

REGISTRATION STATEMENT NO. 333-45996

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

AMENDMENT NO. 4
TO
FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

HARVARD BIOSCIENCE, INC.
(Exact Name of Registrant as Specified in its Charter)

DELAWARE
(State or Other Jurisdiction
of Incorporation or Organization)

3826
(Primary Standard Industrial
Classification Code Number)

04-3306140
(I.R.S. Employer
Identification No.)

84 OCTOBER HILL ROAD
HOLLISTON, MASSACHUSETTS 01746-1371
(508) 893-8066
(Address, including zip code, and telephone number, including area code, of
Registrant's principal executive office)

CHANE GRAZIANO
CHIEF EXECUTIVE OFFICER
HARVARD BIOSCIENCE, INC.
84 OCTOBER HILL ROAD
HOLLISTON, MASSACHUSETTS 01746-1371
(508) 893-8066
(Name, address, including zip code, and telephone number, including area code,
of agent for service)

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APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC: As soon as
practicable after this Registration Statement becomes effective.

If any of the securities being registered on this Form are to be offered on

a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. / / _____

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. / / _____

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. / / _____

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. / / _____

If delivery of the prospectus is expected to be made pursuant to Rule 434, please check the following box. / / _____

THE REGISTRANT HEREBY AMENDS THIS REGISTRATION STATEMENT ON SUCH DATE OR DATES AS MAY BE NECESSARY TO DELAY ITS EFFECTIVE DATE UNTIL THE REGISTRANT SHALL FILE A FURTHER AMENDMENT WHICH SPECIFICALLY STATES THAT THIS REGISTRATION STATEMENT SHALL THEREAFTER BECOME EFFECTIVE IN ACCORDANCE WITH SECTION 8(a) OF THE SECURITIES ACT OF 1933 OR UNTIL THE REGISTRATION STATEMENT SHALL BECOME EFFECTIVE ON SUCH DATE AS THE SEC, ACTING PURSUANT TO SECTION 8(a), MAY DETERMINE.

THE INFORMATION IN THIS PROSPECTUS IS NOT COMPLETE AND MAY BE CHANGED. WE MAY NOT SELL THESE SECURITIES UNTIL THE REGISTRATION STATEMENT FILED WITH THE SECURITIES AND EXCHANGE COMMISSION IS EFFECTIVE. THIS PROSPECTUS IS NOT AN OFFER TO SELL THESE SECURITIES, AND IT IS NOT SOLICITING OFFERS TO BUY THESE SECURITIES IN ANY STATE IN WHICH THE OFFER OR SALE IS NOT PERMITTED.

SUBJECT TO COMPLETION, DATED DECEMBER 1, 2000

PROSPECTUS

[THOMAS WEISEL PARTNERS LLC LOGO]

[HARVARD BIOSCIENCE LOGO]

6,422,450 SHARES
COMMON STOCK

We are selling 6,250,000 shares of our common stock and our president as a selling stockholder is offering an additional 172,450 shares. We will not receive any of the proceeds from the sale of shares by the selling stockholder. We have granted the underwriters a 30-day option to purchase up to an additional 937,500 shares to cover over-allotments, if any.

This is an initial public offering of our common stock. We currently expect the initial public offering price to be between \$11.00 and \$13.00 per share. We have applied for approval for quotation of our common stock on the Nasdaq National Market under the symbol "HBIO."

INVESTING IN OUR COMMON STOCK INVOLVES RISKS. SEE "RISK FACTORS" ON PAGE 6.

	PER SHARE	TOTAL
Public offering price	\$	\$
Underwriting discount	\$	\$
Proceeds, before expenses, to us	\$	\$
Proceeds, before expenses, to the selling stockholder	\$	\$

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

THOMAS WEISEL PARTNERS LLC

DAIN RAUSCHER WESSELS

ING BARINGS

The date of this prospectus is , 2000

EDGAR GRAPHICS DESCRIPTIONS

INSIDE FRONT COVER-GATEFOLD

Pages 2 and 3: Gatefold has title "Harvard Bioscience Products and the Bottlenecks in Post-Genomics Drug Discovery" at the top. Below these words is a process flow diagram illustrating the drug discovery process and the key bottlenecks within this process. The diagram begins on the upper left portion of the gatefold and flows horizontally to the upper right portion of the gatefold. Below and to the right of the diagram is an orange arrow indicating that orange portions of the diagram represent bottlenecks in the drug discovery process. The diagram is initially split into two parallel tracks which merge into a single track near the middle of the pages as the flow diagram moves to the right. The upper track of the diagram is titled "Compound Development" and includes a green arrow titled "Compound Libraries". Below the arrow are the words "Combinatorial Chemistry". The lower track of the diagram is titled "Target Discovery" and includes two arrows. The first arrow is green and is titled "Target Identification". Above this arrow is the word "Genomics". The next arrow to the right is orange and is titled "Target Validation". Above this arrow is the word "Proteomics". Following the "Compound Libraries" arrow on the upper track and the "Target Validation" arrow on the lower track, the two tracks of the diagram combine and include green and orange arrows to illustrate the remaining stages and key bottlenecks in the drug discovery process. The individual arrows from left to right include an orange arrow titled "Assay Development" followed by a green arrow titled "High Throughput Screening". These two arrows in the diagram appear under the title "Primary Screening". To the right of the "High Throughput Screening" arrow is an orange arrow titled "Lead Optimization" followed by an orange arrow titled "ADMET Screening". These two arrows in the diagram appear under the title "Secondary Screening". To the right of the "ADMET Screening" arrow is a green arrow titled "Clinical Trials", the final arrow in the process flow diagram.

The lower portion of the gatefold consists of product descriptions. The lower left portion begins with the words "Protein Purification" with the following product photos and short descriptions appearing below "Protein Purification". A drawing of a pipette tip is followed by the words "PrepTip-TM Coated pipette tips for the purification of minute protein samples". Below this is a photo of spin columns followed by the words "UltraMicro Spin Columns Small plastic tubes containing purification media that are spun in a centrifuge". Below this is a photo of disposable dialyzers followed by the words "Disposable Dialyzers small plastic chambers capped with a membrane that retains proteins but passes contaminants". Below this are the words "Protein Analysis" with the following product photos and short descriptions appearing below "Protein Analysis". A photo of a DNA/RNA/protein calculator followed by the words "GeneQuant Pro-TM DNA/RNA/Protein calculators". Below this are photos of a purple spectrophotometer, a yellow spectrophotometer and a green spectrophotometer followed by the words "Ultraspec-TM Range of spectrophotometers for molecular biology". Below this is a photo of an amino acid analysis system followed by the words "Biochrom-TM 20 Amino Acid Analysis System".

The lower right portion begins with the word "Absorption". Below this is a photo of an absorption measurement chamber followed by the words "NaviCyte-TM Absorption measurement chambers". Below this is the word "Distribution" with a photo of an equilibrium dialysis plate and followed by the words "96 Well Equilibrium Dialysis Plate Equilibrium dialysis plate for the measurement of the interaction of drugs and proteins". Below this are the words "Metabolism and Elimination" with a photo of an isolated organ system and followed by the words "Isolated Organ Systems Liver and kidney systems used for studying metabolism and elimination". Below this is the word "Toxicology" with a photo of a desktop

computer and the ScanTox product followed by the words "ScanTox-TM Screening system for testing toxicology without the use of laboratory animals". Below this is a photo of an infusion pump followed by the words "PHD 2000 Infusion pump for toxicology testing".

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PROSPECTUS SUMMARY

THIS SUMMARY HIGHLIGHTS INFORMATION CONTAINED ELSEWHERE IN THIS PROSPECTUS. YOU SHOULD READ THE ENTIRE PROSPECTUS CAREFULLY, INCLUDING THE "RISK FACTORS" SECTION.

OUR COMPANY

We are a global developer, manufacturer and marketer of innovative, enabling tools used in drug discovery research at pharmaceutical and biotechnology companies, universities and government laboratories. We sell approximately 10,000 products to more than 5,000 customers in over 60 countries. Our proprietary products accounted for approximately 82% of our revenues for the nine months ended September 30, 2000. We have designed our tools to accelerate the speed and to reduce the cost at which our customers can discover and commercialize new drugs. By providing research tools, we participate in the revolutions in genomics, the study of genes, and proteomics, the study of proteins, without bearing the risks inherent in attempting to discover new drugs.

Since our reorganization in March 1996, we have focused on developing tools to alleviate two critical bottlenecks in the drug discovery process:

- PROTEIN PURIFICATION, which is the removal of contaminants such as salts, buffers, detergents and cellular debris from a protein sample, and
- ADMET SCREENING, which is the testing of the absorption, distribution, metabolism, elimination and toxicology properties of drug candidates.

Our proteomics products are tools that allow researchers to purify and analyze proteins contained in a sample. Our ADMET screening products are tools that enable researchers to test drug candidates to determine their absorption, distribution, metabolism, elimination and toxicology properties prior to conducting costly clinical trials.

We market our products primarily through our 1,000 page catalog to approximately 100,000 researchers worldwide. Our catalog is also available on our website. We distribute most of our products directly through our operations in the United States, the United Kingdom, Germany, France and Canada. In addition to our catalog distribution channel, we have a long-standing distribution and marketing relationship with Amersham Pharmacia Biotech, or APBiotech, one of the largest companies in the life sciences industry.

OUR OPPORTUNITY

Drug discovery is a time-consuming and costly process. In the pre-genomics era, the compound development, primary screening and clinical trials stages were bottlenecks in this process. The recent successes of genomics, combinatorial chemistry (the automated production of large numbers of chemical compounds) and high throughput screening have alleviated the bottlenecks at the compound development and primary screening stages. However, these bottlenecks have been replaced by bottlenecks at later stages in the drug discovery process. Our opportunity lies in alleviating these bottlenecks with products that increase the productivity and reduce the cost of drug discovery.

OUR PRODUCTS

We have a broad array of established products for proteomics and ADMET screening. We believe our products offer drug discovery researchers the most comprehensive protein purification and

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ADMET screening solutions. In the past two years, we have expanded our product base by introducing the following proprietary tools:

PROTEIN PURIFICATION:

- specially coated pipette tips, which are small plastic tubes coated on the inside with a material that selectively extracts proteins but not contaminants,
- micro spin columns, which are small plastic tubes partially filled with a material that selectively extracts proteins but not contaminants, and
- micro dialyzers, which are small plastic tubes each containing a dialysis membrane which allows small molecules to pass through but retains large molecules such as proteins.

ADMET SCREENING:

- NaviCyte diffusion chambers, which measure drug absorption by simulating membranes in the human body,
- small plastic plates with 96 wells, which each contain a dialysis membrane that allows small molecules to pass through but retains large molecules such as proteins, and
- ScanTox instruments, which enable toxicology testing without the use of animals.

In protein purification, these new products increase productivity and reduce cost by avoiding the cumbersome sample handling steps required by current technology and by being compatible with automated liquid-handling robots. Many

of the products are available in 96 well plate formats. In ADMET screening, these new products lower cost and increase automation by using molecular, cellular, tissue and organ based assays to reduce the use of live animals.

In addition to our proprietary products, we provide a broad selection of non-proprietary products that are frequently used in conjunction with our proprietary products. We seek to be a single source for our customers' product needs in protein purification and ADMET screening.

OUR STRATEGY

Our goal is to become the leading provider of innovative, enabling technologies and products for proteomics and ADMET research in the drug discovery process. Key elements of our strategy are to:

- establish our new proteomics and ADMET screening products as industry standards,
- launch a broad range of innovative new tools for drug discovery,
- leverage our existing distribution and marketing channels,
- provide a single source of tools for our customers' research needs in proteomics and ADMET screening, and
- acquire complementary technologies.

We organized our company as a Massachusetts corporation on March 7, 1996 in connection with our purchase of a portion of the assets of Harvard Apparatus, a business which, with its predecessors, had been in existence since 1901. The initial Harvard Apparatus catalog was published in 1901 by Dr. William T. Porter, a professor at Harvard Medical School and the founder of the Harvard Apparatus business. We will be reincorporated by merger in Delaware prior to the closing of this offering. In connection with the reincorporation, we will change our corporate name from Harvard Apparatus, Inc. to Harvard Bioscience, Inc. We have no affiliation with Harvard University. Our principal executive offices are located at 84 October Hill Road, Holliston, Massachusetts 01746. Our telephone number at that location is (508) 893-8066 and our Internet address is www.harvardbioscience.com. The information contained on our website is not part of this prospectus.

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We have six wholly-owned subsidiaries, Biochrom Ltd. (United Kingdom), Harvard Apparatus Limited (United Kingdom), Hugo Sachs Elektronik-Harvard Apparatus GmbH (Germany), Harvard Apparatus S.A.R.L. (France), Harvard Apparatus FSC, Inc. (United States) and Ealing Scientific Ltd. (Canada).

The names Harvard Bioscience and Harvard Apparatus and our logo are names and trademarks that we believe belong to us. We have the rights to numerous trademarks and trade names including AmiKa, Biochrom, CPK, GeneQuant, GeneQuantPro, NaviCyte, NovaSpec, PrepTip, PureTip, ScanTox, Stronghold and UltroSpec. This prospectus also contains the trademarks and trade names of other entities that are the property of their respective owners.

THE OFFERING

Common stock offered by us.....	6,250,000 shares
Common stock offered by our president as a selling stockholder.....	172,450 shares
Common stock outstanding after the offering.....	24,782,422 shares
Use of proceeds.....	For payment of existing debt, redemption of our series A redeemable preferred stock, potential acquisitions, working capital and general corporate purposes.
Proposed Nasdaq National Market symbol.....	HBIO

The above information is based on 18,532,422 shares outstanding as of October 15, 2000 and excludes:

- 599,096 shares issuable upon exercise of options then outstanding at a weighted average exercise price of \$1.00 per share.

Unless otherwise noted, this prospectus assumes:

- no exercise of the underwriters' over-allotment,
- an assumed initial offering price of \$12.00 per share,
- a 19.71-for-1 stock split of our common stock effected in connection with this offering,
- our reincorporation by merger in Delaware and our related name change prior to the closing of this offering,
- the redemption of our outstanding series A redeemable preferred stock upon the closing of this offering,
- the automatic conversion of our outstanding series B convertible preferred stock into 955,935 shares of our common stock upon the closing of this offering,
- the issuance of 8,509,905 shares of our common stock upon exercise of all outstanding warrants at a weighted average exercise price of \$0.0005 per share prior to the closing of this offering, and
- the amendment and restatement of our certificate of incorporation in connection with this offering.

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SUMMARY FINANCIAL DATA

	PREDECESSOR COMPANY FISCAL YEAR ENDED DECEMBER 31, 1995	PREDECESSOR COMPANY FOR THE PERIOD FROM JANUARY 1, 1996 TO MARCH 14, 1996	FOR THE PERIOD FROM INCEPTION MARCH 15, 1996 TO DECEMBER 31, 1996
	(UNAUDITED)	(UNAUDITED)	
	(IN THOUSANDS,	EXCEPT SHARE AND	PER SHARE DATA)
STATEMENT OF OPERATIONS DATA:			
Revenues.....	\$ 10,032	\$ 1,989	\$ 8,198
Cost of goods sold.....	5,286	1,059	4,080
Stock compensation expense.....	--	--	--
Gross profit.....	4,746	930	4,118
Other operating expenses.....	4,252	810	3,141
Stock compensation expense.....	--	--	--
Operating income (loss)....	494	120	977
Other (expense) income:			
Common stock warrant interest expense.....	--	--	--
Interest expense, net.....	(472)	(90)	(177)
Amortization of deferred financing costs.....	--	--	--
Other.....	(62)	(139)	98
Other expense, net.....	(534)	(229)	(79)
(Loss) income before income taxes.....	(40)	(109)	898
Income taxes.....	85	--	362
Net (loss) income.....	\$ (125)	\$ (109)	\$ 536
Preferred stock dividends.....	--	--	(97)

Net (loss) income available to common stockholders.....	\$ (125)	\$ (109)	\$ 439
(Loss) income per share:			
Basic.....	\$ (0.01)	\$ (0.01)	\$ 0.04
Diluted.....	\$ (0.01)	\$ (0.01)	\$ 0.02
Weighted average common shares:			
Basic.....	10,259,410	10,259,410	10,259,410
Diluted.....	10,259,410	10,259,410	20,241,145
Pro forma (loss) income per share:			
Basic.....			
Diluted.....			
Pro forma weighted average common shares:			
Basic.....			
Diluted.....			

	FISCAL YEAR ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30,	
	1997	1998	1999	1999	2000
	(UNAUDITED)				
	(IN THOUSANDS, EXCEPT SHARE AND PER SHARE DATA)				
STATEMENT OF OPERATIONS DATA:					
Revenues.....	\$ 11,464	\$ 12,154	\$ 26,178	\$ 18,470	\$ 22,069
Cost of goods sold.....	5,128	5,351	13,547	9,359	11,462
Stock compensation expense.....	--	--	--	--	151
Gross profit.....	6,336	6,803	12,631	9,111	10,456
Other operating expenses.....	4,217	4,391	8,151	5,862	7,723
Stock compensation expense.....	--	--	3,284	937	13,181
Operating income (loss)....	2,119	2,412	1,196	2,312	(10,448)
Other (expense) income:					
Common stock warrant interest expense.....	(117)	(1,379)	(29,694)	(7,403)	(70,920)
Interest expense, net.....	(223)	(210)	(657)	(468)	(655)
Amortization of deferred financing costs.....	--	--	(63)	(44)	(56)
Other.....	10	31	(65)	46	(428)
Other expense, net.....	(330)	(1,558)	(30,479)	(7,869)	(72,059)
(Loss) income before income taxes.....	1,789	854	(29,283)	(5,557)	(82,507)
Income taxes.....	682	783	137	649	1,354
Net (loss) income.....	\$ 1,107	\$ 71	\$ (29,420)	\$ (6,206)	\$ (83,861)
Preferred stock dividends.....	(122)	(122)	(157)	(115)	(123)
Net (loss) income available to common stockholders.....	\$ 985	\$ (51)	\$ (29,577)	\$ (6,321)	\$ (83,984)
(Loss) income per share:					
Basic.....	\$ 0.13	\$ (0.01)	\$ (5.28)	\$ (1.13)	\$ (13.11)
Diluted.....	\$ 0.06	\$ (0.01)	\$ (5.28)	\$ (1.13)	\$ (13.11)
Weighted average common shares:					
Basic.....	7,406,486	5,598,626	5,598,626	5,598,626	6,407,682
Diluted.....	17,500,194	5,598,626	5,598,626	5,598,626	6,407,682
Pro forma (loss) income per share:					
Basic.....			\$ 0.01		\$ (0.82)
Diluted.....			\$ 0.01		\$ (0.82)
Pro forma weighted average common shares:					

Basic.....	14,902,100	15,873,527
	=====	=====
Diluted.....	17,381,677	15,873,527
	=====	=====

Pro forma basic and diluted net (loss) income per share have been calculated assuming the conversion of all outstanding shares of convertible preferred stock into common stock and the exercise of all outstanding warrants for common stock as if they had been converted or exercised on the dates of issuance. Accordingly, common stock warrant interest expense and dividends associated with convertible preferred shares are excluded from the pro forma per share amounts.

The financial data presented above for the year ended December 31, 1995 and for the period from January 1, 1996 to March 14, 1996 represents the financial data of our predecessor company without any adjustments relating to our purchase of a portion of its assets.

AS OF SEPTEMBER 30, 2000

	ACTUAL	PRO FORMA	PRO FORMA AS ADJUSTED
	-----	-----	-----
BALANCE SHEET DATA:			
Cash and cash equivalents.....	\$ 2,149	\$ 2,154	\$68,904
Working capital.....	1,025	1,030	67,780
Total assets.....	23,236	23,241	89,991
Long-term obligations, net of current portion.....	5,730	5,730	5,730
Preferred stock.....	2,500	1,500	--
Common stock warrants.....	102,115	--	--
Stockholders' equity (deficit).....	(97,018)	6,102	74,352

The preceding table presents a summary of our balance sheet data as of September 30, 2000:

- on an actual basis assuming the filing of an amended and restated certificate of incorporation to increase the number of authorized shares of common stock,
- on a pro forma basis to give effect to the conversion of all outstanding shares of convertible preferred stock into an aggregate of 955,935 shares of common stock, the exercise of all outstanding warrants for an aggregate of 8,509,905 shares of common stock upon the closing of this offering and the filing of our amended and restated certificate of incorporation prior to the effective date of this offering, and
- on a pro forma as adjusted basis to reflect the sale of 6,250,000 shares of common stock by us in this offering at an assumed initial offering price of \$12.00 per share, after deducting estimated underwriting discounts, commissions and offering expense and the redemption of all outstanding shares of redeemable preferred stock upon the closing of this offering.

RISK FACTORS

AN INVESTMENT IN OUR COMMON STOCK INVOLVES SIGNIFICANT RISKS. YOU SHOULD CAREFULLY CONSIDER THE FOLLOWING RISKS BEFORE YOU DECIDE TO BUY OUR COMMON STOCK.

IF WE ARE UNABLE TO ACHIEVE AND SUSTAIN MARKET ACCEPTANCE OF OUR NEW PROTEOMICS AND ADMET SCREENING PRODUCTS ACROSS THEIR BROAD INTENDED RANGE OF APPLICATIONS, WE WILL NOT GENERATE EXPECTED REVENUE GROWTH.

Our business strategy depends on our successfully developing and commercializing our new proteomics and ADMET screening technologies to meet our customers' expanding needs and demands. For example, our recent acquisition of AmiKa Corporation involved the purchase of the technology that we are using to

develop our 96 well plate for serum protein binding analysis. Market acceptance of this and other new products will depend on many factors, including the extent of our marketing efforts and our ability to demonstrate to existing and potential customers that our technologies are superior to other technologies and products that are available now or may become available in the future. If our new products do not gain market acceptance, it could materially adversely affect our business and future growth prospects.

OUR PRODUCTS COMPETE IN MARKETS THAT ARE SUBJECT TO RAPID TECHNOLOGICAL CHANGE, AND THEREFORE ONE OR MORE OF OUR PRODUCTS COULD BE MADE OBSOLETE BY NEW TECHNOLOGIES.

