as a separate section of this report.

(b) Form 8-K was filed during the first quarter of 1998.

(c) Exhibits--The response to this portion of Item 14 is submitted as a separate section of this report.

(d) Financial Statement Schedules--The response to this portion of Item 14 is submitted as a separate section of this report.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

BROWN & SHARPE MANUFACTURING COMPANY
(Registrant)

Date: March 25, 1999

By: /s/ Andrew C. Genor

Andrew C. Genor
Vice President and
Chief Financial Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

/s/ Frank T. Curtin

3/25/98

/s/ Howard K. Fuguet 3/25/98

Frank T. Curtin
President, Chief Executive Officer
(Principal Executive Officer),
Chairman of the Board, and Director

Date

Howard K. Fuguet
Director

Date

/s/ J. Robert Held ----- J. Robert Held Director	3/25/98 ----- Date	/s/ John M. Nelson ----- John M. Nelson Director	3/25/98 ----- Date
/s/ Paul R. Tregurtha ----- Paul R. Tregurtha Director	3/25/98 ----- Date	/s/ Russell A. Boss ----- Russell A. Boss Director	3/25/98 ----- Date
/s/ Henry D. Sharpe, III ----- Henry D. Sharpe, III Director	3/25/98 ----- Date	/s/ Roger E. Levien ----- Roger E. Levien Director	3/25/98 ----- Date
/s/ Harry A. Hammerly ----- Harry A. Hammerly Director	3/25/98 ----- Date	/s/ Andrew C. Genor ----- Andrew C. Genor Vice President and Chief Financial Officer	3/25/98 ----- Date
/s/ Alfred J. Corso ----- Alfred J. Corso Controller (Principal Accounting Officer)	3/25/98 ----- Date		

DIRECTORS

Russell A. Boss, Director and President & Chief Executive Officer, A. T. Cross Company

Frank T. Curtin, President & Chief Executive Officer, Brown & Sharpe Manufacturing Company

Howard K. Fuguet, Partner, in the law firm of Ropes & Gray

Harry A. Hammerly, Former Executive Vice President, 3M Company

J. Robert Held, Consultant, Former President and Chief Executive Officer of Chipcom Corporation

Roger E. Levien, Vice President, Strategy and Innovation, Xerox Corporation

John M. Nelson, Chairman & Chief Executive Officer, Wyman-Gordon Company

Henry D. Sharpe, III, Co-founder & Technical Director, Design Lab, Inc.

Paul R. Tregurtha, Chairman of the Board and Chief Executive Officer, Mormac Marine Group, Inc.

OFFICERS

Frank T. Curtin, President, Chief Executive Officer, and Chairman of the Board

Andrew C. Genor, Vice President, and Chief Financial Officer

Charles A. Junkunc, Executive Vice President, Strategic Development

Antonio Aparicio, Vice President & General Manager - Precision Measuring Instruments

Marcus Burton, Vice President & General Manager - Custom Metrology

Phil James, Group Vice President - Measuring Systems

Edward D. DiLuigi, Vice President & General Manager, Measuring Systems - U.S.A.

Brian Gaunt, Vice President & Managing Director - Brown & Sharpe - DEA S.p.A.

Christopher J. Garcia, Vice President - Software Product Development

James W. Hayes, III, Secretary & Corporate Counsel

Alfred J. Corso, Controller

INVESTOR INFORMATION

Annual Meeting: The Annual Meeting of Stockholders will be held April 30, 1999 at 10:00a.m. at the Corporate Offices

Corporate Offices: Precision Park, 200 Frenchtown Road, North Kingstown, RI 02852; Telephone (401) 886-2000

Form 10-K Report: A copy of the Company's Annual Report as filed with the Securities and Exchange Commission is available upon request to the Secretary.

Stock Listing: New York Stock Exchange; Symbol BNS

Transfer Agent and Registrar Common Stock: Bank of Boston, c/o Boston EquiServe, L.P., Mail-Stop 45-02-64, P.O. Box 644, Boston, MA 02012-0644. They also can be reached on the internet at the following address <http://www.equiserve.com>.