Because the market for drug discovery tools is characterized by rapid technological change and frequent new product introductions, our product lines may be made obsolete unless we are able to continually improve our existing products and develop new products. To meet the evolving needs of our customers, we must continually enhance our current and planned products and develop and introduce new products. However, we may experience difficulties which may delay or prevent the successful development, introduction and marketing of new products or product enhancements. In addition, our product lines are based on complex technologies which are subject to rapid change as new technologies are developed and introduced in the marketplace. We may have difficulty in keeping abreast of the rapid changes affecting each of the different markets we serve or intend to serve. Our failure to develop and introduce products in a timely manner in response to changing technology, market demands or the requirements of our customers could cause our product sales to decline, and we could experience significant losses.

We offer and plan to offer a broad product line and have incurred and expect to continue to incur substantial expenses for development of new products and enhanced versions of our existing products. The speed of technological change in our market may prevent us from being able to successfully market some or all of our products for the length of time required to recover their often significant development costs. Failure to recover the development costs of one or more products or product lines could decrease our profitability or cause us to experience significant losses.

WE HAVE LIMITED EXPERIENCE IN MANUFACTURING SOME OF OUR PRODUCTS WHICH COULD CAUSE PROBLEMS OR DELAYS RESULTING IN LOST REVENUE.

We have only recently begun to manufacture and therefore currently have limited manufacturing capacity for some of our products, such as our PrepTip protein purification pipette tips. If we fail to manufacture and deliver products in a timely manner, our relationships with our customers could be seriously harmed, and our revenue could decline. To achieve the production levels necessary for successful commercialization, we will need to scale-up our manufacturing facilities and establish automated manufacturing methods and quality control procedures. We cannot assure you that manufacturing or quality control problems will not arise as we attempt to scale-up our production or that we can scale-up manufacturing and quality control in a timely manner or at commercially

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reasonable costs. If we are unable to manufacture these products consistently on a timely basis because of these or other factors, we may not achieve the level of sales from these products that we otherwise anticipate.

IF AMERSHAM PHARMACIA BIOTECH TERMINATES ITS DISTRIBUTION AGREEMENT WITH US OR FAILS TO PERFORM ITS OBLIGATIONS UNDER OUR DISTRIBUTION AGREEMENT, IT COULD IMPAIR THE MARKETING AND DISTRIBUTION EFFORTS FOR SOME OF OUR PRODUCTS AND RESULT IN LOST REVENUES.

For the nine months ended September 30, 2000, approximately 39% of our revenues were generated through an agreement with Amersham Pharmacia Biotech, or APBiotech, under which APBiotech acts as our primary marketing and distribution channel for the products of our Biochrom subsidiary. Under the terms of this agreement, we are restricted from allowing another person or entity to distribute, market and sell the majority of the products of our Biochrom subsidiary. We are also restricted from making or promoting sales of the majority of the products of our Biochrom subsidiary to any person or entity other than APBiotech or its authorized subdistributors. We have little or no control over APBiotech's marketing and sales activities or the use of its resources. APBiotech may fail to purchase sufficient quantities of products from us or perform appropriate marketing and sales activities. The failure by

APBiotech to perform these activities could materially adversely affect our business and growth prospects during the term of this agreement. In addition, our inability to maintain our arrangement with APBiotech for product distribution, could materially impede the growth of our business and our ability to generate sufficient revenue. Our agreement with APBiotech may be terminated under some circumstances, including in the event of a breach of a material term by us. This agreement has a perpetual term; however, it may be terminated by either party upon 18 months' prior written notice. While we believe our relationship with APBiotech is good, we cannot guarantee that the contract will be renewed or that APBiotech will aggressively market our products in the future.

WE MAY BE ADVERSELY AFFECTED BY THREATENED LITIGATION INVOLVING HARVARD UNIVERSITY.

We received correspondence from counsel to Harvard University on November 7, 2000 alleging trademark infringement, false designation of origin, unfair competition and cybersquatting and threatening legal action against us if we do not take certain steps, including ceasing our use of the term "Harvard Bioscience" and other terms containing the term "Harvard." We do not currently intend to take such steps, and we believe it is likely that Harvard University will pursue this matter against us. This legal action could include, among other things, the filing of a complaint against us seeking injunctive relief and treble damages with respect to these claims. We may suffer adverse consequences as a result of this matter which we cannot now predict. If claims for injunctive relief or other damages are asserted and are decided against us, we could suffer monetary damages, lose our ability to use the names "Harvard Bioscience" and "Harvard Apparatus," lose the reputation and goodwill associated with these names and ultimately experience decreased revenues and earnings in subsequent periods. In addition, any lawsuit or claim for injunctive relief may result in significant litigation expenses.

OUR COMPETITORS AND POTENTIAL COMPETITORS MAY DEVELOP PRODUCTS AND TECHNOLOGIES THAT ARE MORE EFFECTIVE OR COMMERCIALY ATTRACTIVE THAN OUR PRODUCTS.

We expect to encounter increased competition from both established and development-stage companies that continually enter our market. We anticipate that these competitors will include:

- companies developing and marketing life sciences research tools,
- health care companies that manufacture laboratory-based tests and analyzers,
- diagnostic and pharmaceutical companies, and
- companies developing drug discovery technologies.

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Currently, our principal competition comes from established companies that provide products which perform many of the same functions for which we market our products. Our competitors may develop or market products that are more effective or commercially attractive than our current or future products. Many of our competitors have substantially greater financial, operational, marketing and technical resources than we do. Moreover, these competitors may offer broader product lines and tactical discounts, and may have greater name recognition. In addition, we may face competition from new entrants into our field. We may not have the financial resources, technical expertise or marketing, distribution or support capabilities to compete successfully in the future.

IF WE ARE UNABLE TO EFFECTIVELY PROTECT OUR INTELLECTUAL PROPERTY, THIRD PARTIES MAY USE OUR TECHNOLOGY, WHICH WOULD IMPAIR OUR ABILITY TO COMPETE IN OUR MARKETS.

Our continued success will depend in significant part on our ability to obtain and maintain meaningful patent protection for our products throughout the world. Patent law relating to the scope of claims in the technology fields in which we operate is still evolving. The degree of future protection for our proprietary rights is uncertain. We own ten U.S. patents and have four patent applications pending in the U.S. We also own numerous U.S. registered trademarks and trade names and have applications for the registration of trademarks and trade names pending. We rely on patents to protect a significant part of our intellectual property and to enhance our competitive position. However, our

presently pending or future patent applications may not issue as patents, and any patent previously issued to us may be challenged, invalidated, held unenforceable or circumvented. Furthermore, the claims in patents which have been issued or which may be issued to us in the future may not be sufficiently broad to prevent third parties from producing competing products similar to our products. In addition, the laws of various foreign countries in which we compete may not protect our intellectual property to the same extent as do the laws of the United States. If we fail to obtain adequate patent protection for our proprietary technology, our ability to be commercially competitive will be materially impaired.

In addition to patent protection, we also rely on protection of trade secrets, know-how and confidential and proprietary information. To maintain the confidentiality of trade secrets and proprietary information, we generally seek to enter into confidentiality agreements with our employees, consultants and strategic partners upon the commencement of a relationship with us. However, we may not obtain these agreements in all circumstances. In the event of unauthorized use or disclosure of this information, these agreements, even if obtained, may not provide meaningful protection for our trade secrets or other confidential information. In addition, adequate remedies may not exist in the event of unauthorized use or disclosure of this information. The loss or exposure of our trade secrets and other proprietary information would impair our competitive advantages and could have a material adverse effect on our operating results, financial condition and future growth prospects.

WE MAY BE INVOLVED IN LAWSUITS TO PROTECT OR ENFORCE OUR PATENTS WHICH WOULD BE EXPENSIVE AND TIME-CONSUMING.

In order to protect or enforce our patent rights, we may initiate patent litigation against third parties. We may also become subject to interference proceedings conducted in the patent and trademark offices of various countries to determine the priority of inventions. Several of our products are based on patents which are closely surrounded by patents held by competitors or potential competitors. As a result, we believe there is a greater likelihood of a patent dispute than would be expected if our patents were not closely surrounded by other patents. The defense and prosecution, if necessary, of intellectual property suits, interference proceedings and related legal and administrative proceedings would be costly and divert our technical and management personnel from their normal responsibilities. We may not prevail in any of these suits. An adverse determination of any litigation or defense proceedings could put our patents at risk of being invalidated or interpreted narrowly and could put our patent applications at risk of not issuing.

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Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. For example, during the course of this kind of litigation, there could be public announcements of the results of hearings, motions or other interim proceedings or developments in the litigation. Securities analysts or investors may perceive these announcements to be negative, which could cause the market price of our stock to decline.

OUR SUCCESS WILL DEPEND PARTLY ON OUR ABILITY TO OPERATE WITHOUT INFRINGING ON OR MISAPPROPRIATING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS.

We may be sued for infringing on the intellectual property rights of others, including the patent rights, trademarks and trade names of third parties. Intellectual property litigation is costly and the outcome is uncertain. If we do not prevail in any intellectual property litigation, in addition to any damages we might have to pay, we could be required to stop the infringing activity, or obtain a license to or design around the intellectual property in question. If we are unable to obtain a required license on acceptable terms, or are unable to design around any third party patent, we may be unable to sell some of our products and services, which could result in reduced revenue.

AmiKa Corporation, whose assets we purchased in July 2000, has received and responded to correspondence from counsel to a third party competitor regarding the possible infringement by it of a patent and other pending patent applications held by such third party. Because this competitor has not pursued this matter since AmiKa's reply on June 7, 2000 in which AmiKa stated that it did not believe it was infringing on this competitor's patents, we believe that this matter has been concluded. However, we cannot assure you that this third party competitor will not assert these or similar claims in the future. We do

not currently derive a significant portion of our revenue from products which depend on the intellectual property related to this alleged infringement.

CHANGES IN ACCOUNTING FOR GOODWILL AMORTIZATION MAY HAVE A MATERIAL ADVERSE AFFECT ON US.

We currently amortize goodwill purchased in our acquisitions on a straight line basis ranging from 5 to 15 years. At September 30, 2000, we had unamortized goodwill of \$9.1 million, or 39.4% of total assets. Any changes in accounting rules under generally accepted accounting principles that reduce the period over which we may amortize goodwill may have an adverse effect on our ability to consummate future acquisitions and our financial results. A shorter goodwill amortization period would increase annual amortization expense and reduce our net income over the amortization period. In addition, we continually evaluate whether any portion of the remaining balance of goodwill may not be recoverable. If it is determined in the future that a portion of our goodwill is impaired, we may be required to write off that portion of our goodwill which would have an adverse effect on our net income for the period in which the write off occurs.

WE ARE DEPENDENT UPON OUR LICENSED TECHNOLOGIES AND MAY NEED TO OBTAIN ADDITIONAL LICENSES IN THE FUTURE TO OFFER OUR PRODUCTS AND REMAIN COMPETITIVE.

We have licensed key components of our technologies from third parties. While we do not currently derive a material portion of our revenue from products that depend on these licensed technologies, we may in the future. If our license agreements were to terminate prematurely or if we breach the terms of any licenses or otherwise fail to maintain our rights to these technologies, we may lose the right to manufacture or sell our products that use these licensed technologies. In addition, we may need to obtain licenses to additional technologies in the future in order to keep our products competitive. If we fail to license or otherwise acquire necessary technologies, we may not be able to develop new products that we need to remain competitive.

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MANY OF OUR CURRENT AND POTENTIAL CUSTOMERS ARE FROM THE PHARMACEUTICAL AND BIOTECHNOLOGY INDUSTRIES AND ARE SUBJECT TO RISKS FACED BY THOSE INDUSTRIES.

We derive a substantial portion of our revenues from pharmaceutical and biotechnology companies. We expect that pharmaceutical and biotechnology companies will continue to be our major source of revenues for the foreseeable future. As a result, we are subject to risks and uncertainties that affect the pharmaceutical and biotechnology industries, such as pricing pressures as third-party payers continue challenging the pricing of medical products and services, government regulation, ongoing consolidation and uncertainty of technological change, and to reductions and delays in research and development expenditures by companies in these industries. In particular, several proposals are being contemplated by lawmakers in the United States to extend the federal Medicare program to include reimbursement for prescription drugs. Many of these proposals involve negotiating decreases in prescription drug prices or imposing price controls on prescription drugs. If appropriate reimbursement cannot be obtained, it could result in our customers purchasing fewer products from us as they reduce their research and development expenditures.

In addition, we are dependent, both directly and indirectly, upon general health care spending patterns, particularly in the research and development budgets of the pharmaceutical and biotechnology industries, as well as upon the financial condition of various governments and government agencies. Many of our customers, including universities, government research laboratories, private foundations and other institutions, obtain funding for the purchase of our products from grants by governments or government agencies. There exists the risk of a potential decrease in the level of governmental spending allocated to scientific and medical research which could substantially reduce or even eliminate these grants. If government funding necessary to purchase our products were to decrease, our business and results of operations could be materially adversely affected.

OUR BUSINESS IS SUBJECT TO ECONOMIC, POLITICAL AND OTHER RISKS ASSOCIATED WITH INTERNATIONAL REVENUES AND OPERATIONS.

Since we manufacture and sell our products worldwide, our business is subject to risks associated with doing business internationally. Our revenues from our non-U.S. operations represented approximately 69% of our total revenues for the nine months ended September 30, 2000. We anticipate that revenue from international operations will continue to represent a substantial portion of our

total revenues. In addition, a number of our manufacturing facilities and suppliers are located outside the United States. Accordingly, our future results could be harmed by a variety of factors, including:

- changes in foreign currency exchange rates, which resulted in a foreign currency loss of \$456,000 for the nine months ended September 30, 2000,
- changes in a specific country's or region's political or economic conditions, including Western Europe, in particular,
- potentially negative consequences from changes in tax laws affecting our ability to expatriate profits,
- difficulty in staffing and managing widespread operations, and
- unfavorable labor regulations applicable to our European operations, such as the unenforceability of non-competition agreements in the United Kingdom.

WE MAY LOSE MONEY WHEN WE EXCHANGE FOREIGN CURRENCY RECEIVED FROM INTERNATIONAL REVENUES INTO U.S. DOLLARS.

For the nine months ended September 30, 2000, approximately 69% of our business was conducted in currencies other than the U.S. dollar, which is our reporting currency. As a result, currency

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fluctuations among the U.S. dollar and the currencies in which we do business have caused and will continue to cause foreign currency transaction gains and losses. Currently, we attempt to manage foreign currency risk through the matching of assets and liabilities. In the future, we may undertake to manage foreign currency risk through additional hedging methods. We recognize foreign currency gains or losses arising from our operations in the period incurred. We cannot guarantee that we will be successful in managing foreign currency risk or in predicting the effects of exchange rate fluctuations upon our future operating results because of the number of currencies involved, the variability of currency exposure and the potential volatility of currency exchange rates.

IF WE ENGAGE IN ANY ACQUISITION, WE WILL INCUR A VARIETY OF COSTS, AND MAY NEVER REALIZE THE ANTICIPATED BENEFITS OF THE ACQUISITION.

Our business strategy includes the future acquisition of businesses, technologies, services or products that we believe are a strategic fit with our business. If we do undertake any acquisition, the process of integrating an acquired business, technology, service or product may result in unforeseen operating difficulties and expenditures and may absorb significant management attention that would otherwise be available for ongoing development of our business. Moreover, we may fail to realize the anticipated benefits of any acquisition. Future acquisitions could reduce your ownership and could cause us to incur debt, expose us to future liabilities and result in amortization expenses related to goodwill and other intangible assets.

IF WE FAIL TO RETAIN OUR KEY PERSONNEL AND HIRE, TRAIN AND RETAIN QUALIFIED EMPLOYEES, WE MAY NOT BE ABLE TO COMPETE EFFECTIVELY, WHICH COULD RESULT IN REDUCED REVENUE.

Our success is highly dependent on the continued services of key management, technical and scientific personnel. Our management and other employees may voluntarily terminate their employment with us at any time upon short notice. The loss of the services of any member of our senior management team, including our Chief Executive Officer, Chane Graziano, and our President, David Green, or any of our technical or scientific staff may significantly delay or prevent the achievement of product development and other business objectives. We maintain key person life insurance on Messrs. Graziano and Green. Our future success will also depend on our ability to identify, recruit and retain additional qualified scientific, technical and managerial personnel. Competition for qualified personnel in the technology area is intense, and we operate in several geographic locations where labor markets are particularly competitive, including Boston, Massachusetts and London and Cambridge, England, and where demand for personnel with these skills is extremely high and is likely to remain high. As a result, competition for qualified personnel is intense, particularly in the areas of information technology, engineering and science and the process of hiring suitably qualified personnel is often lengthy. If we are unable to hire and retain a sufficient number of qualified employees, our ability to conduct

and expand our business could be seriously reduced.

WE PLAN SIGNIFICANT GROWTH, AND THERE IS A RISK THAT WE WILL NOT BE ABLE TO MANAGE THIS GROWTH.

Our success will depend on the expansion of our operations. Effective growth management will place increased demands on our management, operational and financial resources. To manage our growth, we must expand our facilities, augment our operational, financial and management systems, and hire and train additional qualified personnel. Our failure to manage this growth effectively could impair our ability to generate revenue or could cause our expenses to increase more rapidly than revenue, resulting in operating losses.

OUR EXISTING STOCKHOLDERS WILL HAVE SUBSTANTIAL INFLUENCE OVER MATTERS REQUIRING A STOCKHOLDER VOTE.

Following the completion of this offering, our current stockholders will beneficially own or control approximately 74% of the outstanding shares of our common stock. If all of these stockholders were to

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vote together as a group, they would have the ability to elect our board of directors and control the outcome of stockholder votes, including votes concerning by-law amendments and possible mergers, corporate control contests and other significant corporate transactions. In addition, this concentration of ownership may delay or prevent a change of control of our company at a premium price if these stockholders oppose it. The interests of these stockholders may not always coincide with our interests as a company or the interests of other stockholders.

BECAUSE OUR STOCK PRICE IS LIKELY TO BE HIGHLY VOLATILE, OUR STOCK PRICE COULD EXPERIENCE SUBSTANTIAL DECLINES AND OUR MANAGEMENT'S ATTENTION MAY BE DIVERTED FROM MORE PRODUCTIVE TASKS.

The market price of our common stock is likely to be volatile and could decline, perhaps substantially, following this offering in response to various factors, many of which are beyond our control, including:

- technological innovations by competitors or in competing technologies,
- revenues and operating results fluctuating or failing to meet the expectations of securities analysts or investors in any quarter,
- downward revisions in securities analysts' estimates,
- conditions or trends in the biotechnology and pharmaceutical industries,
- announcements by us of significant acquisitions or financings or changes in strategic partnerships, and
- a decrease in the demand for our common stock.

In addition, the stock market in general, and the Nasdaq National Market and the biotechnology industry market in particular, have experienced significant price and volume fluctuations that at times have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry factors may seriously harm the market price of our common stock, regardless of our operating performance. In the past, securities class action litigation has often been instituted following periods of volatility in the market price of a company's securities. A securities class action suit against us could result in substantial costs, potential liabilities and the diversion of our management's attention and resources.

PROVISIONS OF DELAWARE LAW AND OF OUR CHARTER AND BY-LAWS MAY MAKE A TAKEOVER MORE DIFFICULT WHICH COULD CAUSE OUR STOCK PRICE TO DECLINE.

Provisions in our certificate of incorporation and by-laws and in the Delaware corporate law may make it difficult and expensive for a third party to pursue a tender offer, change in control or takeover attempt which is opposed by our management and board of directors. Public stockholders who might desire to participate in such a transaction may not have an opportunity to do so. We also have a staggered board of directors which makes it difficult for stockholders to change the composition of the board of directors in any one year. These anti-takeover provisions could substantially impede the ability of public

stockholders to change our management and board of directors. Such provisions may also limit the price that investors might be willing to pay for shares of our common stock in the future.

FAILURE TO RAISE ADDITIONAL CAPITAL OR GENERATE THE SIGNIFICANT CAPITAL NECESSARY TO EXPAND OUR OPERATIONS AND INVEST IN NEW PRODUCTS COULD REDUCE OUR ABILITY TO COMPETE AND RESULT IN LOWER REVENUE.

We anticipate that our existing capital resources and the net proceeds from this offering will enable us to maintain currently planned operations for at least the next two years. However, we premise this expectation on our current operating plan, which may change as a result of many factors, including market acceptance of our new products and future opportunities with collaborators.

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Consequently, we may need additional funding sooner than anticipated. Our inability to raise capital could seriously harm our business and product development efforts.

If we raise additional funds through the sale of equity or convertible debt or equity-linked securities, your percentage ownership in the company will be reduced. In addition, these transactions may dilute the value of our outstanding stock. We may issue securities that have rights, preferences and privileges senior to our common stock. If we raise additional funds through collaborations or licensing arrangements, we may relinquish rights to certain of our technologies or products, or grant licenses to third parties on terms that are unfavorable to us. We may be unable to raise additional funds on terms acceptable to us. If future financing is not available to us or is not available on terms acceptable to us, we may have to curtail or cease operations.

SHARES ELIGIBLE FOR PUBLIC SALE AFTER THIS OFFERING COULD ADVERSELY AFFECT OUR STOCK PRICE.

The market price of our common stock could decline as a result of sales of shares by our existing stockholders after this offering, or the perception that such sales will occur. These sales also might make it difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate. After this offering, we will have 24,782,422 shares of common stock outstanding. Of these shares, all of the shares sold in this offering will be freely tradeable. All of our existing stockholders have executed lock-up agreements. Those lock-up agreements restrict all of our existing stockholders from selling, pledging or otherwise disposing of their shares for a period of 180 days after the date of this prospectus without the prior written consent of Thomas Weisel Partners LLC. However, Thomas Weisel Partners LLC may, in its sole discretion, release all or any portion of the common stock from the restrictions of the lock-up agreements. In addition, after this offering, we also intend to register 3,750,000 shares of common stock for issuance under our 2000 Stock Option and Incentive Plan and 500,000 shares under our Employee Stock Purchase Plan.

WE WILL HAVE BROAD DISCRETION AS TO THE USE OF THE PROCEEDS FROM THIS OFFERING AND MAY USE THE PROCEEDS IN A MANNER WITH WHICH YOU DISAGREE.

Our board of directors and our management will have broad discretion over the use of the net proceeds of this offering. You may disagree with the judgment of our board of directors and our management regarding the application of the proceeds of this offering. We intend to use a majority of the proceeds from this offering for payment of existing debt, redemption of our series A preferred stock, working capital and general corporate purposes and to fund potential acquisitions, if any. Because of the number and variability of factors that determine our use of the net proceeds from this offering, we cannot assure you that our actual use will not vary substantially from our currently planned uses. Initially, we intend to invest the net proceeds from this offering in income producing, investment grade securities.