BROWN & SHARPE MANUFACTURING COMPANY
Schedule II - Valuation and Qualifying Accounts

(dollars in thousands)

<TABLE>
<CAPTION>

Year Ended	Balance at Beginning of Period	Charged to Costs and Expenses	Deductions	Foreign Currency Translation	Balance at End of Period
-----	-----	-----	(2)	(1)	-----
<S>	<C>	<C>	<C>	<C>	<C>

December 31, 1998

Allowance for doubtful accounts	\$3,456	\$1,639	\$1,673	\$235	\$3,657
December 31, 1997					
Allowance for doubtful accounts	\$3,226	\$1,874	\$1,358	\$(286)	\$3,456
December 31, 1996					
Allowance for doubtful accounts	\$3,030	\$ 941	\$ 761	\$ 16	\$3,226

- (1) Adjustment resulting from translating allowance for doubtful accounts of foreign subsidiaries at year-end exchange rates.
- (2) Write-offs of uncollectible accounts.

Exhibit Index

Number

- 3.1 Joint Agreement of Merger between Brown & Sharpe Manufacturing Company, incorporated in Rhode Island, and Brown & Sharpe Manufacturing Company, the surviving corporation incorporated in Delaware, filed as the only Exhibit to Form 8-K for the month of January, 1969, and such is hereby incorporated by reference.
- 3.2 Amendment to Certificate of Incorporation, dated April 26, 1989, filed as Exhibit 13 to Form 10-K for the period ending December 29, 1989, and such is hereby incorporated by reference.
- 3.3 Amendment to Certificate of Incorporation, Dated April 25, 1980, filed as Exhibit 3.1 to Form 10-Q for the period ending June 28, 1980, and such is hereby incorporated by reference.
- 3.4 Amendment to Certificate of Incorporation dated April 24, 1987. Exhibit 3.7 was filed as Exhibit 10.4 to Form 10-Q for the period ended June 26, 1987, and such is hereby incorporated by reference.
- 3.5 Amendment to Certificate of Incorporation dated May 6, 1988 filed as Exhibit 1 to Current Report on Form 8-K filed May 9, 1988 and such is hereby incorporated by reference.
- 3.6 Certificate of Designation filed as Exhibit A to Exhibit 5 of Amendment on Form 8 filed on March 6, 1989, and such is hereby incorporated by reference.
- 3.7 Amendment to Certificate of Incorporation dated May 2, 1989. Exhibit 3.7 was filed as Exhibit 3.7 to the Form 10-K for the year ended December 30, 1989 and such is hereby incorporated by reference.
- 3.8 By-laws of Brown & Sharpe Manufacturing Company, as amended through July 29, 1994; previously filed as Exhibit 3.1 to the Form 10-Q for the quarter ended July 2, 1994 and such is hereby incorporated by

reference.

- 3.9 Amendments to By-laws of Brown & Sharpe Manufacturing Company, as of September 28, 1994; previously filed as Exhibit 3 to the Form 10-Q for the quarter ended October 1, 1994 and such is hereby incorporated by reference.
- 4.1 (Intentionally omitted)
- +10.1 (Intentionally omitted)
- +10.2 Amended 1983 Stock Option Plan, as amended through March 9, 1988. Exhibit 10.2 was filed as Exhibit 10.2 to the Form 10-K for the year ended December 31, 1988, and is hereby incorporated herein by reference.
- +10.3 Amendment dated December 29, 1990 to the Brown & Sharpe Amended 1983 Stock Option Plan. Exhibit 10.3 was filed as Exhibit 10.3 to the Form 10-K for the year ended December 29, 1990 and such is herein incorporated by reference.
- +10.4 Amendment No. 4 of the Restated Brown & Sharpe Employee Stock Ownership and Profit Participation Plan and Trust Agreement, as amended through December 21, 1990. Exhibit 10.4 was filed as Exhibit 10.4 to the Form 10-K for the year ended December 29, 1990; and is hereby incorporated herein by reference.
- 10.5 (Intentionally omitted)
- 10.6 (Intentionally omitted)
- +10.7 (Intentionally omitted)
- +10.8 (Intentionally omitted)
- +10.9 The Brown & Sharpe Savings and Retirement Plan for Management Employees dated October 7, 1987.
- 10.10 The Brown & Sharpe Savings and Retirement Plan dated October 7, 1987.
- +10.11 Amendment and Restatement of the Brown & Sharpe Employee Stock Ownership and Profit Participation Plan and Trust Agreement dated October 7, 1987. Exhibits 10.9 through 10.11 were filed as Exhibits 10.2 through 10.4 respectively, to Form 10-Q for the period ended September 26, 1987 and such are hereby incorporated by reference.
- 10.12 Preferred Stock Rights Agreement dated as of March 9, 1988, between the Company and The First National Bank of Boston, as Rights Agent. Exhibit 10.12 was filed as Exhibits 1-4 to the Registration Statement on Form 8-A filed on April 28, 1988, and is hereby incorporated herein by reference.
- 10.13 Amendment No. 1, dated as of May 2, 1988, to Preferred Stock Rights Agreement. Exhibit 10.13 was filed as Exhibit 5 to Amendment No. 1 on Form 8, filed on March 6, 1989, to the Registration Statement on Form 8-A filed on April 28, 1988, and is hereby incorporated herein by reference.
- 10.14 Amendment No. 2, dated as of February 24, 1989, to Preferred Stock Rights Agreement. Exhibit 10.14 was filed as Exhibit 6 to Amendment No. 1 on Form 8, filed on March 6, 1989, to the Registration

Statement on Form 8-A filed on April 28, 1988, and is hereby incorporated herein by reference.

- +10.15 Amendment dated February 23, 1989 to The Brown & Sharpe Savings and Retirement Plan for Management Employees.
- +10.16 Amendment No. 2, dated October 19, 1988, to The Brown & Sharpe Savings and Retirement Plan for Management Employees.
- +10.17 Amendment No. 3, dated February 23, 1989, to The Brown & Sharpe Savings and Retirement Plan for Management Employees.
- 10.18 Amendment dated February 23, 1989 to The Brown & Sharpe Savings and Retirement Plan.
- 10.19 Amendment No. 2, dated October 19, 1988, to The Brown & Sharpe Savings and Retirement Plan.
- 10.20 Amendment No. 3, dated February 23, 1989, to The Brown & Sharpe Savings and Retirement Plan.
- +10.21 Amendment dated February 23, 1989, to the Restated Brown & Sharpe Employee Stock Ownership and Profit Participation Plan and Trust Agreement.
- +10.22 Amendment No. 2, dated October 19, 1988 to the Restated Brown & Sharpe Employee Stock Ownership and Profit Participation Plan and Trust Agreement.
- +10.23 Amendment No. 3, dated February 23, 1989 to the Restated Brown & Sharpe Employee Stock Ownership and Profit Participation Plan and Trust Agreement. Exhibits 10.15 through 10.23 were filed as Exhibits 10.19 through 10.26, respectively, to the Form 10-K for the year ended December 31, 1988, and are hereby incorporated herein by reference.
- +10.24 Amended 1989 Equity Incentive Plan as amended through February 21, 1992. Exhibit 10.24 was filed as Exhibit 10.24 to the Form 10-K for the year ended December 28, 1991 and such is hereby incorporated by reference.
- +10.25 Deferred Stock Equivalent Unit Contract dated September 3, 1987 between Brown & Sharpe Manufacturing Company and Paul R. Tregurtha. Exhibit 10.25 was filed as Exhibit 10.24 to the Form 10-K for the year ended December 30, 1989 and such is herein incorporated by reference.
- +10.26 (Intentionally omitted)
- +10.27 Deferred Stock Equivalent Unit Contract dated November 30, 1989 between Brown & Sharpe Manufacturing Company and Herbert A. Beyer. Exhibit 10.26 was filed as Exhibit 10.25 to the Form 10-K for the year ended December 30, 1989 and such is hereby incorporated by reference.
- +10.28 (Intentionally omitted)
- +10.29 Amendment No. 4, dated October 20, 1989, to Brown & Sharpe Savings and Retirement Plan for Management Employees. Exhibit 10.29 was filed as Exhibit 10.26 to the Form 10-K for the year ended December 30, 1989 and such is hereby incorporated by reference.