FUTURE ISSUANCE OF OUR PREFERRED STOCK MAY DILUTE THE RIGHTS OF OUR COMMON STOCKHOLDERS.

Our board of directors has the authority to issue up to 5,000,000 shares of preferred stock and to determine the price, privileges and other terms of these shares. The board of directors may exercise this authority without any further approval of our stockholders. The rights of the holders of common stock may be adversely affected by the rights of future holders of our preferred stock.

YOU WILL NOT RECEIVE CASH DIVIDENDS ON YOUR INVESTMENT IN OUR COMMON STOCK.

We intend to retain all of our earnings to finance the development and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. Moreover, our ability to declare and pay cash dividends on our common stock is restricted by covenants in our senior credit

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facility and in the indenture governing our senior subordinated notes. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

AN ACTIVE TRADING MARKET FOR OUR COMMON STOCK MAY NOT DEVELOP.

Prior to this offering, there has been no public market for our common stock. Although we expect our common stock to be quoted on the Nasdaq National Market, an active trading market for our shares may not develop or be sustained following this offering. You may not be able to resell your shares at prices equal to or greater than the initial public offering price. The initial public offering price will be determined through negotiations between us and the underwriters and may not be indicative of the market price for these shares following this offering. You should read "Underwriting" for a discussion of the factors to be considered in determining the initial public offering price.

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INFORMATION REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements. The forward-looking statements are principally contained in the sections on "Prospectus Summary," "Business" and "Management's Discussion and Analysis of Financial Condition and Results of Operations." These statements involve known and unknown risks, uncertainties and other factors which may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Forward-looking statements include, but are not limited to:

- our business strategy,
- the market opportunity for our products, including the willingness of our customers to expand proteomics and ADMET investments,
- our plans for hiring additional personnel,
- our estimates regarding our capital requirements and our needs for additional financing, and
- our plans, objectives, expectations and intentions contained in this prospectus that are not historical facts.

In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "could," "would," "expects," "plans," "anticipates," "believes," "estimates," "projects," "predicts," "intends," "potential" and similar expressions intended to identify forward-looking statements. These statements reflect our current views with respect to future events and are based on assumptions and subject to risks and uncertainties. Given these uncertainties, you should not place undue reliance on these forward-looking statements. We discuss many of these risks in greater detail under the heading "Risk Factors." Also, these forward-looking statements represent our estimates and assumptions only as of the date of this prospectus.

You should read this prospectus completely and with the understanding that our actual future results may be materially different from what we expect. We may not update these forward-looking statements, even though our situation may change in the future, unless we have obligations under the Federal securities laws to update and disclose material developments related to previously disclosed information. We qualify all of our forward-looking statements by these cautionary statements.

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USE OF PROCEEDS

We estimate that the net proceeds we will receive from the sale of 6,250,000 shares of common stock will be approximately \$68.3 million, or approximately

\$78.7 million if the underwriters fully exercise their over-allotment option, at the assumed offering price of \$12.00 per share, in each case after deducting estimated underwriting discounts, commissions and offering expenses payable by us. We will not receive any proceeds from the sale of shares by our president as a selling stockholder in this offering.

The principal purposes of this offering are as follows:

- to permit us to repay approximately \$665,000 in subordinated debt and \$9.6 million under our credit facility,
- to permit us to redeem our series A redeemable preferred stock at a cost of approximately \$1.5 million,
- to provide us with funds to complete potential acquisitions and enhance our ability to use our common stock as consideration for potential acquisitions,
- to increase our equity capital and facilitate our future access to public equity markets,
- to increase our working capital, and
- to increase funds available for general corporate purposes.

Except for the payment of existing debt and the redemption of preferred stock listed above, the use of proceeds has not been specifically identified or allocated due to the flexible nature of our planning process and the constantly changing nature of our industry. We will retain broad discretion in the allocation and use of the net proceeds of this offering. Pending the uses described above, we intend to invest the remaining net proceeds from this offering in short-term, investment grade, interest-bearing securities.

Our subordinated debt bears interest at an annual rate of 13.0% and matures upon the consummation of this offering. All of the subordinated debt will be retired out of the proceeds of this offering.

Our credit facility consists of two term loans and a revolving credit line. One term loan and the revolving line of credit mature in January 2002. The other term loan matures in June 2004. The interest rate for the credit facility is equal to our lender's base rate plus 1.0%. This interest rate was 10.5% at October 15, 2000. In July 2000, we increased our borrowings under our credit facility by \$2.5 million to finance the acquisition of AmiKa Corporation. All of our outstanding indebtedness under our credit facility will be repaid out of the proceeds of this offering.

DIVIDEND POLICY

We have never declared or paid dividends on our common stock in the past and do not intend to pay dividends on our common stock in the foreseeable future. Any future determination to pay dividends will be at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements and other factors the board of directors deems relevant. In addition, our existing credit facility does not permit us to pay cash dividends, and any future credit facilities may not permit us to pay cash dividends.

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CAPITALIZATION

The following table describes our capitalization as of September 30, 2000:

- on an actual basis assuming the filing of an amended certificate of incorporation to increase the number of authorized shares of common stock,
- on a pro forma basis to give effect to the conversion of all outstanding shares of convertible preferred stock into an aggregate of 955,935 shares of common stock, the exercise of all outstanding warrants for an aggregate of 8,509,905 shares of common stock upon the closing of this offering and the filing of our amended and restated certificate of incorporation prior to the effective date of this offering, and
- on a pro forma as adjusted basis to reflect the sale of 6,250,000 shares of common stock by us in this offering at an assumed initial offering price of \$12.00 per share, after deducting estimated underwriting

discounts, commissions and offering expenses payable by us and the application of the net proceeds therefrom.

AS OF SEPTEMBER 30, 2000

	ACTUAL	PRO FORMA	PRO FORMA AS ADJUSTED
(IN THOUSANDS, EXCEPT SHARE DATA)			
Series A redeemable preferred stock, par value \$0.01 per share; 469,300 shares authorized, issued and outstanding, actual; 469,300 shares authorized, issued and outstanding, pro forma and no shares issued and outstanding pro forma as adjusted.....	\$ 1,500	\$ 1,500	\$ --
Series B convertible preferred stock, par value \$0.01 per share; 48,500 shares authorized, issued and outstanding, actual; no shares authorized, issued and outstanding, pro forma and pro forma as adjusted.....	1,000	--	--
Total preferred stock.....	\$ 2,500	\$ 1,500	--
Common stock warrants.....	102,115	--	--
Undesignated preferred stock, par value \$0.01 per share; 82,200 shares authorized, no shares issued and outstanding, actual; 5,000,000 shares authorized, no shares issued and outstanding, pro forma and pro forma as adjusted.....	--	--	--
Common stock, par value \$0.01 per share; 80,000,000 shares authorized, 13,727,365 shares issued and outstanding, actual; 80,000,000 shares authorized, 23,193,210 shares issued and outstanding pro forma; 80,000,000 shares authorized, 29,443,210 shares issued and outstanding, pro forma as adjusted.....	137	232	294
Additional paid-in capital.....	18,132	121,157	189,345
Treasury stock.....	(668)	(668)	(668)
Notes receivable.....	(1,548)	(1,548)	(1,548)
Retained earnings (accumulated deficit).....	(112,358)	(112,358)	(112,358)
Accumulated other comprehensive income (loss).....	(713)	(713)	(713)
Total stockholders' equity.....	(97,018)	6,102	74,352
Total capitalization.....	\$ 7,597	\$ 7,602	\$ 74,352

The above table excludes 598,612 shares of common stock issuable upon exercise of stock options outstanding as of September 30, 2000 at a weighted average exercise price of \$1.00 per share. The above table also assumes no exercise of the underwriters' over-allotment option.

DILUTION

Our pro forma net tangible book value as of September 30, 2000, was approximately \$(3.0) million, or \$(0.19) per share of common stock. Pro forma net tangible book value per share represents the amount of our total pro forma tangible assets less total liabilities divided by the pro forma number of shares of common stock outstanding. After giving effect to the issuance and sale by us of 6,250,000 shares of common stock offered by this prospectus at an assumed initial offering price of \$12.00 per share and after deducting estimated underwriting discounts, commissions and offering expenses payable by us, our pro forma net tangible book value as of September 30, 2000 would have been \$65 million, or \$2.63 per share. This represents an immediate increase in the pro forma net tangible book value of \$2.82 per share to existing stockholders and an immediate dilution of \$9.37 per share to new stockholders in this offering illustrated by the following table:

Assumed initial public offering price per share..... \$ 12.00

Pro forma net tangible book value per share before this offering.....	\$ (0.19)
Increase per share attributable to new stockholders.....	2.82

Pro forma net tangible book value per share after the offering.....	2.63

Dilution per share to new investors.....	\$ 9.37
	=====

The following table sets forth on a pro forma basis as of September 30, 2000, the number of shares of common stock purchased from us, the total effective cash consideration and the average price per share paid and to be paid by existing and new stockholders before deducting underwriting discounts, commissions and offering expenses payable by us:

	SHARES PURCHASED		TOTAL CONSIDERATION		AVERAGE PRICE PER SHARE
	NUMBER	PERCENT	AMOUNT	PERCENT	
Existing stockholders.....	18,532,422	74.8%	\$ 2,558,106	3.3%	\$ 0.14
New stockholders.....	6,250,000	25.2	75,000,000	96.7	12.00
	-----	-----	-----	-----	
Total.....	24,782,422	100.0%	\$77,558,106	100.0%	
	=====	=====	=====	=====	

The foregoing discussion and tables assume no issuance of shares by us pursuant to the underwriters' over-allotment option and no exercise of any stock options outstanding. As of September 30, 2000, there were options outstanding to purchase a total of approximately 598,612 shares of common stock with a weighted average exercise price of \$1.00 per share. To the extent that any of these options are exercised, your investment will be further diluted. In addition, we may grant more options in the future under our stock plans.

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SELECTED FINANCIAL DATA

You should read the following selected consolidated financial data in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes included elsewhere in this prospectus. The statement of operations data for the years ended December 31, 1997, 1998 and 1999 and for the nine-month period ended September 30, 2000 and the balance sheet data at December 31, 1998 and 1999 and September 30, 2000 are derived from our audited consolidated financial statements appearing elsewhere in this prospectus. The balance sheet data at December 31, 1997 and 1996, and the statement of operations data for the period from March 15, 1996 to December 31, 1996 are derived from our audited consolidated financial statements not included in this prospectus. The statement of operations data for the year ended December 31, 1995 and for the period from January 1, 1996 to March 14, 1996 and the balance sheet data at December 31, 1995 represents data of a predecessor company and are derived from their unaudited consolidated financial statements not included in this prospectus. The interim statement of operations data for the nine-month period ended September 30, 1999 are derived from our unaudited consolidated interim financial statements appearing elsewhere in this prospectus which, in the opinion of management, have been prepared on the same basis as the audited consolidated financial statements and reflect all adjustments necessary for a fair presentation of that data. The data for the nine-month period ended September 30, 2000 are not necessarily indicative of results for the year ending December 31, 2000 or any future period.

PREDECESSOR
COMPANY
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PREDECESSOR COMPANY FISCAL YEAR ENDED DECEMBER 31, 1995	FROM JANUARY 1, 1996 TO MARCH 14, 1996		INCEPTION MARCH 15, 1996 TO DECEMBER 31, 1996
	(UNAUDITED)	(UNAUDITED)	(UNAUDITED)
(IN THOUSANDS, EXCEPT SHARE AND PER SHARE DATA)			
STATEMENT OF OPERATIONS DATA:			
Revenues.....	\$ 10,032	\$ 1,989	\$ 8,198
Cost of goods sold.....	5,286	1,059	4,080
Stock compensation expense...	--	--	--
	-----	-----	-----
Gross profit.....	4,746	930	4,118
General and administrative expense.....	2,435	487	1,834
Marketing and selling expense.....	1,469	232	1,058
Research and development.....	348	91	249
Amortization of goodwill.....	--	--	--
Stock compensation expense...	--	--	--
	-----	-----	-----
Operating income (loss).....	494	120	977
	-----	-----	-----
Other (expense) income:			
Foreign currency (loss) gain.....	23	(4)	108
Common stock warrant interest expense.....	--	--	--
Interest expense, net.....	(472)	(90)	(177)
Amortization of deferred financing costs.....	--	--	--
Other.....	(85)	(135)	(10)
	-----	-----	-----
Other expense, net.....	(534)	(229)	(79)
	-----	-----	-----
(Loss) income before income taxes.....	(40)	(109)	898
Income taxes.....	85	--	362
	-----	-----	-----
Net (loss) income.....	\$ (125)	\$ (109)	\$ 536
Preferred stock dividends....	--	--	(97)
	-----	-----	-----
Net (loss) income available to common shareholders.....	\$ (125)	\$ (109)	\$ 439
	=====	=====	=====
(Loss) income per share:			
Basic.....	\$ (0.01)	\$ (0.01)	\$ 0.04
	=====	=====	=====
Diluted.....	\$ (0.01)	\$ (0.01)	\$ 0.02
	=====	=====	=====
Weighted average common shares:			
Basic.....	10,259,410	10,259,410	10,259,410
	=====	=====	=====
Diluted.....	10,259,410	10,259,410	20,241,145
	=====	=====	=====

	FISCAL YEAR ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30,	
	1997	1998	1999	1999	2000
(UNAUDITED)					
(IN THOUSANDS, EXCEPT SHARE AND PER SHARE DATA)					
STATEMENT OF OPERATIONS DATA:					
Revenues.....	\$ 11,464	\$ 12,154	\$ 26,178	\$ 18,470	\$ 22,069
Cost of goods sold.....	5,128	5,351	13,547	9,359	11,462
Stock compensation expense...	--	--	--	--	151
	-----	-----	-----	-----	-----
Gross profit.....	6,336	6,803	12,631	9,111	10,456
General and administrative expense.....	2,338	2,317	4,147	2,927	3,733
Marketing and selling expense.....	1,672	1,722	2,448	1,842	2,359
Research and development.....	207	325	1,188	841	1,208
Amortization of goodwill.....	--	27	368	252	423
Stock compensation expense...	--	--	3,284	937	13,181

Operating income					
(Loss).....	2,119	2,412	1,196	2,312	(10,448)
Other (expense) income:					
Foreign currency (loss) gain.....	(96)	21	(48)	61	(456)
Common stock warrant interest expense.....	(117)	(1,379)	(29,694)	(7,403)	(70,920)
Interest expense, net.....	(223)	(210)	(657)	(468)	(655)
Amortization of deferred financing costs.....	--	--	(63)	(44)	(56)
Other.....	106	10	(17)	(15)	28
Other expense, net.....	(330)	(1,558)	(30,479)	(7,869)	(72,059)
(Loss) income before income taxes.....	1,789	854	(29,283)	(5,557)	(82,507)
Income taxes.....	682	783	137	649	1,354
Net (loss) income.....	\$ 1,107	\$ 71	\$ (29,420)	\$ (6,206)	\$ (83,861)
Preferred stock dividends....	(122)	(122)	(157)	(115)	(123)
Net (loss) income available to common shareholders.....	\$ 985	\$ (51)	\$ (29,577)	\$ (6,321)	\$ (83,984)
(Loss) income per share:					
Basic.....	\$ 0.13	\$ (0.01)	\$ (5.28)	\$ (1.13)	\$ (13.11)
Diluted.....	\$ 0.06	\$ (0.01)	\$ (5.28)	\$ (1.13)	\$ (13.11)
Weighted average common share					
Basic.....	7,406,486	5,598,626	5,598,626	5,598,626	6,407,682
Diluted.....	17,500,194	5,598,626	5,598,626	5,598,626	6,407,682

	AS OF DECEMBER 31,					AS OF
	1995	1996	1997	1998	1999	SEPTEMBER 30, 2000
	(UNAUDITED)					
	(IN THOUSANDS)					
BALANCE SHEET DATA:						
Cash and cash equivalents.....	\$ 1,043	\$1,088	\$ 707	\$ 957	\$ 2,396	\$ 2,149
Working capital.....	(4,910)	1,677	1,698	2,205	3,783	1,025
Total assets.....	11,204	6,397	6,161	7,220	20,610	23,236
Long-term obligations, net of current portion.....	498	1,112	829	638	5,073	5,730
Preferred stock.....	--	1,504	1,621	1,500	2,500	2,500
Common stock warrants.....	--	--	--	1,500	31,194	102,115
Stockholders' equity (deficit).....	1,203	516	737	678	(25,711)	(97,018)

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MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

YOU SHOULD READ THE FOLLOWING DISCUSSION IN CONJUNCTION WITH OUR CONSOLIDATED FINANCIAL STATEMENTS, THE RELATED NOTES AND OTHER FINANCIAL INFORMATION APPEARING ELSEWHERE IN THIS PROSPECTUS.

OVERVIEW

We are a provider of innovative, enabling tools for drug discovery research at pharmaceutical and biotechnology companies, universities and government research laboratories. We focus on two critical bottlenecks in the drug discovery process, proteomics during the target validation stage of the drug discovery process and ADMET screening during the secondary screening stage of the drug discovery process. Our proteomics products consist of tools that allow our customers to purify and analyze proteins. Our ADMET screening products are tools that enable our customers to test drug candidates to determine their absorption, distribution, metabolism, elimination and toxicology properties prior to conducting costly clinical trials.

In providing tools for drug discovery generally, we have established a significant base business and have achieved brand recognition through our sale of precision pumps, ventilators and tissue/organ systems. Since our

reorganization in 1996, we have built upon our base business and brand recognition by adding new technologies within the areas of proteomics and ADMET screening. Specifically, we have acquired the following product lines, businesses and technologies:

- In June 1998, we acquired products for cell injection systems from Medical Systems Corporation for \$1.0 million in cash,
- In March 1999, we acquired Biochrom, which develops and manufactures DNA/RNA/protein calculators, spectrophotometers, amino acid analyzers and related consumables in the United Kingdom, from Pharmacia Biotech (Biochrom) Ltd for \$7.0 million in cash,
- In March 1999, we entered into an exclusive license for the technology underlying our ScanTox in vitro toxicology testing product for \$25,000 in cash and ongoing royalties and licensing fee payments,
- In September 1999, we acquired products for intracellular research from Clark Electromedical Instruments for \$349,000 in cash,
- In November 1999, we acquired our NaviCyte diffusion chamber systems product for drug absorption testing from a subsidiary of Trega Biosciences for \$390,000 in cash and future royalties,
- In November 1999, we acquired substantially all the assets and certain liabilities of Hugo Sachs Elektronik, consisting primarily of products for organ testing, for \$568,000 in cash,
- In May 2000, we acquired certain assets of Biotronik, consisting primarily of products for amino acid analysis, for \$469,000 in cash, and
- In July 2000, we acquired substantially all the assets of AmiKa Corporation consisting of purification tips, spin columns, a 96 well drug binding assay and related technology and intellectual property for \$3.1 million in cash.

We have also entered into a non-binding letter of intent to acquire substantially all the assets and certain liabilities of a company that produces tools for toxicity testing. The non-binding letter of intent provides for an initial cash payment of \$200,000, a second cash payment of \$100,000 approximately one month following the initial cash payment and additional contingent payments and royalty payments based on future sales of the acquired products. This non-binding letter of intent will expire on

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December 15, 2000. We are working to complete this acquisition by that date although we cannot be certain that this acquisition will be completed by that date or at all.

REVENUES. We generate revenues by selling instruments, devices and consumables through our catalog, our distributors and our website. Every two to three years, we intend to distribute a new, comprehensive catalog initially in a series of bulk mailings, first to our existing customers, followed by mailings to targeted markets of potential customers. Distribution will then made periodically to potential and existing customers through direct mail and trade shows and in response to telephone inquiries over the life of this catalog. From time to time, we also intend to distribute catalog supplements that promote selected areas of our catalog or new products to targeted subsets of our customer base. Future distributions of our comprehensive catalog and our catalog supplements will be determined primarily by the incidence of new product introductions, which cannot be predicted. Our customers are end user research scientists at pharmaceutical and biotechnology companies, universities and government laboratories. Revenue from catalog sales in any period is a function of time elapsed since the last mailing of the catalog, the number of catalogs mailed and the number of new items included in the catalog. Catalog sales tend to increase immediately following a mailing and level off or decline slightly from the increased level until the next mailing, which repeats the cycle. For the nine months ended September 30, 2000, approximately 82% of our revenues were derived from products we manufacture. The remaining 18% of our revenues were derived from complementary products we distribute in order to provide researchers with a single source for all equipment needed to conduct a particular experiment. Approximately one-half of our revenues are derived through catalog sales and through reference to our website, which is an electronic version of our catalog. We do not currently have the capability to

accept purchase orders through our website. For the nine months ended September 30, 2000, approximately 69% of our revenues were derived from sales made by our non-U.S. operations. A majority of our international sales during this period consisted of sales to Amersham Pharmacia Biotech, the distributor for our spectrophotometers and amino acid analyzers. Amersham Pharmacia Biotech distributes these products to customers around the world from its distribution center in Upsalla, Sweden, including to many customers located in the United States. As a result, we believe our international sales would have been less as a percentage of our revenues for the nine months ended September 30, 2000 than indicated above if we had shipped our products directly to their end users.

COST OF GOODS SOLD. Cost of goods sold includes material, labor and manufacturing overhead costs, obsolescence charges, packaging costs, warranty costs, shipping charges and royalties. Our costs of goods sold may vary over time based on the mix of products sold. We sell products that we manufacture and products that we purchase from third parties. The products that we purchase from third parties have lower margins because the profit is effectively shared with the original manufacturer. For the nine months ended September 30, 2000, our manufactured products had lower cost of goods sold. We anticipate that our manufactured products will continue to have a lower cost of goods sold for the foreseeable future.

GENERAL AND ADMINISTRATIVE EXPENSE. General and administrative expense consists primarily of salaries and other related costs for personnel in executive, finance, accounting, information technology and human relations functions. Other costs include facility costs, professional fees for legal and accounting services, and provision for doubtful accounts.

SALES AND MARKETING EXPENSE. Sales and marketing expense consists primarily of salaries and related expenses for personnel in sales, marketing and customer support functions. We also incur costs for trade shows, demonstration equipment, public relations and marketing materials, consisting primarily of the printing and distribution of our 1,000 page catalog and the maintenance of our web site. We may from time to time in the future expand our marketing efforts by employing additional

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technical marketing specialists in an effort to increase sales of selected categories of products in our catalog.

RESEARCH AND DEVELOPMENT EXPENSE. Research and development expense consists primarily of salaries and related expenses for personnel and capital resources used to develop and enhance our products. Other research and development expense includes fees paid to consultants and outside service providers, and material costs for prototype and test units. We expense research and development costs as incurred. We believe that significant investment in product development is a competitive necessity and plan to continue this investment in order to realize the potential of our new technologies for proteomics and ADMET.

STOCK COMPENSATION EXPENSE. Stock compensation resulting from stock option grants to our employees represents the difference between the fair market value and the exercise price of the stock options on the date the stock options were granted for those options that are considered fixed awards. Stock compensation expense is also recorded for stock option grants that were considered variable awards as the number of shares to be acquired by employees was indeterminable at the date of grant. Deferred compensation on fixed awards is amortized as a charge to operations over the vesting period of the options. Based on grants in 2000, we incurred deferred compensation of \$9.9 million and recognized deferred compensation expense of \$3.3 million for the nine months ended September 30, 2000.

Since our reorganization in 1996, we have experienced substantial revenue growth. In the future we intend to introduce new products for proteomics and ADMET research that support emerging and potentially large markets. In order to support the anticipated growth of these new products, we may expand our product development and sales and marketing activities. In the event we pursue activities which increase our product development and sales and marketing expenses, operating results will be adversely affected if revenues do not increase proportionately. If revenues are below expectations, our business, operating results and financial condition are likely to be materially and adversely affected. Net income may be disproportionately affected by a reduction in revenues as a relatively smaller amount of our expenses vary with changes in our revenues. As a result, we believe that period-to-period comparisons of our results of operations are not necessarily meaningful and should not be relied

upon as indications of future performance.

NINE MONTHS ENDED SEPTEMBER 30, 2000 COMPARED TO NINE MONTHS ENDED
SEPTEMBER 30, 1999

REVENUES. Revenues increased \$3.6 million, or 20%, to \$22.1 million in 2000 from \$18.5 million in 1999. Excluding the impact of changes in foreign currency exchange rates, revenues based on 1999 rates would have been approximately \$22.8 million in 2000. Approximately \$1.1 million of the \$3.6 million increase, or 31%, was attributable to the full period effect of revenues from the acquisition of our Biochrom subsidiary in March 1999 net of exchange rate effects of \$508,000. The balance of the increase was attributable to \$2.5 million of revenue from product line acquisitions made in the second half of 1999 partially offset by the cyclical nature of catalog sales of traditional products. During the year preceding the mailing of a new catalog in April 2000, traditional products were not promoted because we were concentrating on the acquisition of new products or businesses as well as the development of the new catalog to include these newly acquired products. This new catalog was the first new, comprehensive catalog produced since April 1997.

COST OF GOODS SOLD. Cost of goods sold increased \$2.1 million, or 23%, to \$11.5 million in 2000 from \$9.4 million in 1999. The increase in cost of goods sold as a percentage of revenues was due to slightly higher cost of goods sold on acquired product lines and for our Biochrom subsidiary acquired in March 1999. Our Biochrom subsidiary experiences lower revenues and correspondingly lower general and administration and sales and marketing expenses relative to cost of goods sold as a consequence of marketing its products primarily through a distributor.

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GENERAL AND ADMINISTRATIVE EXPENSE. General and administrative expense increased \$807,000, or 28%, to \$3.7 million in 2000 from \$2.9 million in 1999 due primarily to the full period effect of Biochrom as well as increased support for operations.

SALES AND MARKETING EXPENSE. Sales and marketing expense increased \$517,000, or 28%, to \$2.4 million in 2000 from \$1.8 million in 1999. The increase was primarily due to expenses of acquisitions as well as the addition of marketing personnel and additional catalog costs. As a percentage of revenues, marketing and sales expense was 11% in 2000 and 10% in 1999. This increasing percentage reflects the addition of marketing personnel to promote newly acquired technology. In the future we may add employees to expand selected categories of our catalog as well as to expand the capabilities of our web site and integrate it into our business planning and processes.

RESEARCH AND DEVELOPMENT EXPENSE. Research and development spending increased \$367,000, or 44%, to \$1.2 million in 2000 from \$841,000 in 1999. The increase in research and development expense resulted from expenses of acquisitions, spending on product enhancement and new product development, primarily on ScanTox in vitro toxicology testing and other core technology. As a percentage of revenues, research and development expense was 6% in 2000 and 5% in 1999. This increasing percentage reflects expanded efforts on ADMET testing products.

STOCK COMPENSATION EXPENSE. We recorded \$13.3 million of stock compensation expense in the nine months ended September 30, 2000. In connection with the grant of stock options to employees in 2000, we recorded deferred compensation of approximately \$3.3 million and will recognize approximately \$6.6 million of additional expense over the remaining vesting life of the options. In addition, in the third quarter of 2000, we also recorded \$10.0 million of stock compensation expense in connection with options granted in 1996 and 1999. In 1999, we recorded \$937,000 of stock compensation expense related to these 1996 and 1999 option grants.

AMORTIZATION OF GOODWILL. Amortization of goodwill was \$423,000 in 2000 and \$252,000 in 1999. The increase is the result of amortizing additional goodwill incurred in connection with our acquisitions in 2000.

OTHER EXPENSE, NET. Other expense, net, was \$72.1 million in 2000 compared to \$7.9 million in 1999. Other expense, net, included a non-cash charge for common stock warrant interest expense of \$70.9 million in 2000 and \$7.4 million in 1999. This amount represents the difference between the fair value of the warrant for financial reporting purposes and its exercise price. This liability represents the right of warrant holders to require us to pay cash equal to the

fair market value of the warrants in exchange for the warrants, or any common stock from the exercise of the warrants, beginning March 15, 2002. Effective with this offering, the warrants will be exercised for common stock and the right to be paid cash will terminate. The liability previously recorded will become part of common stock and additional-paid-in capital, and no additional liability will be incurred with respect to these warrants. Net interest expense increased \$186,000, or 40%, to \$655,000 in 2000 from \$468,000 in 1999. The increase resulted primarily from higher debt balances in 2000, which were incurred to finance acquisitions.

INCOME TAXES. The Company's effective income tax rates were 39% for 2000 and 33% for 1999 notwithstanding the impacts for common stock warrant interest expense and stock compensation expense in excess of allowable tax benefits on exercise of options, which are not deductible for income tax purposes. The increase in the rate is principally due to certain blended higher foreign statutory jurisdiction income tax rates. The effective income tax rates may change compared to the remainder of each respective calendar year if operating results differ significantly from the interim results.

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YEAR ENDED DECEMBER 31, 1999 COMPARED TO YEAR ENDED DECEMBER 31, 1998

REVENUES. Revenues increased \$14.0 million, or 115%, to \$26.2 million in 1999 from \$12.2 million in 1998. Approximately \$12.2 million, or 87%, of the increase was derived from the March 1999 acquisition of Biochrom. Excluding the impact of changes in foreign currency exchange rates, revenues based on 1998 rates would have been approximately \$26.3 million in 1999. Revenues from our existing business increased \$1.8 million, or 15%, to \$14.0 million in 1999 from \$12.2 million in 1998. The increase was attributable to full year revenues of \$570,000 from the products acquired from Medical Systems in June 1998, increased sales resulting from our expanded direct marketing efforts on traditional products of \$884,000, which included hiring additional marketing staff, producing a CD-ROM of our catalog, and creating and installing an electronic version of our catalog on our website, with the balance due to revenues from product lines acquired in the second half of 1999.

COST OF GOODS SOLD. Cost of goods sold increased \$8.2 million, or 153%, to \$13.5 million in 1999 from \$5.4 million in 1998. As a percentage of revenues, cost of goods sold increased to 52% in 1999 from 44% in 1998. The increase in cost of goods sold in 1999 was primarily the result of the acquisition of Biochrom. The percentage increase was also the result of Biochrom, which experiences higher costs of goods sold as a percentage of revenues due to the marketing of its products primarily through a distributor, which receives a discount to the list price that is calculated to cover the distributor's costs and profits.

GENERAL AND ADMINISTRATIVE EXPENSE. General and administration expense increased \$5.1 million, or 221%, to \$7.4 million in 1999 from \$2.3 million in 1998. Biochrom accounted for \$1.1 million, or 22%, of the increase. Also in 1999, \$3.3 million was recorded as non-cash compensation expense from options granted in 1996. Excluding the Biochrom acquisition and the compensation expense, expenses increased \$800,000, or 35%, to \$3.1 million in 1999 from \$2.3 million in 1998. The increase was due to the need to support expanding operations. As a percentage of revenues, general and administration expense increased to 28% in 1999 from 19% in 1998.

SALES AND MARKETING EXPENSE. Sales and marketing expense increased \$727,000, or 42%, to \$2.4 million in 1999 from \$1.7 million in 1998. Biochrom accounted for \$608,000, or 84%, of the increase. Excluding the Biochrom acquisition, expenses increased \$119,000, or 7%, to \$1.8 million in 1999 from \$1.7 million in 1998. The increase was due to expanded direct marketing efforts and the full year effect of support for the products acquired in June 1998. As a percentage of revenues, sales and marketing expense decreased to 9% in 1999 from 14% in 1998. The decrease in sales and marketing expense as a percentage of revenues was primarily due to the acquisition of Biochrom, which has lower sales and marketing expense because those expenses are primarily borne by its distributor.

RESEARCH AND DEVELOPMENT EXPENSE. Research and development spending increased \$863,000 in 1999, or 266%, to \$1.2 million from \$325,000 in 1998. The acquisition of Biochrom contributed \$577,000 to the increase. The balance of the increase was spending for development of our newly licensed ScanTox technology and expansion of our core drug screening products. As a percentage of revenues, research and development expense increased to 5% in 1999 from 3% in 1998. The

increase in research and development expense as a percentage of revenues was primarily due to Biochrom, our employment of additional engineers and increased charges for outside services.

AMORTIZATION OF GOODWILL. Amortization of goodwill was \$368,000 in 1999 and \$28,000 in 1998. The increase is the result of amortizing additional goodwill incurred in connection with our acquisitions in 1999 and the full year effect of the acquisition of the Medical Systems products in June 1998.

OTHER EXPENSE, NET. Other expense, net was \$30.5 million in 1999 compared to \$1.6 million in 1998. Other expense, net, included a non-cash charge for common stock warrant interest expense of \$29.7 million in 1999 and \$1.4 million in 1998. Net interest expense increased \$447,000, or 214%, to

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\$656,000 in 1999 from \$209,000 in 1998. The increase resulted primarily from higher debt balances in 1999, which were incurred to finance acquisitions.

INCOME TAXES. The Company's effective income tax rates were 33% for 1999 and 35% for 1998 notwithstanding the impact for common stock warrant interest expense which is not deductible for income tax purposes. The decrease in the rate is principally due to certain lower foreign statutory jurisdiction income tax rates, specifically the result of the acquisition of a United Kingdom subsidiary.

YEAR ENDED DECEMBER 31, 1998 COMPARED TO YEAR ENDED DECEMBER 31, 1997

REVENUES. Revenues increased \$690,000, or 6%, to \$12.2 million in 1998, from \$11.5 million in 1997. The increase was due to the introduction of new products from the acquisition of Medical Systems in June 1998, which accounted for \$510,000 of the increase, as well as growth in sales of existing products, primarily due to the issuance of two catalog supplements in 1998 compared to one supplement issued in 1997.

COST OF GOODS SOLD. Cost of goods sold increased approximately \$224,000, or 4%, to \$5.4 million in 1998 from \$5.1 million in 1997. As a percentage of revenues, cost of goods sold decreased to 44% in 1998 from 45% in 1997. The decrease was due to spreading manufacturing overhead across increased production relating to the products acquired with the purchase of Medical Systems.

GENERAL AND ADMINISTRATIVE EXPENSE. General and administrative expense remained constant at \$2.3 million from 1997 to 1998. As a percentage of revenues, general and administrative expense decreased to 19% in 1998 from 20% in 1997. The decrease in general and administrative expense as a percentage of revenues was primarily due to spreading general and administrative costs over a greater revenue base.

SALES AND MARKETING EXPENSE. Sales and marketing expense increased \$49,000, or 3%, to \$1.7 million in 1998 from \$1.7 million in 1997. As a percentage of revenues, sales and marketing expense decreased to 14% in 1998 from 15% in 1997. The decrease in sales and marketing expense as a percentage of revenues was primarily due to spreading sales and marketing costs over a greater revenue base.

RESEARCH AND DEVELOPMENT EXPENSE. Research and development spending increased \$118,000, or 57%, to \$325,000 in 1998 from \$206,000 in 1997. The increase in spending represented investments in product development and enhancement of the existing family of products. As a percentage of revenues, research and development expense increased to 3% in 1998 from 2% in 1997.

AMORTIZATION OF GOODWILL. Amortization of goodwill consisted of a charge of \$28,000 in 1998 resulting from the acquisition of Medical Systems. There was no corresponding charge in 1997.

OTHER EXPENSES, NET. Other expenses, net were \$1.6 million in 1998 compared to \$330,000 in 1997. The increase was due primarily to a charge of \$1.4 million for common stock warrant interest expense.

INCOME TAXES. The Company's effective income tax rates were 35% for 1998 and 36% for 1997 notwithstanding the impact for common stock warrant interest expense which is not deductible for income tax purposes. The change in the tax rate is principally due to certain tax rates in foreign jurisdictions.

LIQUIDITY AND CAPITAL RESOURCES

Historically, we have financed our business through cash provided by operating activities, the issuance of common and preferred stock, and bank borrowings. Our liquidity requirements have arisen primarily from investing activities, including funding of acquisitions, payments on outstanding indebtedness, research and development expenditures, and capital expenditures. As of September 30,

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2000, we had cash of \$2.1 million. Since our reorganization in March 1996, we have raised \$14.2 million, consisting of \$2.5 million of preferred and common stock and \$11.7 million of debt. As of September 30, 2000, we had \$6.8 million in debt under a bank term loan, \$478,000 in subordinated debt and \$3.1 million outstanding under a \$3.8 million revolving credit facility.

Our operating activities generated cash of \$2.0 million in the first nine months of 2000, \$2.9 million in fiscal 1999, \$1.8 million in fiscal 1998 and \$1.1 million in fiscal 1997. For all periods presented, operating cash flows were primarily due to operating results, including the full-year effect of acquisitions prior to non-cash charges, partially offset by working capital requirements. Working capital requirements were affected by acquisitions, which increased accounts receivable and inventory carrying amounts partially offset by increased amounts in accounts payable and accrued expenses.

Our investing activities used cash of \$4.7 million in the first nine months of 2000, \$8.5 million in fiscal 1999, \$1.4 million in fiscal 1998 and \$653,000 in fiscal 1997. Cash has been used in the following technology and business acquisitions:

- \$469,000 for Biotronik's amino acid analysis systems business in May 2000,
- \$390,000 for the NaviCyte diffusion chamber systems product line in November 1999,
- \$568,000 for Hugo Sachs Elektronik in November 1999,
- \$349,000 for intracellular research products from Clark Electromedical Instruments in September 1999,
- \$7.0 million for Biochrom in March 1999,
- \$1.0 million for Medical Systems Corporation's cell injection systems business in June 1998, and
- \$3.1 million for substantially all the assets of AmiKa Corporation in July 2000.

Our financing activities provided cash of \$2.5 million for the first nine months of 2000 and \$7.0 million in fiscal 1999, and used cash of \$105,000 in fiscal 1998 and \$874,000 in fiscal 1997. Financing cash flows consisted of borrowings under a revolving credit facility, long-term debt and the issuance of preferred stock. As of September 30, 2000, we had approximately \$600,000 available under our revolving credit facility, subject to our ability to maintain compliance with all of the covenants contained in our revolving credit agreement. We were not in compliance with the net income covenants as of September 30, 2000 due to non-cash stock compensation and imputed interest on warrants. Our credit facility was amended to exclude the accounting treatment for stock option compensation and warrant interest expense. This amendment brought us into compliance with our credit facility and we are currently in compliance with all of the covenants in our credit facility.

Prior to 1999, we had historically generated sufficient cash flow from operations to fund expenditures on capital equipment, debt service, equity transactions, stock repurchases and preferred dividend payments. In 1999, in connection with the acquisition of Biochrom, we increased our long-term indebtedness by approximately \$5.5 million and issued approximately \$1.0 million in convertible preferred stock. As a result, the level of debt service required increased substantially compared to historical levels. Upon completion of the offering, we intend to use a portion of the proceeds to redeem our series A redeemable preferred stock in the amount of \$1.5 million, and to repay the bank term loan, the subordinated debt and the revolving credit facility.

Based on our operating plans, we expect that proceeds from this offering, available cash, cash generated from operations, and cash available from our revolving credit facility will be sufficient to finance operations and capital expenditures for at least two years from the date of this prospectus. However, we may use a substantial portion of the proceeds from this offering to accelerate product development, expand our sales and marketing activities or consummate acquisitions, although we have no current plans in this regard. Therefore, we may need to raise additional capital, which may be

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dilutive to existing stockholders. The additional capital may not be available on acceptable terms or at all. Accordingly, there can be no assurance that we will be successful in raising additional capital.

IMPACT OF FOREIGN CURRENCIES

We sell our products in many countries and a substantial portion of our sales, costs and expenses are denominated in foreign currencies, especially the United Kingdom pound sterling and the Euro. In the first nine months of 2000 and in 1999, the U.S. dollar strengthened against these currencies resulting in reduced consolidated revenue growth, as expressed in U.S. dollars. In addition, the currency fluctuations resulted in foreign currency losses of approximately \$48,000 in 1999 and \$456,000 in the first nine months of 2000.

Historically, we have not hedged our foreign currency position. Currently, we attempt to manage foreign currency risk through the matching of assets and liabilities. However, as our sales expand internationally, we plan to evaluate our currency risks and we may enter into foreign exchange contracts from time to time to mitigate foreign currency exposure.

BACKLOG

Our order backlog was approximately \$2.7 million as of September 30, 2000 and \$2.1 million as of September 30, 1999. We include in backlog only those orders for which we have received valid purchase orders. Purchase orders may be cancelled at any time prior to shipment. Our backlog as of any particular date may not be representative of actual sales for any succeeding period. We expect to ship substantially all of the September 30, 2000 backlog by December 31, 2000.

ACCOUNTING PRONOUNCEMENTS

In June 1998, the Financial Accounting Standard Board issued Statement of Financial Accounting Standards (SFAS) No. 133, "Accounting for Derivative Instruments and Hedging Activities." SFAS 133 establishes accounting and reporting standards requiring that every derivative instrument be recorded in the balance sheet as either an asset or liability measured at its fair value. SFAS 133, as amended by SFAS 137 and SFAS 138, is effective for years beginning after June 15, 2000. SFAS 133 will be adopted on January 1, 2001. We believe the adoption of this statement will not have a significant impact on our financial position, results of operations or cash flows.

QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest rate risk and foreign currency rate risk are the primary sources of market risk to our operations. As of September 30, 2000, we had aggregate variable rate long-term debt of \$6.8 million and revolving credit facility debt of \$3.2 million. A 10% change in interest rates, from 10.5% to 11.55%, would change the annual interest expense on our long-term debt by approximately \$71,400 and on our revolving credit facility by approximately \$33,600.

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BUSINESS

OVERVIEW

We are a global provider of innovative, research enabling tools for drug discovery. We provide a broad array of tools designed to accelerate the speed and to reduce the cost at which our customers can introduce new drugs. Since our 1996 reorganization, we have focused on alleviating the protein purification and ADMET screening bottlenecks in drug discovery.

To address these two critical bottlenecks in protein purification and ADMET

screening, we recently introduced several new proprietary tools. For protein purification, these tools include specially treated pipette tips, spin columns and micro-dialyzers. For ADMET screening, these tools include NaviCyte diffusion chambers for drug absorption testing, 96 well equilibrium dialysis plates for drug distribution testing and ScanTox in vitro toxicology screening instruments.

We also have an established product base in proteomics, which is the study of gene function through the analysis of protein interactions. This product base consists of DNA/RNA/protein calculators, life science spectrophotometers and amino acid analysis systems, as well as precision infusion pumps, organ testing systems and ventilators used in ADMET screening.

OUR HISTORY

Our business began in 1901 and has grown over the intervening years with the development and evolution of modern drug discovery tools. Our past inventions include the mechanical syringe pump in the 1950s for drug infusion and the microprocessor controlled syringe pump in the 1980s.

In March 1996, a group of investors led by our current management team acquired a majority of the then existing business of our predecessor, Harvard Apparatus. Following this acquisition, we redirected our strategy to focus on high growth areas within drug discovery by acquiring innovative technologies through strategic acquisitions and licensing while continuing to grow our existing business through internal product development and marketing. We have completed five business acquisitions, including Biochrom, the licensing of key new technology for in vitro toxicology assays and drug absorption measurement chambers, the internal development of new product lines, including new generation syringe pumps and DNA/RNA/protein calculators and the mailing of expanded new catalogs.

INDUSTRY OVERVIEW

The life sciences research industry is undergoing fundamental change and growth resulting principally from the explosive growth in gene discovery and the demand for greater efficiency in the drug discovery process. Industry experts estimate that in 2000, the life sciences research industry will spend more than \$50 billion on drug discovery research and development. The goal of drug discovery is to find compounds that will bind specifically to a given target without significantly affecting any other molecules in the body. Traditionally, chemists have laboriously synthesized new compounds with potential therapeutic activity one at a time or painstakingly isolated them from natural resources. Today, combinatorial chemistry techniques are used to greatly increase the supply and diversity of such compounds. Libraries of hundreds of thousands, or even millions, of compounds are now available for testing in biological assays against targets.

Until recently, life sciences researchers had identified only a few hundred targets against which to test these compounds. Driven by large-scale DNA sequencing projects, such as the Human Genome Project, life sciences researchers expect to identify tens of thousands of new genes as they decipher the genomes of both humans and disease-causing organisms. When a gene, which is a segment of DNA, is expressed, a copy of the gene sequence is carried in messenger RNA, or mRNA, which is used to direct the manufacture of a protein. Although genes, DNA, mRNA and proteins are all targets for

drug discovery, proteins are by far the most common. Proteins are the molecular machines of the cell that are responsible for performing the majority of cellular functions. Once proteins are identified and validated as potential targets, they need to be screened against hundreds of thousands, if not millions, of compounds in a process known as primary screening.