- 10.30 Amendment No. 4, dated October 30, 1989, to Brown & Sharpe Savings and Retirement Plan. Exhibit 10.30 was filed as Exhibit 10.26 to the Form 10-K for the year ended December 30, 1989 and such is hereby incorporated by reference.
- 10.31 Amendment No. 5, dated September 7, 1990, of the Brown & Sharpe Savings and Retirement Plan. Exhibit 10.31 was filed as Exhibit 10.30 to the Form 10-K for the year ended December 29, 1990 and such is hereby incorporated by reference.
- +10.32 Amendment No. 5, dated September 7, 1990, of the Brown & Sharpe Savings and Retirement Plan for Management Employees. Exhibit 10.32 was filed as Exhibit 10.31 to the Form 10-K for the year ended December 29, 1990 and such is hereby incorporated by reference.
- 10.33 (Intentionally omitted)
- +10.34 (Intentionally omitted)
- +10.35 (Intentionally omitted)
- +10.36 (Intentionally omitted)
- +10.37 (Intentionally omitted)
- +10.38 The sales agreement pertaining to the sale of GageTalker Corporation to P. Eric Berg by Brown & Sharpe Manufacturing Company dated January, 1992. Exhibit 10.38 was filed as Exhibit 10.38 to the Form 10-K for the year ended December 28, 1991 and is hereby incorporated by reference.
- +10.39 (Intentionally omitted)
- +10.40 Amendment No. 5 of the Restated Brown & Sharpe Employee Stock Ownership and Profit Participation Plan and Trust Agreement, as amended through March 23, 1991.
- +10.41 Employment/Severance Agreement dated April 23, 1992 between Brown & Sharpe Manufacturing Company and Charles A. Junkunc.
- +10.42 Amendment dated July 24, 1992 to Employment/Severance Agreement dated April 23, 1992 between Brown & Sharpe Manufacturing Company and Charles A. Junkunc.
- +10.43 Amendment dated November 11, 1992 to 1989 Equity Incentive Plan as amended through November 6, 1992.
- Exhibits 10.38 through 10.43 were filed as Exhibits 10.38 through 10.43, respectively, to the Form 10-K for the year ended December 26, 1992, and are hereby incorporated by reference.
- 10.44 The Share Purchase and Transfer agreement dated March 24, 1994 by and between Diehl GmbH & Co. and Brown & Sharpe Manufacturing Company was filed as Exhibit (c) to Form 8-K filed as of May 13, 1994, and is hereby incorporated by reference.
- 10.45 The Acquisition Agreement pertaining to the acquisition of DEA dated as of June 10, 1994 between Brown & Sharpe Manufacturing Company and Finmeccanica S.p.A.

10.46 The Form of Shareholders Agreement to be entered into between Brown & Sharpe Manufacturing Company and Finmeccanica, S.p.A.

10.47 Amendment No. 3, dated June 16, 1994, to Rights Agreement, dated March 9, 1988 between Brown & Sharpe Manufacturing Company and the First National Bank of Boston, as Rights Agent.

Exhibits 10.45 through 10.47 were filed as Exhibits 1 through 3, respectively, to the Form 8-K filed as of June 24, 1994, and are hereby incorporated by reference.

10.48 Definitive acquisition Agreement providing for the combination of the DEA metrology business of Finmeccanica (the "DEA Group") with the Brown & Sharpe Measuring Systems Division dated as of June 10, 1994 between Brown & Sharpe Manufacturing Company and Finmeccanica S.p.A., was filed as Exhibit 1 to Form 8-K dated June 24, 1994, and is hereby incorporated by reference.

10.49 Amendment No. 1 dated July 31, 1994, to Acquisition Agreement, amending certain debt provisions of the agreement was filed as Exhibit 10.1.1 to Form 10-Q/A for the quarter ended July 2, 1994 and is hereby incorporated by reference.

10.50 Letter Agreement of Henry D. Sharpe, Jr. dated September 28, 1994 entered into pursuant to the DEA Acquisition Agreement (was filed as Exhibit No. 3 to Report on Form 8-K as of September 28, 1994), filed October 13, 1994 is hereby incorporated by reference.

10.51 Amendment No. 6, dated November 10, 1994, to Brown & Sharpe Savings and Retirement Plan for Management Employees

10.52 Amendment No. 6, dated November 10, 1994, to Brown & Sharpe Savings and Retirement Plan.

10.53 Amended Profit Incentive Plan, as amended through February 14, 1994.

10.54 Restated Supplemental Executive Retirement Plan dated January 23, 1995, filed as Exhibit 10.54 to Form 10-Q for the quarter ended March 31, 1995, and is hereby incorporated by reference.

10.55 Amendment to the Equity Incentive Plan as of February 15, 1995, filed as Exhibit 10.55 to Form 10-Q for the quarter ended March 31, 1995, and is hereby incorporated by reference.

10.56 Amendment No. 1 dated May 31, 1995 to the Brown & Sharpe Savings and Retirement Plan for Management Employees. (1994 Restatement)

10.57 Amendment No. 2 dated May 31, 1995 to the Brown & Sharpe Savings and Retirement Plan for Management Employees. (1994 Restatement)

10.58 Amendment No. 1 dated May 31, 1995 to the Brown & Sharpe Savings and Retirement Plan. (1994 Restatement)

10.59 (Intentionally omitted)

10.60 Employment Agreement with Frank T. Curtin dated May 17, 1995.

Exhibits 10.56 through 10.60 were filed as Exhibits 10.56 through 10.60, respectively, to the Form 10-Q for the quarter ended June 30, 1995, and are hereby incorporated by reference.

- 10.61 Indemnity Agreement with Frank T. Curtin dated May 3, 1995.
- 10.62 Indemnity Agreement with Alfred J. Corso dated May 3, 1995.
- 10.63 Indemnity Agreement with Enrico Albareto dated October 28, 1994.
- 10.64 Indemnity Agreement with Alberto de Benedictis dated October 28, 1994.
- 10.65 Indemnity Agreement with Vincenzo Cannatelli dated October 28, 1994.
- Exhibits 10.61 through 10.65 were filed as Exhibits 10.61 through 10.65, respectively, to the Form 10-Q for the quarter ended September 30, 1995, and are hereby incorporated by reference.
- 10.66 Indemnity Agreement with Robert D Batting dated October 5, 1995.
- 10.67 Letter Agreement with Finmeccanica dated December 18, 1995 concerning Purchase Price Adjustment.
- 10.68 The Brown & Sharpe Key Employee Long-Term Deferred Cash Incentive Plans dated February 23, 1996 effective January 1, 1995.
- 10.69 Amendment dated July 28, 1995 to Employment/Severance Agreement dated March 14, 1988 between Brown & Sharpe Manufacturing Company and Richard F. Paolino.
- 10.70 (Intentionally omitted)
- 10.71 Employment Agreement with Robert D. Batting dated September 26, 1995.
- 10.72 Employment Agreement with C. John Cooke dated November 26, 1991.
- 10.73 Employment Agreement with Antonio Aparicio dated October 17, 1995.
- 10.74 (Intentionally omitted)
- 10.75 Employment Agreement with James W. Cooper dated July 17, 1996, as amended July 24, 1996 and August 1, 1996.
- 10.76 Amendment to Employment Agreement with Frank T. Curtin dated as of January 1, 1996.
- Exhibits 10.69 through 10.76 were filed as Exhibits 10.69 through 10.76, respectively, to the Form S-1 dated October 9, 1996, and are hereby incorporated by reference.
- 10.77 (Intentionally omitted)
- 10.78 Indemnity Agreement with James W. Cooper dated August 19, 1996.
- 10.79 Indemnity Agreement with Harry A. Hammerly dated October 25, 1996.
- 10.80 Indemnity Agreement with John Robert Held dated October 25, 1996.
- 10.81 Indemnity Agreement with Roger E. Levien dated October 25, 1996.
- 10.82 Indemnity Agreement with Christopher J. Garcia dated January 1, 1998.
- 10.83 Indemnity Agreement with Marcus Burton dated January 1, 1998.