Drug discovery is a time-consuming and costly process. In the pre-genomics era, the compound development, primary screening and clinical trials stages were bottlenecks in this process. The successes of genomics, combinatorial chemistry and high throughput screening in recent years have alleviated the bottlenecks at the compound development and primary screening stages. However, these bottlenecks have been replaced by bottlenecks at the target validation, assay development and absorption, distribution, metabolism, elimination and toxicology, or ADMET, testing stages. The revolution in genomics is expected to increase the number of targets from 500 to 10,000, which will consequently greatly increase the need for protein purification and analysis. The increase in the number of compounds in libraries from tens of thousands to millions together

with the increase in the number of targets is greatly increasing the number of leads requiring ADMET screening.

THE DRUG DISCOVERY PROCESS

The drug discovery process consists of several steps, which are illustrated below.

The diagram that illustrates the drug discovery process is initially split into two parallel tracks which merge into a single track as the diagram moves to the right. The upper track of the diagram is titled "Compound Development" and includes an arrow titled "Compound Libraries." Below the arrow are the words "Combinatorial Chemistry." The lower track of the diagram is titled "Target Discovery" and includes two arrows. The first arrow is titled "Target Identification." Below this arrow is the word "Genomics." The next arrow to the right is titled "Target Validation." Below this arrow is the word "Proteomics." Following the "Compound Libraries" arrow on the upper track and the "Target Validation" arrow on the lower track, the two tracks of the diagram combine and include arrows to illustrate the remaining stages and key bottlenecks in the drug discovery process. The individual arrows from left to right include an arrow titled "Assay Development" followed by an arrow titled "High Throughput Screening." These two arrows in the diagram appear under the title "Primary Screening." To the right of the "High Throughput Screening" arrow is an arrow titled "Lead Optimization" followed by an arrow titled "ADMET Screening." These two arrows in the diagram appear under the title "Secondary Screening." To the right of the "ADMET Screening" arrow is an arrow titled "Clinical Trials," the final arrow in the process flow diagram.

TARGET IDENTIFICATION involves isolating a particular molecule, typically a protein, and evaluating the role that it plays in the body to determine whether it might be a viable target for further investigation. Today, this activity is most often initiated by genomics studies, including DNA sequencing, RNA analysis and genetic mapping.

TARGET VALIDATION involves demonstrating that affecting the function of a particular target has a positive effect on the course of a disease. Target validation employs a variety of methods including RNA analysis, protein analysis and cell biology. Target validation is a more time-consuming process than target identification.

PRIMARY SCREENING involves the large-scale testing of collections of chemical compounds, known as compound libraries, against validated targets. These libraries are tested using high throughput assays. The goal is to find individual compounds that bind to and inhibit or activate a particular target, commonly referred to as a hit. An assay, in the context of screening compounds against a new target, refers to a test a researcher must develop for measuring whether particular compounds in a library interact with the target in a certain manner. An assay must be developed for each target to be screened. The major pharmaceutical companies are moving towards screening up to 100 targets annually with libraries of up to one million compounds each.

SECONDARY SCREENING involves the refinement of hits into leads that can be used in clinical trials. This step consists of lead optimization and ADMET testing. Lead optimization involves conducting successive rounds of chemical alterations and biological tests to find compounds similar to the original compound identified in primary screening which have improved drug properties over the initial compound, particularly efficacy. ADMET testing involves the conducting of various tests on compounds

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to ensure that they are safe and have good pharmacological properties such as high adsorption into the blood from the digestive tract and good distribution to the site of the target molecule in the body. This stage also involves the testing of compounds to determine therapeutic activity in animal models of disease and to ensure that the compounds can be manufactured with consistent quality.

CLINICAL TRIALS involve the testing of pharmaceutical compounds in humans to demonstrate their safety and efficacy. Because clinical trials are by far the most expensive part of drug discovery, and undesirable ADMET properties are the most common reasons for failure, pharmaceutical and biotechnology companies can achieve substantial cost savings by identifying drug candidates with poor ADMET properties as early in the drug discovery process as possible. Drugs with successful clinical trials are almost always commercialized.

PROTEOMICS

Proteomics involves the large-scale purification, identification and analysis of proteins. Proteins are manufactured in the body's cells according to the code contained in DNA and are the molecular machines of the cell that are responsible for performing the majority of cellular functions. Proteins are the most common targets in the field of drug discovery because proteins tend to be far more accessible to drugs than either DNA or mRNA which are located in the nucleus of the cell.

Every protein that is identified as a potential target must be analyzed. The trend in protein analysis currently is moving towards the use of mass spectrometry, which is the fastest and most accurate technique for protein analysis. Because mass spectrometers are highly sensitive, they require the use of pure samples in order to properly analyze the protein. Thus, protein purification, the removal of reagents such as salts, detergents and buffers, is essential to target discovery.

In the last few years the revolution in genomics and the completion of the Human Genome Project has vastly increased the number of known targets. Before the Human Genome Project there were only approximately 500 known targets. Some experts believe that the sequencing of the human genome will ultimately lead to the identification of 50,000 to 100,000 genes and over 1,000,000 proteins. Many scientists expect that this will in turn lead to the identification of up to 10,000 targets. Each of these targets, many of which will be proteins, will need to be purified and analyzed many times prior to becoming a validated target for primary screening. As a result of the recent and projected increases in the number of known drug targets, purifying protein samples has been and will continue to be a significant bottleneck in the drug discovery process.

ADMET SCREENING

The goal of ADMET screening is to identify compounds that have toxic side effects or undesirable pharmacological properties. These compounds are then either eliminated or further chemically modified and re-screened. While ADMET screening is traditionally conducted late in the drug discovery process, early application of ADMET screening can be highly beneficial. This is because more than half of the 90% of lead compounds which fail in the costly clinical trial stage of drug discovery fail due to poor pharmacological properties. These important pharmacological properties consist of absorption, distribution, metabolism and elimination which, together with toxicology, are described below:

ABSORPTION. Absorption describes the ability of a drug to pass through the wall of the digestive tract and enter the blood stream. Absorption is an important property of an effective drug because adequate absorption allows a drug to be administered orally rather than by direct injection into the blood. If a lead candidate cannot be absorbed easily from the digestive tract into the blood, its commercial viability will be adversely impacted even if it effectively acts against the target.

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DISTRIBUTION. Distribution describes the amount of a drug that different tissues in the body take in from the blood. Distribution of the drug to the tissue containing the target molecule is necessary for the drug to have the desired effect. Moreover, undesirable side effects may occur if the drug is distributed to tissues other than the one containing the target molecule. Effective distribution requires the drug to be transported around the body and released into the tissue containing the target molecule at an appropriate rate. The flow of blood alone is often an effective distribution method. However, while the binding of a drug to blood proteins can increase the proper distribution of a drug, it can cause toxic problems if the bond formed is too strong.

METABOLISM. Metabolism describes the chemical changes that the body makes to a drug. This is an important property of an effective drug for three reasons. First, some drugs must be metabolized in order to become effective. Second, some drugs may have no toxic side effects, but the byproducts of their metabolism, known as metabolites, may be toxic. Third, metabolism usually makes drugs more soluble in water, which in turn makes it easier for the body to eliminate them in the urine.

ELIMINATION. Elimination describes the process by which the body expels a drug. If the blood absorbs a drug, it will be primarily eliminated in the urine

either in its native or metabolized forms. Elimination is important because toxicity is primarily a matter of concentration--even common compounds such as aspirin and caffeine are toxic at high enough concentrations. If the body does not eliminate a drug, the drug's concentration will build up with every dose taken, eventually reaching toxic levels.

TOXICOLOGY. Toxicology describes the adverse effects a drug has on the body. These range from nausea to death. All drugs must be shown to be safe to the satisfaction of regulatory authorities prior to commercialization. Toxicology consists of tests designed to determine the likelihood that a drug will cause death or the growth of tumors, disrupt normal reproductive function or the immune system or mutate DNA.

For every 1,000 hits identified through primary screening, only about ten survive secondary screening and make it into clinical trials, the final stage of drug discovery. Of those ten, only one, on average, survives the regulatory process to be commercialized as a new drug.

CURRENT TECHNOLOGIES FOR PROTEIN PURIFICATION AND ADMET SCREENING

PROTEIN PURIFICATION. Protein purification is an essential step in proteomics. Researchers must remove any salts, buffers, detergents and cellular debris prior to analyzing a protein sample. Current technologies for protein purification include packed bed columns and dialysis. In order to isolate a specific protein, two-dimensional gel electrophoresis, or 2DGE, is typically used in advance of running a sample through a packed bed column or dialysis. Two-dimensional gel electrophoresis isolates different types of proteins in a two-stage process using electric currents passed through gels. Each protein migrates to a specific location in the gel. The protein can then be separated from the gel residue using packed bed columns or dialysis.

PACKED BED COLUMNS are small disposable plastic tubes containing chromatography media. A protein sample is typically pipetted into the top of the column, which is then placed in a centrifuge or vacuum manifold to draw the sample through the media. These columns will remove salts, detergents, buffers and 2DGE gel residue, but may retain some of the protein in the media.

DIALYSIS involves the use of a porous membrane which allows small molecules such as salts, detergents, buffers and 2DGE gel residue to pass through but blocks larger molecules such as proteins from passing through. Dialysis involves pipetting the protein sample into a device which consists of a chamber with the porous membrane covering one otherwise open end. The chamber is then placed in a large volume of pure water and stirred for a period of time, which may be minutes or hours.

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ADMET SCREENING. ADMET testing at the secondary screening stage has traditionally relied almost exclusively on live animal testing instead of tools. The most common animals used in drug discovery studies are laboratory rats and mice. As a drug compound moves closer to human clinical trials, the United States Food and Drug Administration requires that studies be performed using larger animals, such as rabbits and dogs.

LIMITATIONS OF CURRENT TECHNOLOGIES

PROTEIN PURIFICATION. Current technologies for protein purification in proteomics have the following limitations:

- **LOW PRODUCTIVITY.** Neither packed bed columns nor dialyzers are easily capable of automated sample handling. Using packed bed columns, either alone or in connection with two-dimensional gel electrophoresis, requires centrifugation or the use of a vacuum to move the sample through the purification media. This means the sample must be physically moved to the centrifuge or vacuum pump, left to run--typically for several minutes--then removed, washed and the protein eluted.
- **LOSS OF PROTEIN SAMPLE.** Packed bed columns consume a portion of the sample leading to sample loss. The amount of sample lost in the purification process may only be microliters. This is not a significant problem if several milliliters of sample are available, as is common in DNA purification. However, if only a few microliters of sample are available, as is common in protein purification, the loss of even one microliter may be a large percentage of the total. In addition, protein

samples are typically expensive and thus sample loss must be minimized.

ADMET SCREENING. Current technologies for ADMET screening have the following limitations:

- HIGH COST. Animal assays are costly because all animals have to be housed and cared for under strict government regulations often in clean room environments and with a significant staff to care for the animals. A standard 14-day range finding study performed using laboratory rats costs approximately \$75,000, and a two-year carcinogenicity study carried out with laboratory rats costs approximately \$1 million. A later stage 90-day study carried out using dogs typically costs almost twice as much as the same test performed using laboratory rats.
- LABOR INTENSITY. By their nature, animal assays cannot be automated and thus require the time of highly skilled research scientists, such as surgeons and pathologists.
- ETHICAL CONSIDERATIONS. Even though researchers must use the lowest number of the least sentient animals to achieve the scientifically needed information, avoid pain and consider alternatives to the use of live animals, the large number of animals used still creates ethical considerations.

OUR SOLUTIONS

We overcome the limitations of current technologies by providing innovative, enabling tools for drug discovery, particularly in the areas of proteomics and ADMET screening. Set forth below are examples of the manner in which some of the newer proprietary products we have recently begun to market provide solutions in protein purification and ADMET screening.

PROTEIN PURIFICATION

Our protein purification technologies are designed to be quick to use and to reduce sample loss.

- HIGHER PRODUCTIVITY. Our purification pipette tips are quicker to use than packed bed columns because a centrifugation or vacuuming step is not necessary. This avoids both the moving of the sample to and from the centrifuge or vacuum pump and the run time in the centrifuge or

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vacuum pump. We believe our protein purification pipette tips are the only pipette tips capable of being fitted to standard pipetting workstations and thus being used for automated protein purification. This automation increases our customers' productivity. In addition, our 96 well plate versions of dialyzers and spin columns can be used directly in automated equipment, again increasing our customers' productivity.

- REDUCED SAMPLE LOSS. Our miniaturization of dialyzers and spin columns reduces sample loss in the membrane or column material. Our purification pipette tips contain smaller volumes of material than packed bed columns and thus less sample is retained in the material.

ADMET SCREENING

Our ADMET screening technologies employ novel approaches to obtaining ADMET data while reducing the use of large numbers of live animals.

- LOWER COST. Most of our ADMET screening products use organs, tissue or blood proteins rather than live animals. For example, our in vitro toxicology assay uses the lenses of cows' eyes obtained as a by-product of the beef industry, and our 96 well plate for serum protein binding uses blood proteins in vitro rather than in the bloodstream of live laboratory animals.
- IMPROVED AUTOMATION. Our in vitro toxicology assay can be run in a few minutes of instrument time and a few hours of elapsed time. By contrast, basic toxicology tests in animals typically take days of elapsed time and more advanced tests take weeks or months. Our 96 well plate for serum protein binding, for instance, can be run on automated liquid handling

equipment.

- REDUCED ANIMAL USAGE. Our in vitro toxicology assay uses cow eye lenses instead of live animals to detect toxic effects of compounds. Our drug absorption chamber uses cultured human colon cells instead of animal intestinal tissue to simulate the absorption of a drug into the blood from the digestive tract. Our 96 well plate for serum protein binding tests the binding ability of compounds on extracted blood proteins instead of infusing the compounds into the bloodstreams of live test animals.

OUR STRATEGY

Our goal is to become the leading provider of innovative, enabling technologies and products for proteomics and ADMET research in the drug discovery process. Key elements of our strategy are to:

ESTABLISH OUR PROTEOMICS AND ADMET SCREENING PRODUCTS AS INDUSTRY STANDARDS

In order to establish our products as industry standards, we intend to provide a broad selection of products focused on the target validation and ADMET screening stages of the drug discovery process. We have recently introduced several new innovative products designed to reduce the cost and time associated with protein purification and ADMET screening in drug discovery. We have already begun to realize revenue from the sales of our products, including purification pipette tips, spin columns, dialyzers, in vitro toxicology assays and equilibrium dialysis plates. We intend to rapidly increase the market acceptance of these products through the development of new uses for these products, focused, direct marketing campaigns to our extensive customer base and promotions at scientific exhibitions.

LAUNCH A BROAD RANGE OF INNOVATIVE NEW TOOLS FOR DRUG DISCOVERY

Since our reorganization in 1996, we have focused on becoming a leading provider of tools for proteomics and ADMET screening. We believe that our customers are eager to acquire new and innovative tools that reduce drug discovery time and expense. Since 1996, we have introduced several new tools for proteomics and ADMET screening such as our protein and DNA purification pipette tips, protein purification dialyzers, ScanTox in vitro toxicology assay and NaviCyte diffusion chambers.

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We intend to continue to identify, develop and introduce new tools to alleviate bottlenecks in all stages of the drug discovery process.

LEVERAGE OUR EXISTING DISTRIBUTION AND MARKETING CHANNELS

We intend to leverage the strength of our existing distribution channels to launch new products. Our 1,000 page catalog is currently distributed worldwide to approximately 100,000 researchers engaged in drug discovery and is also accessible on our website. Our customer list consists primarily of research personnel, who are the end-users of our products and largely responsible for initiating the purchase of our products. We also have wholly-owned subsidiaries in the United Kingdom, Germany, France and Canada providing us with an international market presence. In addition, some of our products are sold through a distribution arrangement with Amersham Pharmacia Biotech, or APBiotech, providing us with access to APBiotech's extensive customer base, reputation and support infrastructure. We believe that our extensive existing distribution channels, when combined with our strong reputation for high quality, reliable and durable tools, provides us with a competitive advantage in bringing new products to market quickly and cost effectively.

PROVIDE A SINGLE SOURCE OF TOOLS FOR OUR CUSTOMERS' RESEARCH NEEDS IN PROTEOMICS AND ADMET SCREENING

We seek to provide our customers with all of the tools necessary to conduct a wide variety of proteomic and ADMET experiments that are crucial to the drug discovery process. We believe that being a single source sets us apart from our competitors by increasing the likelihood that our customers will turn to our catalog or website first when looking for help with a particular experiment. Currently, our catalog and website include approximately 10,000 products. In addition, our extensive product selection allows us to leverage the sales of our proprietary products through the simultaneous sale of complementary products.

ACQUIRE COMPLEMENTARY TECHNOLOGIES

We intend to selectively acquire companies and technologies which we believe will strengthen our portfolio of tools for drug discovery, particularly in the areas of proteomics and ADMET screening. Since 1996, we have completed the acquisition of Biochrom, four other acquisitions involving the integration of acquired products and technology into our existing manufacturing base and distribution channel, and three technology acquisition or licensing transactions. In the future, we may pursue acquisitions of new products and technologies through business acquisitions, partnerships or licensing arrangements.

OUR PRODUCTS

Our products consist of both proprietary and non-proprietary products. We have historically derived the majority of our revenue from sales of proprietary products. We also act as a distributor for many non-proprietary products, which consist primarily of products used in conjunction with our proprietary products. We offer these products as a means of deriving additional revenue from customers whose initial interest in our products arises primarily out of our selection of proprietary products. We have historically derived most of our remaining revenue from the sales of these complementary, non-proprietary products.

Our broad array of proprietary products consist of the products set forth in the table below and the products described in the "Other Proprietary Products" section below the table:

PRODUCT CATEGORY	REPRESENTATIVE PRODUCT AREAS	DESCRIPTION	NUMBER OF PRODUCTS	YEAR OF INTRODUCTION FOR PRODUCT AREAS
PROTEOMICS				
Protein Purification	Purification Pipette Tips	Disposable pipette tips - coated with purification media - loaded with purification media	50	1999 (coated) Est. Q4 2000 (loaded)
	Macro Spin Columns	Disposable tubes containing purification media	20	1998
	Ultra Micro Spin Columns	Disposable tubes containing purification media	20	1998
	Dialyzers	Membrane capped plastic chambers - reusable - disposable - plates with 96 wells	45	1996 and prior
	Equilibrium Dialyzers	Membrane separating two plastic chambers - disposable - plates with 96 wells	9	1996-1999
Protein Analysis	Molecular Biology Spectrophotometers*	Range of spectrophotometers	6	1970s (initial) 2000 (latest)
	DNA/RNA/Protein Calculators*	Spectrophotometers with application software	2	1993 (initial) 2000 (latest)
	Multi-Well Plate Readers	Range of automated readers - absorbance - luminescence - fluorescence	3	Est. Q4 2000 (absorbance) Est. 2001 (luminescence) Est. 2001 (fluorescence)
	Amino Acid Analysis Systems*	Ninhydrin-based amino acid detection systems	2	1970s (initial) 2000 (latest)
ADMET SCREENING				
Absorption (in vitro)	NaviCyte Diffusion Chambers	Simulated digestive tract/ blood stream interfaces	6	1999
Distribution	Equilibrium Dialysis Plate	Membrane separating two chambers	9	1996-1999
Metabolism/ Elimination	Organ Testing Systems	Chambers with stimulators, perfusion	8	1970s-1999

and recording devices				
Toxicology	ScanTox Assay	In vitro toxicology assay	1	2000
	Precision Infusion Pumps	Syringe pumps	80	1952 (mechanical) 1986 (microprocessor) 1998 (latest)

* We acquired all of these products in March 1999 through our acquisition of Biochrom. The financial statements for Biochrom included in this prospectus present the financial results of Biochrom's business for the years ended December 31, 1998 and 1997.

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We believe that sales of products included within the product areas set forth in the table above currently generate approximately two-thirds of our total revenue. For the fiscal years ended December 31, 1997 and 1998, which preceded our March 1999 acquisition of Biochrom, we believe that we generated less than two-thirds of our revenue from sales of these products. For the year ended December 31, 1999 and the nine-month period ended September 30, 2000, we believe that revenue from sales of our molecular biology spectrophotometers and related consumables exceeded 15% of our total revenue. For the year ended December 31, 1998, we believe that revenue from sales of our precision infusion pumps exceeded 15% of our total revenue. Except as noted above, we do not believe that revenue from sales of any other class of our products exceeded 15% of our total revenue in the years ended December 31, 1998 and 1999 and the nine-month period ended September 30, 2000. The year of introduction for each product area set forth in the table above represents the year in which we or one of our predecessor companies introduced the first generation product in this product area.

PROTEOMICS PRODUCTS--PROTEIN PURIFICATION

PREPTIP PROTEIN PURIFICATION PIPETTE TIPS

Our proprietary PrepTip pipette tips consist of a standard disposable pipette tip coated on the inside with the same chromatography media used in packed bed columns. This coating selectively binds proteins, but not the salts, detergents, electrophoresis gels, buffers and cellular debris that are often mixed in with the proteins. Our PrepTip pipette tip enables customers to rapidly purify proteins by avoiding the time-consuming usage of a centrifuge required when using spin columns. In addition, it is easy to use because the protein solution is handled entirely within the pipette tip and does not have to be moved through a separate device like a packed bed column or dialyzer. Because our PrepTip pipette tips use the same chromatography media as packed bed columns, they can take advantage of the wide range of existing purification protocols using these media.

PURETIP DNA PURIFICATION PIPETTE TIPS

PureTip pipette tip uses a pipette tip that is similar to the PrepTip pipette tip, but is loaded with a gel rather than coated. This is well suited for performing DNA purification. PureTip pipette tips are more adaptable to automation than spin columns because they fit onto automated pipetting workstations. We expect to launch the PureTip pipette tip later this year.

SPIN COLUMNS

Spin columns are short plastic tubes that contain purification media. Once a sample is placed in the tube, it is typically spun in a centrifuge to move the sample through the media and separate the proteins from the other cellular debris. Our Ultra Micro spin columns, which we provide in both single and 96 well plate versions, contain chromatography media for use in purifying sample volumes as small as five microliters. This is significantly smaller than the sample volume required by columns produced by our largest competitors.

PROTEIN PURIFICATION DIALYZERS

Dialyzers are small chambers with an open end covered with a membrane. The

membrane allows small molecules to pass through but not large molecules. Because proteins are large molecules and most contaminants are small molecules, this is an effective way to purify proteins. We make single- and double-sided reusable and disposable dialyzers.

DISPOSABLE EQUILIBRIUM DIALYZERS

Our proprietary disposable equilibrium dialyzers are effective cost-efficient products for protein binding studies and can handle sample sizes as small as 75 microliters. These disposable products are particularly useful for binding studies involving radioactively labeled compounds because the dialyzer does not require cleaning after use.