- 10.84 Employment Agreement dated May 29, 1997 with Edward D. DiLuigi.
- 10.85 Employment Agreement dated August 18, 1997 with Philip James.
- Exhibits 10.84 and 10.85 were filed as Exhibits 10.84 through 10.85, respectively, to the Form 10-Q for the quarter ended September 30, 1997, and are hereby incorporated by reference.
- +10.86 Indemnity Agreement with Edward D. DiLuigi dated June 16, 1997.
- +10.87 Indemnity Agreement with Philip James dated September 8, 1997.
- +10.88 Indemnity Agreement with Brian Gaunt dated February 13, 1998.
- +10.89 Supplemental Executive Retirement Plan dated February 13, 1998.
- 10.90 Rights Agreement dated as of February 13, 1998 ("Rights Agreement") between the Company and BankBoston N.A., as Rights Agent, filed as Exhibit 1 to Report on Form 8-K dated March 5, 1998, which is hereby incorporated by reference.
- 10.91 Form of Certificate of Designation with respect to the Series B Participating Preferred Stock, par value \$1.00 per share, of the Company (filed as Exhibit A to the Rights Agreement, filed as Exhibit A to Report on Form 8-K dated March 5, 1998), which is hereby incorporated by reference.
- +*10.92 Severance agreement between Brown & Sharpe Manufacturing Company and Frank T. Curtin dated February 17, 1998.
- +*10.93 Severance agreement between Brown & Sharpe Manufacturing Company and Charles A. Junkunc dated February 17, 1998.
- +*10.94 Severance agreement between Brown & Sharpe Manufacturing Company and Philip James dated February 17, 1998.
- +*10.95 Severance agreement between Brown & Sharpe Manufacturing Company and Antonio Aparicio dated February 17, 1998.
- +*10.96 Severance agreement between Brown & Sharpe Manufacturing Company and Marcus Burton dated February 17, 1998.
- +*10.97 Severance agreement between Brown & Sharpe Manufacturing Company and Edward D. DiLuigi dated February 17, 1998.
- +*10.98 Severance agreement between Brown & Sharpe Manufacturing Company and Christopher J. Garcia dated February 17, 1998.
- +*10.99 Severance agreement between Brown & Sharpe Manufacturing Company and Brian Gaunt dated February 17, 1998.
- +*10.100 Severance agreement between Brown & Sharpe Manufacturing Company and Alfred J. Corso dated February 17, 1998.
- +*10.101 Severance agreement between Brown & Sharpe Manufacturing Company and James W. Hayes, III dated February 17, 1998.
- +*10.102 Severance agreement between Brown & Sharpe Manufacturing Company and Les W. Sgnilek dated February 17, 1998.
- +*10.103 Severance agreement between Brown & Sharpe Manufacturing Company

and Bryn Edwards dated February 17, 1998.

- +*10.104 Severence agreement between Brown & Sharpe Manufacturing Company and Kenneth Kirkendall dated February 17, 1998.
- +*10.105 Severence agreement between Brown & Sharpe Manufacturing Company and Fred Schutter dated February 17, 1998.
- +*10.106 Key Employee's Long-Term Deferred Cash Incentive Plan as amended through February 23, 1998.
- +*10.107 Supplemental Executive Retirement Plan as amended February 13, 1998.
- +*10.108 Senior Executive Supplemental Umbrella Pension Plan dated February 13, 1998.

Exhibits 10.92 through 10.108 were filed as Exhibits 10.92 through 10.108, respectively, to the Form 10-Q for the quarter ended June 30, 1998, and are hereby incorporated by reference.