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PROTEOMICS PRODUCTS--PROTEIN ANALYSIS

MOLECULAR BIOLOGY SPECTROPHOTOMETERS

A spectrophotometer is an instrument widely used in molecular biology and cell biology to quantify the amount of a compound in a sample by shining a beam of white light through a prism or grating to divide it into component wavelengths. Each wavelength in turn is shone through a liquid sample and the spectrophotometer measures the amount of light absorbed at each wavelength. This enables the quantification of the amount of a compound in a sample. We sell a wide range of spectrophotometers under the names UltroSpec and NovaSpec. These products are manufactured by our Biochrom subsidiary and sold primarily through our distribution arrangement with Amersham Pharmacia Biotech.

DNA/RNA/PROTEIN CALCULATORS

A DNA/RNA/protein calculator is a bench top instrument dedicated to quantifying the amount of DNA, RNA or protein in a sample. It uses a process similar to that of a molecular biology spectrophotometer. These are sold under the names GeneQuant and GeneQuantPro. Launched in 1993, we believe that we were the first company to sell such an instrument. These products are manufactured by our Biochrom subsidiary and sold primarily through Amersham Pharmacia Biotech.

MULTI-WELL PLATE READERS

Multi-well plate readers are widely used for high throughput screening assays in the drug discovery process. The most common format is 96 wells. They use light to detect chemical interactions. We plan to introduce a range of these products beginning with absorbance readers in the fourth quarter of 2000 and luminescence and fluorescence readers in 2001 primarily for distribution through Amersham Pharmacia Biotech.

AMINO ACID ANALYSIS SYSTEMS

An amino acid analysis system uses chromatography to separate the amino acids in a sample and then uses a chemical reaction to detect each one in turn as they flow out of the chromatography column. Amino acids are the building blocks of proteins. In June 2000, we acquired substantially all of the amino acid analysis systems business of the Biotronik subsidiary of Eppendorf-Netheler-Hinz GmbH and integrated it with the existing amino acid analysis systems business in our Biochrom subsidiary.

ADMET SCREENING PRODUCTS

We have traditionally sold products for ADMET testing that are based upon animal models. However, as a result of a series of acquisitions and licensing transactions, we have begun to develop and manufacture organ testing systems, tissue testing systems and serum protein binding assays for early toxicology testing.

NAVICYTE DIFFUSION CHAMBERS

A diffusion chamber is a small plastic chamber with a membrane separating the two halves of the chamber used to measure the absorption of a drug into the bloodstream. The membrane can either be tissue such as intestinal tissue or a cultured layer of cells such as human colon cells. This creates a miniaturized model of intestinal absorption. We entered this market with our 1999 acquisition of the assets of NaviCyte Inc., a wholly owned subsidiary of Trega Biosciences.

96 WELL EQUILIBRIUM DIALYSIS PLATE FOR SERUM PROTEIN BINDING ASSAYS

Our 96 well equilibrium dialysis plate operates in a similar way to the equilibrium dialyzers for target validation described above. The difference is that both chambers on either side of the membrane are capped. The protein target is placed on one side of the membrane and the drug on the other. The small molecule drug diffuses through the membrane. If it binds to the target, it cannot diffuse back

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again. If it does not bind, it will diffuse back and forth until an equilibrium is established. Thus, measuring the drug concentration determines the strength of binding. This product is principally used for ADMET screening to determine if a drug binds to blood proteins. A certain level of reversible binding is advantageous in order to promote good distribution of a drug through the human body. However, if the binding is too strong, it may impair normal protein function and cause toxic effects.

ORGAN TESTING SYSTEMS

Organ testing systems use glass or plastic chambers together with stimulators and recording electrodes to study organ function. Organ testing systems enable either whole organs or strips of tissue from organs such as hearts, livers and lungs to be kept functioning outside the body while researchers perform experiments with them. They are typically used in place of live animals. We have sold basic versions of these systems for many years, but have significantly expanded our product offerings through our November 1999 acquisition of Hugo Sachs Elektronik. Studies on isolated livers are useful in determining metabolism and studies on kidneys are useful in determining elimination.

SCANTOX IN VITRO TOXICOLOGY SCREENING

Our proprietary ScanTox in vitro toxicology screening system uses a living organ system, a bovine eye lens, to detect the toxic effect of compounds by measuring the refraction of laser light passing through the eye lens. A healthy lens focuses light to a point, but when a toxic compound is added to the lens environment, the lens reacts by defocusing. The extent of defocusing is measured and analyzed by the instrument. Its advantages include:

- higher relevance to whole body toxicology than a cell-based assay, without the complicated support and measurement apparatus needed for other organs such as hearts or lungs,
- higher sensitivity and reproducibility than live animal assays,
- higher sensitivity than other tissue assays, and
- easier operation than other animal or tissue assays because the data is collected and analyzed automatically.

PRECISION INFUSION PUMPS

Infusion pumps, typically syringe pumps, are used to accurately infuse very small quantities of liquid, commonly drugs. Infusion pumps are typically used for long-term toxicology testing of drugs by infusion into animals, typically laboratory rats. We sell 80 types of syringe pumps.

OTHER PROPRIETARY PRODUCTS

CELL INJECTION SYSTEMS

Cell injection systems use extremely fine bore glass capillaries to penetrate and inject drugs into or around individual cells. Cell injection systems are used to study the effects of drugs on single cells. Injection is accomplished either with air pressure or, if the drug molecule is electrically charged, by applying an electric current. We entered this market with our 1998 acquisition of the research products of Medical Systems Corporation.

VENTILATORS

Ventilators use a piston driven air pump to inflate the lungs of an anesthetized animal. Ventilators are typically used in surgical procedures

common in drug discovery. Our advanced Inspira ventilators have significant safety and ease of use features, such as default safety settings, not found on other ventilators.

CPK ATOMIC MODELS

CPK atomic models use colored plastic parts to accurately model molecular structures, such as DNA. We offer a wide range of components and assembled models.

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STRONGHOLD LABORATORY CLAMPS

Stronghold laboratory clamps are made from glass reinforced nylon. Our clamps resist rusting which is a common problem with steel clamps. We provide a wide variety of clamps, stands and lattices.

OEM PRODUCTS

Our reputation for quality, durability and reliability has led to the formation of a number of original equipment manufacturer, or OEM, relationships with major life science instrument companies. These relationships are conducted through purchase orders and are not contractual. A good example of these relationships is with respect to our syringe pumps. Our syringe pumps are capable of delivering flow rates as low as 0.001 microliters per hour while maintaining high accuracy. We have adapted, in conjunction with our OEMs, the core technology embodied in our syringe pumps to make specialized sample injectors for many of the major mass spectrometry manufacturers.

DISTRIBUTED PRODUCTS

In addition to the proprietary, manufactured products described above, we buy and resell through our catalog products made by other manufacturers. We have negotiated supply agreements with the majority of the companies that provide our distributed products. These supply agreements specify pricing only and contain no minimum purchase commitments. None of these agreements represents more than two percent of our revenues. Distributed products accounted for approximately 18% of our revenues for the nine months ended September 30, 2000. These distributed products enable us to provide our customers with a single source for their experimental needs. These complementary products consist of a large variety of devices, instruments and consumable items used in experiments involving animals and biological tissue in the fields of proteomics, physiology, pharmacology, neuroscience, cell biology, molecular biology and toxicology. Our manufactured products are often leaders in their fields, but researchers often need complementary products in order to conduct their particular experiments. Most of these complementary products come from small companies without our extensive distribution and marketing channel.

OUR CUSTOMERS

Our customers are primarily end user research scientists at pharmaceutical and biotechnology companies, universities and government laboratories, such as the U.S. National Institutes of Health, or NIH. Our largest customers in the United States include Baylor College of Medicine, Bristol-Myers Squibb Company, Eli Lilly and Company, Johns Hopkins University, Merck & Co., Inc., NIH, Parke-Davis, Pfizer Inc., Schering-Plough Corporation, SmithKline Beecham plc and the University of California.

We conduct direct sales in the United States, the United Kingdom, Germany, France and Canada. We also maintain distributors in other countries. Aggregate sales to our largest customer, Amersham Pharmacia Biotech, as a distributor with end users similar to ours, accounted for approximately 39% of our revenue for the nine months ended September 30, 2000, and 44% of our revenue for the fiscal year ended December 31, 1999. We have several thousand customers worldwide and no other customer accounted for more than five percent of our revenue for such periods.

SALES AND MARKETING

DIRECT SALES

We periodically produce and mail approximately 100,000 copies of our

1,000-page catalog, which contains approximately 10,000 items. We distribute the majority of our products ordered from our catalog through our worldwide subsidiaries. Our manufactured products accounted for approximately 82% of our revenues for the nine months ended September 30, 2000. The complete catalog is also

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available as a CD-ROM and can be accessed on our website, www.harvardbioscience.com. Our significant positions in many of our manufactured products create traffic to the catalog and web site which enables cross-selling and facilitates the introduction of new products. In addition to the comprehensive catalog, we create and mail abridged catalogs which focus on specific product areas along with direct mailers which introduce or promote new products.

AMERSHAM PHARMACIA BIOTECH DISTRIBUTOR

Since the 1970s, our Biochrom subsidiary has used Amersham Pharmacia Biotech, or APBiotech, and its predecessors as its primary marketing and distribution channel. When we acquired Biochrom from Pharmacia and Upjohn in 1999, we signed a distribution, marketing and new product development agreement with APBiotech. Under the terms of this agreement, APBiotech serves as the exclusive distributor, marketer and seller of a majority of the products of our Biochrom subsidiary. During the term of this agreement, APBiotech has agreed to purchase a minimum number of our products for an annual amount of \$12.5 million, subject to adjustment for price increases and product sales volume. We have certain affirmative duties under the agreement to assist APBiotech in the sale of our products. For example, we have agreed to cooperate with APBiotech in its sales and marketing program and to provide sales, demonstration and support training for APBiotech. This agreement may be terminated early under specified circumstances. For example, if we breach the exclusivity, pricing or shipping provisions of the agreement and fail to remedy the breach within 30 days of receiving written notice of the breach from APBiotech, then the agreement may be terminated. In addition, we may terminate the agreement under specified circumstances. For example, failure by APBiotech to place certain information in escrow, to pay for products or to purchase a minimum number of products each year enables us to terminate the agreement unless APBiotech remedies the breach within 30 days of receiving written notice of the breach from us. This agreement may be terminated by either party upon 18 months' prior written notice. This agreement does not have a finite term, but remains in effect until terminated by either us or APBiotech.

RESEARCH AND DEVELOPMENT

Our principal research and development mission is to develop a broad portfolio of technologies, products and core competencies in drug discovery tools, particularly for application in the areas of proteomics and ADMET.

Our development expenditures were \$206,000 in 1997, \$325,000 in 1998 and \$1.2 million in 1999. We anticipate that we will continue to make significant development expenditures. We plan to continue to pursue a balanced development portfolio strategy of originating new products from internal research and development programs and business and technology acquisitions.

We maintain development staff in each of our manufacturing facilities to design and develop new products. In-house development is focused on our current technologies. For new technologies, our strategy has been to license or acquire proven technology from universities and biotechnology companies and then develop the technology into commercially viable products.

MANUFACTURING

We manufacture and test the majority of our products in our four principal manufacturing facilities located in the United States, the United Kingdom and Germany. We have considerable manufacturing flexibility at our various facilities, and each facility can manufacture multiple products at the same time. We maintain in-house key manufacturing know-how, technologies and resources. We seek to maintain multiple suppliers for key components that are not manufactured in-house.

Our manufacturing operations are essentially to assemble and test. Our manufacturing of syringe pumps, ventilators, cell injectors and protein purification products takes place in Holliston,

Massachusetts. Our manufacturing of spectrophotometers and amino acid analysis systems takes place in Cambridge, England. Our manufacturing of surgery-related products and teaching products takes place in Edenbridge, England. Our manufacturing of complete organ testing systems takes place in March-Hugstetten, Germany. Our Cambridge, England facility is certified to ISO 9001.

COMPETITION

The markets into which we sell our products are highly competitive, and we expect the intensity of competition to increase. We compete with many companies engaged in developing and selling tools for drug discovery. Many of our competitors have greater financial, operational, sales and marketing resources, and more experience in research and development and commercialization than we have. Moreover, competitors may have greater name recognition than we do, and many offer discounts as a competitive tactic. These competitors and other companies may have developed or could in the future develop new technologies that compete with our products or which could render our products obsolete. We cannot assure you that we will be able to make the enhancements to our technologies necessary to compete successfully with newly emerging technologies. We are not aware of any significant products sold by us which are currently obsolete.

We believe that we offer one of the broadest selections of protein purification and ADMET technologies to companies engaged in drug discovery. We are not aware of any competitor which offers a product line of comparable breadth within the protein purification and ADMET product markets. We have numerous competitors on a product line basis. We believe that we compete favorably with our competitors on the basis of product performance, including quality, reliability and speed, technical support, price and delivery time. We compete with several companies that provide instruments for proteomics and ADMET screening. In the DNA/RNA/protein calculator area, we compete with PerkinElmer Instruments, Inc. and Bio-Rad Laboratories, Inc. In the molecular biology spectrophotometer area, we compete with Beckman Coulter, Inc. and PerkinElmer Instruments, Inc. In the protein sample preparation area, we compete with Millipore Corporation, Pierce Chemical Company and Spectrum Medical. In the ADMET screening area, we compete with KD Scientific, Razel Scientific Instruments, Inc., Experimetria Ltd., Kent Scientific Corporation, Warner Instruments, General Valve Company, Eppendorf-Netheler-Hinz GmbH, Ugo Basile and Becton, Dickinson and Company. In the area of OEM products, we face competition primarily from the in-house engineering teams of our OEM customers.

INTELLECTUAL PROPERTY

To establish and protect our proprietary technologies and products, we rely on a combination of patent, copyright, trademark and trade-secret laws, as well as confidentiality provisions in our contracts. Most of our new technology is covered by patents or patent applications. Most of our base business is protected by trade names and trade secrets only.

We have implemented a patent strategy designed to provide us with freedom to operate and facilitate commercialization of our current and future products. We currently own ten issued U.S. patents and have four pending applications. We also hold exclusive licenses for the technologies used in our ScanTox in vitro toxicology products, our NaviCyte drug absorption products and our PureTip pipette tip products. In addition to these licenses, our principal technologies are covered by issued patents for our dialyzers and our Ultra Micro spin columns and by pending applications for our PrepTip pipette tips. Furthermore, international patent applications are pending in connection with one of our U.S. patent applications and one of our licensed patents.

Generally, U.S. patents have a term of 17 years from the date of issue for patents issued from applications filed with the U.S. Patent Office prior to June 8, 1995, and 20 years from the application filing date or earlier claimed priority date in the case of patents issued from applications filed on or

after June 8, 1995. Our issued US patents will expire between 2011 and 2018. Our success depends to a significant degree upon our ability to develop proprietary products and technologies. We intend to continue to file patent applications as we develop new products and technologies.

Patents provide some degree of protection for our intellectual property.

However, the assertion of patent protection involves complex legal and factual determinations and is therefore uncertain. The scope of any of our issued patents may not be sufficiently broad to offer meaningful protection. In addition, our issued patents or patents licensed to us may be successfully challenged, invalidated, circumvented or unenforceable so that our patent rights would not create an effective competitive barrier. Moreover, the laws of some foreign countries may not protect our proprietary rights to the same extent as do the laws of the United States. In addition, the laws governing patentability and the scope of patent coverage continue to evolve, particularly in areas of interest to us. As a result, there can be no assurance that patents will issue from any of our patent applications or from applications licensed to us. In view of these factors, our intellectual property positions bear some degree of uncertainty.

We also rely in part on trade-secret protection of our intellectual property. We attempt to protect our trade secrets by entering into confidentiality agreements with third parties, employees and consultants. Our employees and consultants also sign agreements requiring that they assign to us their interests in patents and copyrights arising from their work for us. Many of our U.S. employees have signed agreements not to compete unfairly with us during their employment and after termination of their employment, through the misuse of confidential information, soliciting employees, soliciting customers and the like. However, it is possible that these agreements may be breached or invalidated and if so, there may not be an adequate corrective remedy available. Despite the measures we have taken to protect our intellectual property, we cannot assure you that third parties will not independently discover or invent competing technologies, or reverse engineer our trade secrets or other technologies. Therefore, the measures we are taking to protect our proprietary rights may not be adequate.

We do not believe that our products infringe on the intellectual property rights of any third party. We cannot assure you, however, that third parties will not claim such infringement by us or our licensors with respect to current or future products. We expect that product developers in our market will increasingly be subject to such claims as the number of products and competitors in our market segment grows and the product functionality in different market segments overlaps. In addition, patents on production and business methods are becoming more common and we expect that more patents will issue in our technical field. Any such claims, with or without merit, could be time-consuming, result in costly litigation and diversion of management's attention and resources, cause product shipment delays or require us to enter into royalty or licensing agreements. Moreover, such royalty or licensing agreements, if required, may not be on terms acceptable to us, or at all, which could seriously harm our business or financial condition.

GOVERNMENT REGULATION

We are not subject to direct governmental regulation other than the laws and regulations generally applicable to businesses in the domestic and foreign jurisdictions in which we operate. In particular, we are not subject to regulatory approval by the United States Food and Drug Administration as none of our products are sold for use in diagnostic procedures or on human clinical patients. In addition, we believe we are in compliance with all relevant environmental laws.

EMPLOYEES

As of October 15, 2000, we had 127 full-time employees and 6 part-time employees, 38 of whom resided in the United States, 77 of whom resided in the United Kingdom, 11 of whom resided in

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Germany, 3 of whom resided in France and 4 of whom resided in Canada. None of our employees is subject to any collective bargaining agreement. We believe that our relationship with our employees is good.

FACILITIES

Our four principal facilities incorporate manufacturing, development, sales and marketing and administration functions. Our facilities consist of:

- a leased 20,000 square foot facility in Holliston, Massachusetts, which is our corporate headquarters,

- a leased 28,000 square foot facility in Cambridge, England,
- an owned 15,500 square foot facility in Edenbridge, England, and
- a leased 9,000 square foot facility in March-Hugstetten, Germany.

We lease additional facilities for sales and administrative support in Les Ulix, Paris France and Montreal, Quebec Canada.

LEGAL PROCEEDINGS

On November 7, 2000, we received correspondence from counsel to Harvard University claiming that our use of the term "Harvard Bioscience" and other terms containing or consisting of the term "Harvard" constitutes trademark infringement, false designation of origin, unfair competition and cybersquatting. Counsel to Harvard University has also threatened us with legal action if we do not cease and permanently refrain from using these terms. We do not currently intend to take such steps, and we believe it is likely that Harvard University will pursue this matter against us. We believe that these claims are without merit, and we will vigorously seek to protect our rights regarding such claims. While we are still investigating the matter, we do not believe that the matter will have a material adverse effect on our business, financial position or results of operations.

From time to time, we may be involved in various other claims and legal proceedings arising in the ordinary course of business. We are not currently a party to any other claims or proceedings which, we believe, if decided adversely to us, would either individually or in the aggregate have a material adverse effect on our business, financial condition or results of operations.

MANAGEMENT

EXECUTIVE OFFICERS AND DIRECTORS

The following table shows information about our executive officers and directors as of October 15, 2000.

NAME	AGE	POSITION
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Chane Graziano.....	62	Chief Executive Officer and Director
David Green.....	36	President and Director
James Warren.....	55	Chief Financial Officer
Mark Norige.....	46	Chief Operating Officer
John House.....	56	Managing Director, Biochrom Ltd
Susan Lusinski.....	44	Vice President of Finance and Administration
Christopher W. Dick.....	46	Director
Robert Dishman.....	56	Director
John F. Kennedy.....	51	Director
Richard C. Klaffky, Jr.....	54	Director
Earl R. Lewis.....	56	Director

Messrs. Dick and Klaffky are members of our compensation committee.

Messrs. Kennedy, Klaffky and Lewis are members of our audit committee.

CHANE GRAZIANO has served as our Chief Executive Officer and as a member of our board of directors since March 1996. Prior to joining Harvard Bioscience, Mr. Graziano served as the President of Analytical Technology Inc., an analytical electrochemistry instruments company, from 1993 to 1996 and as the President and Chief Executive Officer of its predecessor, Analytical

Technology Inc.-Orion, an electrochemistry instruments and laboratory products company, from 1990 until 1993. Mr. Graziano served as the President of Waters Corporation, an analytical instrument manufacturer, from 1985 until 1989. Mr. Graziano has over 36 years experience in the laboratory products and analytical instruments industry.

DAVID GREEN has served as our President and as a member of our board of directors since March 1996. Prior to joining Harvard Bioscience, Mr. Green was a strategy consultant with Monitor Company, a strategy consulting company, in Cambridge, Massachusetts and Johannesburg, South Africa from June 1991 until September 1995 and a brand manager for household products with Unilever PLC, a packaged consumer goods company, in London from September 1985 to February 1989. Mr. Green graduated from Oxford University with a B.A. Honors degree in physics and holds a M.B.A. degree with distinction from Harvard Business School.

JAMES WARREN has served as our Chief Financial Officer since July 2000. Prior to joining Harvard Bioscience, Mr. Warren served as the Chief Financial Officer of Aquila Biopharmaceuticals, Inc., a life sciences company, from January 1998 until July 2000 and as the Corporate Controller of Genzyme Corporation, a biotechnology company, from 1991 until January 1998. Mr. Warren holds a M.B.A. degree from Boston University.

MARK NORIGE has served as our Chief Operating Officer since January 2000 and in various other positions with us since September 1996. Prior to joining Harvard Bioscience, Mr. Norige served as a Business Unit Manager at QuadTech, Inc., an impedance measuring instrument manufacturer, from May 1995 until September 1996. Mr. Norige worked at Waters Corporation from 1977 until May 1995.

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JOHN HOUSE has served as Managing Director of our Biochrom Ltd subsidiary since July 2000. Prior to joining Biochrom, Mr. House was retired from January 1995 until July 2000 and engaged during that period primarily in charitable activities. Mr. House served in various positions with, and most recently as a Managing Director of, Unicam Ltd., a manufacturer of analytical instruments, from 1987 until January 1995.

SUSAN LUSCINKSI has served as our Vice President of Finance and Administration since May 1999. Ms. Luscinski served as our Corporate Controller from May 1988 until May 1999 and has served in various other positions at our company and its predecessor since January 1985.