- *13. 1998 Annual Report to Shareowners, filed for information of the Commission except for those portion thereof which are expressly incorporated by reference in this report.
- *18. Letter of Ernst & Young LLP, independent accountants, regarding preferability of change in accounting principles to conform worldwide use of completed contract method basis accounting for its larger, more fully configured machines.
- *22. Subsidiaries of the Registrant.
- *23. Consent of Independent Auditors - Ernst & Young LLP.
- 27 Financial Data Schedule for Fiscal Year ended December 31, 1998.

* To obtain a copy of the Exhibits filed with this Annual Report on Form 10-K, refer to page 30.

+ This identifies management contracts or compensatory plans.

Shareholders may obtain the following Exhibits filed with the 1998 Annual Report on Form 10-K upon request. Charges will be made according to the following schedule and payment should be made by either check or money order and should accompany the request. The charge for all 1998 Exhibits is \$57.05. Charges for previously filed Exhibits incorporated by reference will be provided upon request. Requests should be directed to: Secretary, Brown & Sharpe Manufacturing Company, 200 Frenchtown Road, North Kingstown, Rhode Island 02852.

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Exhibit		Pages	Postage	Total
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10.92	Severence agreement between Brown & Sharpe Manufacturing Company and Frank T. Curtin dated February 17, 1998.	13	\$.55	\$3.80

10.93	Severence agreement between Brown & Sharpe Manufacturing Company and Charles A. Junkunc dated February 17, 1998.	13	\$.55	\$3.80
10.94	Severence agreement between Brown & Sharpe Manufacturing Company and Philip James dated February 17, 1998.	13	\$.55	\$3.80
10.95	Severence agreement between Brown & Sharpe Manufacturing Company and Antonio Aparicio dated February 17, 1998.	13	\$.55	\$3.80
10.96	Severence agreement between Brown & Sharpe Manufacturing Company and Marcus Burton dated February 17, 1998.	13	\$.55	\$3.80
10.97	Severence agreement between Brown & Sharpe Manufacturing Company and Edward D. DiLuigi dated February 17, 1998.	13	\$.55	\$3.80
10.98	Severence agreement between Brown & Sharpe Manufacturing Company and Christopher J. Garcia dated February 17, 1998.	13	\$.55	\$3.80
10.99	Severence agreement between Brown & Sharpe Manufacturing Company and Brian Gaunt dated February 17, 1998.	13	\$.55	\$3.80
10.100	Severence agreement between Brown & Sharpe Manufacturing Company and Alfred J. Corso dated February 17, 1998.	13	\$.55	\$3.80
10.101	Severence agreement between Brown & Sharpe Manufacturing Company and James W. Hayes, III dated February 17, 1998.	13	\$.55	\$3.80
10.102	Severence agreement between Brown & Sharpe Manufacturing Company and Les W. Sgnilek dated February 17, 1998.	13	\$.55	\$3.80
10.103	Severence agreement between Brown & Sharpe Manufacturing Company and Bryn Edwards dated February 17, 1998.	13	\$.55	\$3.80

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<S>	<C>	<C>	<C>	<C>
10.104	Severence agreement between Brown & Sharpe Manufacturing Company and Kenneth Kirkendall dated February 17, 1998.	13	\$.55	\$3.80
10.105	Severence agreement between Brown & Sharpe Manufacturing Company and Fred Shutter dated February 17, 1998.	13	\$.55	\$3.80
10.106	Key Employee's Long-Term Deferred Cash Incentive Plan as amended through February 23, 1998.	10	\$.55	\$3.05

10.107	Supplemental Executive Retirement Plan as amended February 13, 1998.	8	\$.55	\$ 2.55
10.108	Senior Executive Supplemental Umbrella Pension Plan dated February 13, 1998.	11	\$.55	\$ 3.30
13.	1997 Annual Report to Shareowners			
18.	Ernst & Young LLP, letter regarding preferability of change in accounting principles.	1	\$.33	\$.58
22.	Subsidiaries of the Registrant.	2	\$.33	\$.83
23.	Consent of Independent Auditors - Ernst & Young LLP.	1	\$.33	\$.58

</TABLE>

February 5, 1999

Mr. Alfred J. Corso
Corporate Controller
Brown & Sharpe Manufacturing Co.
200 Frenchtown Road
North Kingstown, RI 02852