CHRISTOPHER W. DICK has served as a director of Harvard Bioscience since March 1996. Mr. Dick has served as Managing Director of Ascent Venture Management, Inc., a private equity firm, since March 1999. Mr. Dick has served as a Managing Member or General Partner of Ascent Venture Partners, L.P. fund and Ascent Venture Partners II, L.P. fund since 1999. Prior to joining Ascent Venture Management, Inc., Mr. Dick served as General Partner of Pioneer Capital Corporation, a private equity management firm, from 1991 until March 1999. Mr. Dick is a graduate of Cornell University and holds a M.B.A. degree from Babson College.

ROBERT DISHMAN has served as a director of Harvard Bioscience since October 2000. Since 1994, Mr. Dishman has served in various positions with, and most recently as an Executive Vice President and Director of Dyax Corp. (formerly Biotage, Inc.), a commercial physical and biological research company. Mr. Dishman holds a Ph.D. in Analytical Chemistry from the University of Massachusetts-Amherst.

JOHN F. KENNEDY has served as a director of Harvard Bioscience since October 2000. Mr. Kennedy has served as the Senior Vice President, Finance, Chief Financial Officer and Treasurer of RSA Security Inc., an e-business security company, since August 1999. Prior to joining RSA Security, Mr. Kennedy was Chief Financial Officer of decalog, NV, a developer of enterprise investment management software, from 1998 to 1999. From 1993 to 1998, Mr. Kennedy served as Vice President of Finance, Chief Financial Officer and Treasurer of Natural MicroSystems Corporation, a telecommunications company. Mr. Kennedy holds a M.S.B.A. in Accounting from the University of Massachusetts-Amherst.

RICHARD C. KLAFFKY, JR. has served as a director of Harvard Bioscience since March 1996. Since 1987, Mr. Klaffky has served as President of FINEC Corp., the corporate general partner of two private equity partnerships, First New England Capital L.P. and First New England Capital 2 L.P., based in Hartford,

Connecticut. Mr. Klaffky also serves as a director of Centrum Industries, a manufacturing company in the metal forming, material handling and motor production industries. Mr. Klaffky is a graduate of Brown University and holds a M.B.A. degree from Columbia University.

EARL R. LEWIS has served as a director of Harvard Bioscience since October 2000. Mr. Lewis has served in various capacities with Thermo Instrument Systems (now merged into Thermo Electron Corporation) since 1986 and was subsequently named President in 1997 and Chief Executive Officer in 1998. ThermoElectron Corporation develops, manufactures and markets measuring and controlling devices. Mr. Lewis is Chairman of Thermo BioAnalysis Corporation, Thermo Vision Corporation, Thermo Optek Corporation, ThermoQuest Corporation, each of which is a developer of laboratory analytical instruments, and ONIX Systems, Inc., a developer of measuring and controlling devices. Mr. Lewis is a director of SpectRx, Inc., an electromedical and electrotherapeutic company, Metrika Systems Corporation, a developer of industrial instruments for measurement, display and control, and ThermoSpectra Corporation, a developer of instruments for measuring and testing of electricity and electric signals.

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BOARD COMPOSITION

Following the closing of this offering, our board of directors will be divided into three classes, each of whose members will serve for a staggered three-year term. Our board of directors will consist of Messrs. Dick, Dishman and Klaffky as Class I directors, whose term of office will continue until the 2001 annual meeting of stockholders, Messrs. Green and Kennedy as Class II directors, whose term of office will continue until the 2002 annual meeting of stockholders, and Messrs. Graziano and Lewis as Class III directors, whose term of office will continue until the 2003 annual meeting of stockholders. At each annual meeting of stockholders, a class of directors will be elected for a three-year term to succeed the directors of the same class whose terms are then expiring.

BOARD COMMITTEES

Effective upon the closing of this offering, our board of directors will reconstitute the audit committee and compensation committee.

AUDIT COMMITTEE. The members of the audit committee will be responsible for recommending to the board of directors the engagement of our outside auditors and reviewing our accounting controls and the results and scope of audits and other services provided by our auditors. Our audit committee will consist of three independent directors.

COMPENSATION COMMITTEE. The members of the compensation committee, a majority of whom will be independent directors, will be responsible for approving or recommending to the board of directors the amount and type of consideration to be paid to senior management, administering our stock option plans and establishing and reviewing general policies relating to compensation and benefits of employees.

DIRECTOR COMPENSATION

We reimburse our non-employee directors for their expenses incurred in connection with attending board and committee meetings but do not provide cash compensation for their services as board or committee members. Directors are eligible to participate in our 2000 Stock Option and Incentive Plan. Each of our non-employee directors, other than Messrs. Dick and Klaffky, will receive a one-time option grant of 10,000 shares vesting annually over three years upon joining the board and an annual option grant of 2,500 shares vesting annually over three years on the date of each annual meeting of stockholders following the closing of this offering. The exercise price for each of these option grants will be equal to the fair market value of the underlying shares of our common stock on the date of grant.

EXECUTIVE COMPENSATION

The following table sets forth the total compensation paid or accrued in the fiscal year ended December 31, 1999 to our Chief Executive Officer and the three other executive officers whose aggregate compensation exceeded \$100,000.

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SUMMARY COMPENSATION TABLE

NAME AND POSITION	ANNUAL COMPENSATION		LONG-TERM	ALL OTHER COMPENSATION
	SALARY	BONUS	COMPENSATION	
			NUMBER OF SECURITIES UNDERLYING OPTIONS GRANTED	
Chane Graziano Chief Executive Officer	\$219,000	\$232,000	458,257	\$19,592 (1)
David Green President	175,000	186,000	458,257	15,507 (2)
Mark A. Norige Chief Operating Officer	108,000	35,000	--	5,447 (3)
Susan M. Lusciniski Vice President of Finance and Administration	95,000	47,500	--	4,832 (3)

(1) Includes \$7,357 in automobile lease payments, \$7,520 in contributions by us to Mr. Graziano's 401(k) account and \$4,715 representing life insurance purchased for Mr. Graziano's benefit.

(2) Includes \$7,687 in automobile lease payments, \$7,165 in contributions by us to Mr. Green's 401(k) account and \$655 representing life insurance purchased for Mr. Green's benefit.

(3) Represents contributions by us to the executive officers' 401(k) accounts.

OPTION GRANTS IN LAST FISCAL YEAR AND OPTION VALUES AT FISCAL YEAR END

The following table provides information regarding stock options granted to the named executive officers during the fiscal year ended December 31, 1999.

OPTION GRANTS IN FISCAL YEAR 1999

NAME	DATE OF GRANT	INDIVIDUAL GRANTS			EXPIRATION DATE	POTENTIAL REALIZABLE VALUE AT ASSUMED ANNUAL RATE OF STOCK PRICE APPRECIATION FOR OPTION TERM (3)	
		NUMBER OF SECURITIES UNDERLYING OPTIONS GRANTED (1)	PERCENT OF TOTAL OPTIONS GRANTED TO EMPLOYEES IN FISCAL YEAR (2)	EXERCISE PRICE PER SHARE		5%	10%
Chane Graziano	3/2/1999	458,257	50%	\$1.0461	3/2/2009	\$301,480	\$764,009
David Green	3/2/1999	458,257	50%	1.0461	3/2/2009	301,480	764,009

(1) The options, as amended in September 2000, vest upon the sale of all or substantially all of our assets or capital stock for a price per share of common stock of at least \$2.09, or if our fair market value at any time prior to December 31, 2000 results in a per share valuation, on a fully-diluted basis, of not less than \$2.09 per share. The exercise price of the options is equal to the fair market value of our common stock on the date of grant.

(2) Based on an aggregate of 916,514 options granted in fiscal 1999.

(3) The amounts shown as potential realizable value illustrate what might be realized upon exercise immediately prior to expiration of the option term using the 5% and 10% appreciation rates compounded annually as established in regulations of the Securities and Exchange Commission.

The following table sets forth the potential realizable value of the options granted to the listed executive officers using our assumed initial public offering price of \$12.00 per share:

	NUMBER OF SECURITIES UNDERLYING OPTIONS GRANTED	POTENTIAL REALIZABLE VALUE AT ASSUMED ANNUAL RATES OF STOCK PRICE APPRECIATION FOR OPTION TERM	
		5%	10%
		-----	-----
Chane Graziano.....	458,257	\$8,478,047	\$13,783,827
David Green.....	458,257	\$8,478,047	\$13,783,827

The potential realizable value is not intended to predict future appreciation of the price of our common stock. The values shown do not consider non-transferability, vesting or termination of the options upon termination of the employee's employment relationship with us.

FISCAL YEAR-END OPTION VALUES

The following table sets forth information concerning the number and value of unexercised options to purchase common stock held as of December 31, 1999 by the executive officers listed in the Summary Compensation Table. There was no public trading market for our common stock as of December 31, 1999. Accordingly, the values of the unexercised in-the-money options have been calculated on the basis of the estimated fair value of our common stock at December 31, 1999 of \$3.67, less the applicable exercise price multiplied by the number of shares which may be acquired on exercise. None of the executive officers listed in the Summary Compensation Table exercised any stock options in fiscal 1999.

AGGREGATE OPTION AMOUNTS AND FISCAL YEAR-END OPTION VALUES

NAME	NUMBER OF SECURITIES UNDERLYING UNEXERCISED OPTIONS AT FISCAL YEAR-END		VALUE OF UNEXERCISED IN-THE-MONEY OPTIONS AT FISCAL YEAR-END	
	EXERCISABLE	UNEXERCISABLE	EXERCISABLE	UNEXERCISABLE
	-----	-----	-----	-----
Chane Graziano.....	783,808	570,229	\$2,872,746	\$1,610,825
David Green.....	783,808	570,229	2,872,746	1,610,825
Mark A. Norige.....	55,976	55,996	204,366	204,438
Susan M. Lusinski.....	83,965	28,007	307,742	102,653

BENEFIT PLANS

2000 STOCK OPTION AND INCENTIVE PLAN. Our board of directors has adopted the 2000 Stock Option and Incentive Plan, subject to stockholder approval. The 2000 Stock Option and Incentive Plan will be submitted to our stockholders for approval in November 2000. The 2000 Stock Option and Incentive Plan allows for the issuance of up to 3,750,000 shares of common stock plus an additional amount equal to 15% of any net increase in the total number of shares of common stock outstanding after this offering. Our compensation committee will administer the 2000 Stock Option and Incentive Plan.

Under the 2000 Stock Option and Incentive Plan, our compensation committee may:

- grant incentive stock options,
- grant non-qualified stock options,

- grant stock appreciation rights,
- issue or sell common stock with vesting or other restrictions, or without restrictions,

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- grant rights to receive common stock in the future with or without vesting,
- grant common stock upon the attainment of specified performance goals, and
- grant dividend rights in respect of common stock.

These grants and issuances may be made to our officers, employees, directors, consultants, advisors and other key persons.

Our compensation committee has the right, in its discretion, to select the individuals eligible to receive awards, determine the terms and conditions of the awards granted, accelerate the vesting schedule of any award and generally administer and interpret the plan.

The exercise price of options granted under the 2000 Stock Option and Incentive Plan is determined by our compensation committee. Under present law, incentive stock options and options intended to qualify as performance-based compensation under Section 162(m) of the Internal Revenue Code of 1986 may not be granted at an exercise price less than the fair market value of the common stock on the date of grant, or less than 110% of the fair market value in the case of incentive stock options granted to optionees holding more than 10% of the voting power.

Non-qualified stock options may be granted at prices which are less than the fair market value of the underlying shares on the date granted. Options are typically subject to vesting schedules, terminate 10 years from the date of grant and may be exercised for specified periods after the termination of the optionee's employment or other service relationship with us. Upon the exercise of options, the option exercise price must be paid in full either in cash or by certified or bank check or other instrument acceptable to the committee or, in the sole discretion of the committee, by delivery of shares of common stock that have been owned by the optionee free of restrictions for at least six months.

The 2000 Stock Option and Incentive Plan and all awards issued under the plan will terminate upon a merger, reorganization or consolidation, the sale of all or substantially all of our assets or all of our outstanding capital stock or a liquidation or other similar transaction, unless Harvard Bioscience and the other parties to such transactions have agreed otherwise. All participants under the 2000 Stock Option and Incentive Plan will be permitted to exercise for a period of 30 days before any such termination all awards held by them which are then exercisable or will become exercisable upon the closing of the transaction.

EMPLOYEE STOCK PURCHASE PLAN. The Employee Stock Purchase Plan was adopted by our board of directors in October 2000 subject to stockholder approval. The Employee Stock Purchase Plan will be submitted to stockholders in November 2000. Up to 500,000 shares of our common stock may be issued under the Employee Stock Purchase Plan. The Employee Stock Purchase Plan is administered by our compensation committee.

The first offering under the Employee Stock Purchase Plan will commence on January 1, 2001 and end on June 30, 2001. Subsequent offerings will commence on each January 1 and July 1 thereafter and will have a duration of six months. Generally, all employees who are customarily employed for more than 20 hours per week as of the first day of the applicable offering period are eligible to participate in the Employee Stock Purchase Plan. Any employee who owns or is deemed to own shares of stock representing in excess of 5% of the combined voting power of all classes of our stock may not participate in the Employee Stock Purchase Plan.

During each offering, an employee may purchase shares under the Employee Stock Purchase Plan by authorizing payroll deductions of up to 10% of his cash compensation during the offering period. Unless the employee has previously withdrawn from the offering, his accumulated payroll deductions will be used to purchase shares of our common stock on the last business day of the period at a price equal to 85% of the fair market value of our common stock on the first or last day of the offering period, whichever is lower. Under applicable tax rules, an employee may purchase no more than

\$25,000 worth of our common stock in any calendar year under the Employee Stock Purchase Plan. We have not issued any shares to date under the Employee Stock Purchase Plan.

1996 STOCK OPTION AND GRANT PLAN. Our 1996 Stock Option and Grant Plan was initially approved by our board of directors and was approved by our stockholders in March 1996. Our 1996 Stock Option and Grant Plan provides for the issuance of 4,072,480 shares of our common stock. As of October 15, 2000, options to purchase 599,096 shares of our common stock were outstanding under our 1996 Stock Option and Grant Plan. Options granted under our 1996 Stock Option and Grant Plan generally vest over four years and terminate on the tenth anniversary of the date of grant. We will not make any additional grants under our 1996 Stock Option and Grant Plan after the completion of this offering.

EMPLOYMENT ARRANGEMENTS

We anticipate entering into employment agreements with each of Messrs. Graziano, Green and Warren. Each proposed agreement is for a period of two years, other than Mr. Warren's agreement which is for one year. Messrs. Graziano and Green's agreement automatically extends for two additional years on the second anniversary date and Mr. Warren's agreement automatically extends for one additional year on the anniversary date unless either party has given notice that it does not wish to extend the agreement. Each agreement provides for the payment of base salary and incentive compensation and for the provision of certain fringe benefits to the executive. Under their respective employment agreements, the annual salary for Mr. Graziano is \$275,000, the annual salary for Mr. Green is \$225,000 and the annual salary for Mr. Warren is \$185,000. The agreements require our executive officers to refrain from competing with us and from soliciting our employees for a period of 12 months following termination for any reason. Each agreement also provides for certain payments and benefits for an executive officer should his or her employment with us be terminated because of death or disability, by the executive for good reason or by us without cause, as further defined in the agreements. In general, in the case of a termination by the executive officer for good reason, or by us without cause, the executive officer will receive up to two years' salary and bonus in the cases of Messrs. Graziano and Green and one years' salary and bonus in the case of Mr. Warren, an extension of benefits for one year and an acceleration of vesting for stock options and restricted stock which otherwise would vest during the next twenty-four months. Upon a change of control, as defined in the agreements, the executive officer is eligible for payment of up to three years' salary and bonus in the cases of Messrs. Graziano and Green and one-and-a-half years' salary and bonus in the case of Mr. Warren, an extension of benefits for one year and an acceleration of vesting for all outstanding stock options and restricted stock.

COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION

Messrs. Dick and Klaffky are the members of our compensation committee. Neither Mr. Dick nor Mr. Klaffky is an executive officer of our company or has received any compensation from us within the last three years other than in his capacity as a director.

RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

STOCK REDEMPTIONS AND LOAN REPAYMENTS WITH STOCKHOLDERS

In March 1996, our business was acquired by a group that was led by our current management team of Chane Graziano, our Chief Executive Officer, and David Green, our President, and that also included Paul Grindle, a former member of our board of directors, Ascent Venture Partners, L.P. (formerly known as Pioneer Venture Limited Partnership), Ascent Venture Partners II, L.P. (formerly known as Pioneer Venture Limited Partnership II) and First New England Capital, L.P. In connection with this acquisition, we issued redeemable preferred stock for an aggregate purchase price of \$1.5 million and subordinated debentures with an aggregate principal amount of \$1.0 million to our investors. The redeemable preferred stock pays cumulative dividends at the rate of \$0.26 per share quarterly in arrears and the subordinated debentures bear interest at an annual rate of 13% payable quarterly in arrears. The terms of the redeemable preferred stock and the subordinated debentures require us to redeem or repay these instruments upon the completion of this offering. A portion of the proceeds of

this offering will be used to retire the redeemable preferred stock and the subordinated debentures. The redemption of the preferred stock and the retirement of the subordinated debentures will result in payments of approximately \$167,000 to Mr. Graziano, our Chief Executive Officer and a member of our board of directors, \$500,000 to Ascent Venture Partners, L.P., \$1.0 million to Ascent Venture Partners II, L.P. and \$500,000 to First New England Capital, L.P. Christopher W. Dick, a member of our board of directors, is a Managing Director of Ascent Venture Management, Inc., the general partner of Ascent Venture Partners, L.P., and Ascent Management SBIC Corp., the general partner of Ascent Venture Partners II, L.P., and Richard C. Klaffky, Jr., a member of our board of directors, is the President of FINEC Corp., the general partner of First New England Capital, L.P.

TRANSACTIONS WITH AN AFFILIATE OF AN EXECUTIVE OFFICER

In March 1996, we acquired our business from a company now known as Harvard Clinical Technology Inc. Following this acquisition, we entered into several transition-related transactions with Harvard Clinical. In 1997, we sold Harvard Clinical several items of furniture, fixtures, appliances and equipment, leased Harvard Clinical office space on the same terms as the underlying lease with the third-party landlord, provided transition support services and assumed Harvard Clinical's obligations to pay \$10,000 in professional fees in exchange for 1,529,180 shares of our common stock held by a principal stockholder of Harvard Clinical at an agreed upon value of \$0.11 per share. The assets purchased by Harvard Clinical had an aggregate purchase price of approximately \$93,000, which reflected their estimated fair market value as determined by Mr. Graziano, our Chief Executive Officer, and the value at which they were recorded on our balance sheet. We originally purchased these assets as part of the March 1996 acquisition of our business. We believe that each of these transactions was consummated on terms at least as favorable to us as could have been obtained from unaffiliated parties. Diane Green, who is an officer, director and stockholder of Harvard Clinical, is the spouse of Mr. Green, our President and a member of our board of directors.

LOANS TO OFFICERS IN CONNECTION WITH OPTION EXERCISES

In September 2000, Mr. Graziano, our Chief Executive Officer, and Mr. Green, our President, each exercised options to purchase 740,228 shares of our common stock. Each of these officers paid substantially all of the exercise price for these shares by issuing promissory notes to the Company. The aggregate loans to Mr. Graziano are \$789,000 and to Mr. Green are \$789,000 pursuant to these promissory notes. Each of these promissory notes is due in September 2003 and bears interest at an annual rate of 10%. These promissory notes are secured by a pledge of all of the shares for which the exercise price was paid with the respective promissory notes as well as additional shares held by each of these officers.

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CONSULTING RELATIONSHIP WITH FORMER DIRECTOR

Mr. Grindle, a member of our board of directors until October 2000, was retained by us as a consultant to provide general marketing and other advice to our senior management team and to review all of the revisions to our catalog from March 1996 to September 2000 when the consulting agreement was terminated. In connection with this consulting agreement, Mr. Grindle received consulting fees of \$294,583 for the nine months ended September 30, 2000 and \$258,437, \$262,040 and \$268,030 for the years ended December 31, 1999, 1998 and 1997, respectively. Mr. Grindle is no longer affiliated with us.

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PRINCIPAL AND SELLING STOCKHOLDERS

The following table sets forth information regarding the beneficial ownership of Harvard Bioscience common stock as of October 15, 2000 and on an as adjusted basis to reflect the sale of the common stock offered hereby by:

- all persons known by us to own beneficially 5% or more of the common stock,
- each of our directors,

- the executive officers listed in the summary compensation table,
- the stockholder selling shares in this offering, and
- all of our directors and executive officers as a group.

The number of shares beneficially owned by each stockholder is determined under rules issued by the Securities and Exchange Commission and includes voting or investment power with respect to securities. Under these rules, beneficial ownership includes any shares as to which the individual or entity has sole or shared voting power or investment power and includes any shares as to which the individual or entity has the right to acquire beneficial ownership within 60 days after October 15, 2000 through the exercise of any warrant, stock option or other right. The inclusion in this prospectus of such shares, however, does not constitute an admission that the named stockholder is a direct or indirect beneficial owner of such shares. Unless otherwise indicated, the address of all listed stockholders is c/o Harvard Bioscience, Inc., 84 October Hill Road, Holliston, MA 01746-1371.

NAME OF BENEFICIAL OWNER	BENEFICIAL OWNERSHIP PRIOR TO OFFERING (1)		SHARES TO BE SOLD	BENEFICIAL OWNERSHIP AFTER OFFERING (1)	
	SHARES	PERCENT		SHARES	PERCENT
Christopher W. Dick(2) 255 State Street Boston, MA 02109	6,465,037	34.9%	--	6,465,037	26.1%
Chane Graziano(3)	5,089,929	27.5%	--	5,089,929	20.5%
Ascent Venture Partners II, L.P.(4) 255 State Street Boston, MA 02109	3,927,651	21.2%	--	3,927,651	15.8%
David Green	3,479,386	18.8%	172,450	3,306,936	13.3%
Ascent Venture Partners, L.P.(5) 255 State Street Boston, MA 02109	2,537,386	13.7%	--	2,537,386	10.2%
First New England Capital, L.P.(6) 100 Pearl Street Hartford, CT 06103	1,963,825	10.6%	--	1,963,825	7.9%
Richard C. Klaffky(7) 100 Pearl Street Hartford, CT 06103	1,963,825	10.6%	--	1,963,825	7.9%
NEGF, II, L.P.(8)	955,935	5.2%	--	955,935	3.9%
Susan M. Lusinski	111,972	*	--	111,972	*
Mark A. Norige	83,964	*	--	83,964	*
Robert Dishman	--	*	--	--	*
John F. Kennedy	--	*	--	--	*
Earl R. Lewis	--	*	--	--	*
All executive officers and directors, as a group (9 persons)	17,194,113	92.8%	172,450	17,021,663	68.7%

* Represents less than 1% of the outstanding shares of common stock.