Dear Mr. Corso:

Note 2 of Notes to consolidated financial statements of Brown & Sharpe Manufacturing Company included in its Annual Report to Shareholders (Form 10-K) for the year ended December 31, 1998, describes a change in the method of accounting for long-term contracts from the percentage of completion method to the completed contract method. You have advised us that you believe that the change is to a preferable method in your circumstances because it provides a better matching of cost and revenue and it is more practical to recognize revenues upon shipment as the Company's financial position and results of operations would not vary materially from those resulting from use of the percentage of completion method due to the short-term nature of the production cycle.

We conclude that the change in the method of accounting for long-term contracts is to an acceptable alternative method which, based on your business judgment to make this change for the reasons cited above, is preferable in your circumstances.

Very truly yours,

Ernst & Young LLP

EXHIBIT 22

BROWN & SHARPE MANUFACTURING COMPANY

SUBSIDIARIES OF THE REGISTRANT

Subsidiaries of the Registrant as of December 31, 1998 are as follows:

<TABLE>

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Name of Subsidiary	Jurisdiction of Incorporation	Percentage of Voting Power Owned by the Registrant
-----	-----	-----
<S>	<C>	<C>
Borel & Dunner, Inc.	Michigan	100%
Automation Software Inc.	Delaware	100%
Roch - Brown & Sharpe S.A.	France	100%
Mauser Prazisions Messmittel GmbH	Germany	100%
DEA - Brown & Sharpe S.p.A. ** and its subsidiaries:	Italy	100%
DEA - Brown & Sharpe S.A.	Spain	100%
DEA - Brown & Sharpe S.A.	France	100%
DEA - Brown & Sharpe KK	Japan	100%
Brown & Sharpe International Capital Corporation and its subsidiaries:	Delaware	100%
Leitz - Brown & Sharpe Messtechnik G.m.b.H.	Germany	100%
Tesa - Brown & Sharpe S.A. and its subsidiaries:	Switzerland	100%
P. Roch, S.a.R.L.	Switzerland	100%
Tesa - Brown & Sharpe S.A.	France	100%
Tesa - Brown & Sharpe KK	Japan	100%
Brown & Sharpe Group Ltd.* and its subsidiaries:	United Kingdom	100%
White Lodge Financial Limited	United Kingdom	100%

Brown & Sharpe Ltd.	United Kingdom	100%
Mercer - Brown & Sharpe Ltd.	United Kingdom	100%

</TABLE>

* Owned 71.3% by Brown & Sharpe International Capital Corporation and 28.7% by Tesa, S.A.

** Owned 85.0% by Brown & Sharpe Manufacturing Company and 15.0% by Brown & Sharpe International Capital Corporation.

EXHIBIT 23

CONSENT OF INDEPENDENT AUDITORS

We consent to the incorporation by reference in this Annual Report (Form 10-K) of Brown & Sharpe Manufacturing Company of our report dated February 5, 1999, included in the 1998 Annual Report to Shareowners of Brown & Sharpe Manufacturing Company.

Our audits also included the financial statement schedule of Brown & Sharpe Manufacturing Company listed in Item 14(a). This schedule is the responsibility of the Company's management. Our responsibility is to express an opinion based on our audits. In our opinion, the financial statement schedule referred to above, when considered in relation to the basic financial statements taken as a whole, presents fairly in all material respects the information set forth therein.

We also consent to the incorporation by reference in Registration Statements (Form S-8 Nos. 2-33676, 2-56821, 2-60398, 2-77219, 2-77575, 2-83637, 2-97935, 33-17831, 33-23601, 33-23603, 33-30927, and 33-54496) pertaining to employee benefit plans, of Brown & Sharpe Manufacturing Company of our report dated February 5, 1999, with respect to the consolidated financial statements incorporated herein by reference, and our report included in the preceding paragraph with respect to the financial statement schedule included in this Annual Report (Form 10-K) for the year ended December 31, 1998.

ERNST & YOUNG LLP

Providence, Rhode Island
March 22, 1999

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