(1) All percentages assume the underwriters do not elect to exercise the over-allotment option to purchase an additional 937,500 shares of common stock. The number of shares of common stock set forth herein includes shares to be issued upon completion of this offering pursuant to the conversion of all outstanding shares of our series B convertible preferred stock into shares of common stock and the exercise of all outstanding warrants to purchase shares of our common stock.

(2) Consists solely of the shares described in notes (4) and (5) below, of which Mr. Dick may be considered the beneficial owner. Mr. Dick disclaims beneficial ownership of such shares, except to the extent of his pecuniary interest therein.

- (3) Includes 1,291,004 shares held by two trusts for the benefit of Mr. Graziano's children, of which Mr. Graziano is a trustee.
- (4) Ascent Management SBIC Corp. is the general partner of Ascent Venture Management II, L.P., which is the general partner of Ascent Venture Partners II, L.P., which exercises sole voting and investment power with respect to all of the shares held of record by Ascent Venture Partners II, L.P. Mr. Dick, a member of our board of directors, is the Managing Director of Ascent Management SBIC Corp. Mr. Dick disclaims any beneficial ownership of the shares held by Ascent Venture Partners II, L.P., except to the extent of his pecuniary interest therein.
- (5) Ascent Venture Management, Inc. is the general partner of Ascent Venture Partners, L.P., which exercises sole voting and investment power with respect to all of the shares held of record by Ascent Venture Partners, L.P. Mr. Dick, a member of our board of directors, is the Managing Director of Ascent Venture Management, Inc. Mr. Dick disclaims any beneficial ownership of the shares held by Ascent Venture Partners, L.P., except to the extent of his pecuniary interest therein.
- (6) FINEC Corp. is the general partner of First New England Capital, L.P., which exercises sole voting and investment power with respect to all of the shares held of record by First New England Capital, L.P. Mr. Klaffky, a member of our board of directors, is the President of FINEC Corp. Mr. Klaffky disclaims any beneficial ownership of the shares held by First New England Capital, L.P., except to the extent of his pecuniary interest therein.
- (7) Consists solely of the shares described in note (6) above, of which Mr. Klaffky may be considered the beneficial owner. Mr. Klaffky disclaims beneficial ownership of such shares, except to the extent of his pecuniary interest therein.
- (8) NEGF Ventures, Inc. is the general partner of New England Partners, II, L.P., which is the general partner of NEGF II, L.P. NEGF Ventures, Inc. exercises sole voting and investment power with respect to all of the shares held of record by NEGF II, L.P. Individually, no stockholder, director or officer of NEGF Ventures, Inc. is deemed to have or share such voting or investment power.

DESCRIPTION OF CAPITAL STOCK

Following this offering, our authorized capital stock will consist of 80,000,000 shares of common stock and 5,000,000 shares of undesignated preferred stock, issuable in one or more series designated by our board of directors. No other class of capital stock will be authorized. Prior to this offering, our common stock was held by seven stockholders of record. The following information relates only to our certificate of incorporation and by-laws, as they will exist after this offering.

COMMON STOCK

VOTING RIGHTS. The holders of our common stock have one vote per share. Holders of our common stock are not entitled to vote cumulatively for the election of directors. Generally, all matters to be voted on by stockholders must be approved by a majority, or, in the case of election of directors, by a plurality, of the votes cast at a meeting at which a quorum is present, voting together as a single class, subject to any voting rights granted to holders of any then outstanding preferred stock.

DIVIDENDS. Holders of common stock will share ratably in any dividends declared by our board of directors, subject to the preferential rights of any preferred stock then outstanding. Dividends consisting of shares of common stock may be paid to holders of shares of common stock.

OTHER RIGHTS. Upon our liquidation, dissolution or winding up, all holders of common stock are entitled to share ratably in any assets available for distribution to holders of shares of common stock. No shares of common stock are subject to redemption or have preemptive rights to purchase additional shares of common stock.

PREFERRED STOCK

Our certificate of incorporation provides that 5,000,000 shares of preferred stock may be issued from time to time in one or more series. Our board of directors is authorized to fix the voting rights, if any, designations, powers, preferences, qualifications, limitations and restrictions thereof, applicable to the shares of each series. Our board of directors may, without stockholder approval, issue preferred stock with voting and other rights that could adversely affect the voting power and other rights of the holders of the common stock and could have anti-takeover effects, including preferred stock or rights to acquire preferred stock in connection with implementing a shareholder rights plan. We have no present plans to issue any shares of preferred stock. The ability of our board of directors to issue preferred stock without stockholder approval could have the effect of delaying, deferring or preventing a change of control with respect to our company or the removal of existing management.

WARRANTS

As of October 15, 2000, we had outstanding warrants to purchase 8,509,905 shares of common stock at an exercise price of \$0.0005 per share. The warrants will expire on March 15, 2003. These warrants will be exercised in connection with this offering.

REGISTRATION RIGHTS

Following this offering, the holders of 17,208,101 shares of our common stock will have rights with respect to registration of these shares under the Securities Act of 1933. These rights are provided under the terms of a securityholders agreement between us and certain of the holders of registrable securities. Under these registration rights, holders of registrable securities holding 30% or more of the then outstanding registrable securities held by all holders of registrable securities may require on two occasions that we register their shares for public resale. In addition, certain holders of registrable securities may require that we register their shares for public resale on Form S-3 or similar short-form registration, if we are eligible to use Form S-3 or similar short form registration and the value of the

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securities to be registered is at least \$2,000,000. If we elect to register any of our shares of common stock for any public offering, the holders of registrable securities are entitled to include shares of common stock in the registration. However, we may reduce the number of shares proposed to be registered in view of market conditions. We will pay all expenses in connection with any registration, other than underwriting discounts and commissions.

INDEMNIFICATION MATTERS

Prior to the offering, we will have entered into indemnification agreements with each of our directors. The form of indemnification agreement provides that we will indemnify our directors for expenses incurred because of their status as a director to the fullest extent permitted by Delaware law, our certificate of incorporation and our by-laws.

Our certificate of incorporation contains a provision permitted by Delaware law that generally eliminates the personal liability of directors for monetary damages for breaches of their fiduciary duty, including breaches involving negligence or gross negligence in business combinations, unless the director has breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct or a knowing violation of law, paid a dividend or approved a stock repurchase in violation of the Delaware General Corporation Law or obtained an improper personal benefit. This provision does not alter a director's liability under the federal securities laws and does not affect the availability of equitable remedies, such as an injunction or rescission, for breach of fiduciary duty. Our by-laws provide that directors and officers shall be, and in the discretion of our board of directors, non-officer employees may be, indemnified by us to the fullest extent authorized by Delaware law, as it now exists or may in the future be amended, against all expenses and liabilities reasonably incurred in connection with service for or on behalf of us. Our by-laws also provide for the advancement of expenses to directors and, in the discretion of our board of directors, to officers and non-officer employees. In addition, our by-laws provide that the right of directors and officers to indemnification shall be a contract right and shall not be exclusive of any other right now possessed or hereafter acquired under any by-law, agreement, vote of stockholders or otherwise. We also have directors' and officers' insurance against certain liabilities. We believe that the indemnification

agreements, together with the limitation of liability and indemnification provisions of our certificate of incorporation and by-laws and directors' and officers' insurance will assist us in attracting and retaining qualified individuals to serve as our directors and officers.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be provided to directors, officers or persons controlling us as described above, we have been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable. At present, there is no pending material litigation or proceeding involving any of our directors, officers, employees or agents in which indemnification will be required or permitted.

PROVISIONS OF OUR CERTIFICATE OF INCORPORATION AND BY-LAWS THAT MAY HAVE ANTI-TAKEOVER EFFECTS

Certain provisions of our certificate of incorporation and by-laws described below, as well as the ability of our board of directors to issue shares of preferred stock and to set the voting rights, preferences and other terms thereof, may be deemed to have an anti-takeover effect and may discourage takeover attempts not first approved by our board of directors, including takeovers which particular stockholders may deem to be in their best interests. These provisions also could have the effect of discouraging open market purchases of our common stock because they may be considered disadvantageous by a stockholder who desires subsequent to such purchases to participate in a business combination transaction with us or to elect a new director to our board.

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NO STOCKHOLDER ACTION BY WRITTEN CONSENT

Our certificate of incorporation provides that any action required or permitted to be taken by our stockholders at an annual or special meeting of stockholders must be effected at a duly called meeting and may not be taken or effected by a written consent of stockholders.

SPECIAL MEETINGS OF STOCKHOLDERS

Our certificate of incorporation and by-laws provide that a special meeting of stockholders may be called only by our board of directors. Our by-laws provide that only those matters included in the notice of the special meeting may be considered or acted upon at that special meeting unless otherwise provided by law.

ADVANCE NOTICE OF DIRECTOR NOMINATIONS AND STOCKHOLDER PROPOSALS

Our by-laws include advance notice and informational requirements and time limitations on any director nomination or any new proposal which a stockholder wishes to make at an annual meeting of stockholders. For the first annual meeting following the completion of this offering, a stockholder's notice of a director nomination or proposal will be timely if delivered to our secretary at our principal executive offices not later than the close of business on the later of the 75th day prior to the scheduled date of such annual meeting or the 10th day following the day on which public announcement of the date of such annual meeting is made by us.

AMENDMENT OF THE CERTIFICATE OF INCORPORATION

As required by Delaware law, any amendment to our certificate of incorporation must first be approved by a majority of our board of directors and, if required by law, thereafter approved by a majority of the outstanding shares entitled to vote with respect to such amendment, except that any amendment to the provisions relating to stockholder action by written consent, directors, limitation of liability and the amendment of our certificate of incorporation must be approved by not less than 75% of the outstanding shares entitled to vote with respect to such amendment.

AMENDMENT OF BY-LAWS

Our certificate of incorporation and by-laws provide that our by-laws may be amended or repealed by our board of directors or by the stockholders. Such action by the board of directors requires the affirmative vote of a majority of the directors then in office. Such action by the stockholders requires the

affirmative vote of at least 75% of the shares present in person or represented by proxy at an annual meeting of stockholders or a special meeting called for such purpose unless our board of directors recommends that the stockholders approve such amendment or repeal at such meeting, in which case such amendment or repeal only requires the affirmative vote of a majority of the shares present in person or represented by proxy at the meeting.

STATUTORY BUSINESS COMBINATION PROVISION

Following the offering, we will be subject to Section 203 of the Delaware General Corporation Law, which prohibits a publicly-held Delaware corporation from consummating a "business combination," except under certain circumstances, with an "interested stockholder" for a period of three years after the date such person became an "interested stockholder" unless:

- before such person became an interested stockholder, the board of directors of the corporation approved the transaction in which the interested stockholder became an interested stockholder or approved the business combination;
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- upon the closing of the transaction that resulted in the interested stockholder becoming such, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding shares held by directors who are also officers of the corporation and shares held by employee stock plans; or
 - following the transaction in which such person became an interested stockholder, the business combination is approved by the board of directors of the corporation and authorized at a meeting of stockholders by the affirmative vote of the holders of at least two-thirds of the outstanding voting stock of the corporation not owned by the interested stockholder.

The term "interested stockholder" generally is defined as a person who, together with affiliates and associates, owns, or, within the prior three years, owned, 15% or more of a corporation's outstanding voting stock. The term "business combination" includes mergers, consolidations, asset sales involving 10% or more of a corporation's assets and other similar transactions resulting in a financial benefit to an interested stockholder. Section 203 makes it more difficult for an "interested stockholder" to effect various business combinations with a corporation for a three-year period. A Delaware corporation may "opt out" of Section 203 with an express provision in its original certificate of incorporation or an express provision in its certificate of incorporation or by-laws resulting from an amendment approved by holders of at least a majority of the outstanding voting stock. Neither our certificate of incorporation nor our by-laws contain any such exclusion.

TRADING ON THE NASDAQ NATIONAL MARKET SYSTEM

We have applied to have our common stock approved for quotation on the Nasdaq National Market under the symbol "HBIO."

NO PREEMPTIVE RIGHTS

No holder of any class of our stock has any preemptive right to purchase any of our securities.

TRANSFER AGENT AND REGISTRAR

The transfer agent and registrar for our common stock will be Registrar and Transfer Company.

SHARES ELIGIBLE FOR FUTURE SALE

Upon consummation of the offering, we will have outstanding 24,782,422 shares of common stock or 25,719,922 shares if the underwriters' over-allotment option is exercised in full, in each case excluding shares underlying outstanding options. Of these shares, all of the shares sold in this offering (6,422,450 shares, or 7,359,950 shares if the underwriters' over-allotment option is exercised in full) will be freely tradeable without restriction or further registration under the Securities Act except for any shares purchased by

an "affiliate," which will be subject to the limitations of Rule 144 of the Securities Act. As defined in Rule 144, an "affiliate" of an issuer is a person that directly, or indirectly through one or more intermediaries, controls, is controlled by or is under common control with the issuer. The remaining outstanding shares of common stock will be "restricted securities" as defined in Rule 144 and may not be resold in the absence of registration under the Securities Act or pursuant to an exemption from such registration, including exemptions provided by Rule 144.

In addition, our executive officers, directors, and existing stockholders, who own all of the shares of our capital stock outstanding prior to this offering, have signed lock-up agreements in which they have agreed not to offer, sell, contract to sell or otherwise dispose of any common stock or any securities convertible into or exchangeable for common stock for a period of 180 days after the date of this prospectus without the prior written consent of Thomas Weisel Partners LLC. Immediately following this offering, the shares subject to the lock-up agreements will represent approximately 74% of the then outstanding shares of common stock (71% if the underwriters' over-allotment option is exercised in full). While the underwriters have indicated no present intention to waive these restrictions, were they to do so, up to approximately an additional 18,359,972 shares of our common stock could be available for sale during the period following the offering, which could harm our stock price or make it more difficult to sell our shares. Historically, factors that have led underwriters to waive lock-up restrictions on a case by case basis include bona fide gifts to charitable institutions and other small waivers which underwriters reasonably believe will have minimal effect on the trading price of the common stock of the applicable company.

RULE 144

In general, under Rule 144, beginning 90 days after the date of this prospectus, a person who has beneficially owned restricted shares for at least one year, including persons who are affiliates, would be entitled to sell within any three-month period a number of shares that does not exceed the greater of:

- 1% of the then outstanding shares of our common stock, approximately 247,824 shares immediately after this offering; or
- the reported average weekly trading volume of our common stock during the four calendar weeks preceding a sale by such person.

Sales under Rule 144 are also subject to manner-of-sale provisions, notice requirements and the availability of current public information.

RULE 144(k)

Under Rule 144(k), a person who has not been one of our affiliates during the 90 days preceding a sale, and who has beneficially owned the shares proposed to be sold for at least two years, is free to sell such shares without regard to the volume, manner-of-sale or certain other limitations contained in Rule 144. Upon completion of this offering, no holders of shares of our common stock will be eligible to freely sell shares under Rule 144(k).

Prior to this offering, there has been no public market for our common stock and we can make no predictions about the effect, if any, that market sales of shares or the availability of shares for sale will have on the market price of our common stock prevailing from time to time. Future sales of substantial

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amounts of our common stock in the public market, or the perception that such sales may occur, may cause the market prices of our common stock to decline.

REGISTRATION RIGHTS

After the 180-day period following the closing of this offering, the holders of 17,208,101 shares of our common stock will have rights which require us to register their shares for sale. See "Description of Capital Stock--Registration Rights."

OPTIONS

As of October 15, 2000, options to purchase 599,096 shares of our common stock were outstanding. At some time following the effectiveness of the offering chosen by the board of directors in its discretion, we intend to file a

registration statement on Form S-8 under the Securities Act to register all of the shares of our common stock reserved for issuance under our 2000 Stock Option and Incentive Plan, our Employee Stock Purchase Plan and our 1996 Stock Option and Grant Plan. The filing of this registration statement will allow these shares, other than those held by members of management who are deemed to be affiliates, to be eligible for resale without restriction, subject to the lock-up period related to this offering, or further registration upon issuance to participants. After the effective date of the registration statement on Form S-8 and, if applicable, the expiration of the lock-up period related to this offering, shares purchased upon exercise of options granted pursuant to these plans, generally will be available for resale in the public market by non-affiliates without restriction. Sales by our affiliates of shares registered on this registration statement are subject to all of the Rule 144 restrictions except for the one-year minimum holding period requirement.

In addition to possibly being able to sell option shares without restriction under a Form S-8 registration statement when effective, persons other than our affiliates are allowed under Rule 701 of the Securities Act to sell shares of our common stock issued upon exercise of stock options beginning 90 days after the date of this prospectus, subject only to the manner of sale provisions of Rule 144 and to the lock-up period related to this offering. Our affiliates may also begin selling option shares beginning 90 days after the date of this prospectus but are subject to all of the Rule 144 restrictions except for the one-year holding period requirement and to the 180-day lock-up period related to this offering.

UNDERWRITING

GENERAL

Subject to the terms and conditions set forth in an agreement among the underwriters and us, each of the underwriters named below, through their representatives, Thomas Weisel Partners LLC, Dain Rauscher Incorporated and ING Barings LLC have severally agreed to purchase from us the aggregate number of shares of common stock set forth opposite its name below:

UNDERWRITERS -----	NUMBER OF SHARES -----
Thomas Weisel Partners LLC.....	
Dain Rauscher Incorporated.....	
ING Barings LLC.....	

Total.....	6,422,450 =====

Of the 6,422,450 shares to be purchased by the underwriters, 6,250,000 shares will be purchased from us and 172,450 shares will be purchased from our president as a selling stockholder.

The underwriting agreement provides that the obligations of the several underwriters are subject to various conditions. The nature of the underwriters' obligations commits them to purchase and pay for all of the shares of common stock listed above if any are purchased.

The underwriting agreement provides that we and the selling stockholder will indemnify the underwriters against liabilities specified in the underwriting agreement under the Securities Act or will contribute to payments that the underwriters may be required to make relating to these liabilities.

Thomas Weisel Partners LLC expects to deliver the shares of common stock to purchasers on _____, 2000.

OVER-ALLOTMENT OPTION

We have granted a 30-day over-allotment option to the underwriters to purchase up to a total of 937,500 additional shares of our common stock from us at the initial public offering price, less the underwriting discounts and

commissions payable by us, as set forth on the cover page of this prospectus. If the underwriters exercise this option in whole or in part, then each of the underwriters will be separately committed, subject to conditions described in the underwriting agreement, to purchase the additional shares of our common stock in proportion to their respective commitments set forth in the table above.

DETERMINATION OF OFFERING PRICE

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be determined through negotiations between us and the representatives. In addition to prevailing market conditions, the factors to be considered in determining the initial public offering price will include:

- the valuation multiples of publicly-traded companies that the representatives believe are comparable to us,
- our financial information,

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- our history and prospects and the outlook for our industry,
- an assessment of our management, our past and present operations, and the prospects for, and timing of, our future revenues,
- the present state of our development and the progress of our business plan, and
- the above factors in relation to market values and various valuation measures of other companies engaged in activities similar to ours.

We cannot assure you that an active or orderly trading market will develop for our common stock or that our common stock will trade in the public markets subsequent to this offering at or above the initial offering price.

COMMISSIONS AND DISCOUNTS

The underwriters propose to offer the shares of common stock directly to the public at the public offering price set forth on the cover page of this prospectus, and at this price less a concession not in excess of \$ per share of common stock to other dealers specified in a master agreement among underwriters who are members of the National Association of Securities Dealers, Inc. The underwriters may allow, and the other dealers specified may reallow, concessions, not in excess of \$ per share of common stock to these other dealers. After this offering, the offering price, concessions and other selling terms may be changed by the underwriters. Our common stock is offered subject to receipt and acceptance by the underwriters and to other conditions, including the right to reject orders in whole or in part.

The following table summarizes the compensation to be paid to the underwriters by us and the expenses payable by us:

	PER SHARE	TOTAL	
		WITHOUT OVER-ALLOTMENT	WITH OVER-ALLOTMENT
Public offering price.....	\$	\$	\$
Underwriting discount.....			
Proceeds, before expenses, to us.....			
Proceeds, before expenses, to our president as a selling stockholder.....			

INDEMNIFICATION OF THE UNDERWRITERS

We and the selling stockholder will indemnify the underwriters against some civil liabilities, including liabilities under the Securities Act and liabilities arising from breaches of our representations and warranties contained in the underwriting agreement. If we are unable to provide this

indemnification, we will contribute to payments the underwriters may be required to make in respect of those liabilities.

RESERVED SHARES

The underwriters, at our request, have reserved for sale at the initial public offering price up to 300,000 shares of common stock to be sold in this offering for sale to our employees and other persons designated by us. The number of shares available for sale to the general public will be reduced to the extent that any reserved shares are purchased. Any reserved shares not purchased in this manner will be offered by the underwriters on the same basis as the other shares offered in this offering.

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NO SALES OF SIMILAR SECURITIES

Our directors, officers, selling stockholder and other stockholders holding all of the outstanding shares of our capital stock prior to this offering have agreed or have a contractual obligation to agree, subject to specified exceptions, not to offer, sell, agree to sell, directly or indirectly, or otherwise dispose of any shares of common stock or any securities convertible into or exchangeable for shares of common stock without the prior written consent of Thomas Weisel Partners LLC for a period of 180 days after the date of this prospectus.

We have agreed that for a period of 180 days after the date of this prospectus we will not, without the prior written consent of Thomas Weisel Partners LLC, offer, sell, or otherwise dispose of any shares of common stock, except for the shares of common stock offered in the offering and the shares of common stock issuable upon exercise of outstanding options and warrants on the date of this prospectus.

INFORMATION REGARDING THOMAS WEISEL PARTNERS LLC

Thomas Weisel Partners LLC, one of the representatives of the underwriters, was organized and registered as a broker-dealer in December 1998. Since December 1998, Thomas Weisel Partners LLC has been named as a lead or co-manager on 148 completed transactions and has acted as a syndicate member in an additional 129 public offerings of equity securities. Thomas Weisel Partners LLC does not have any material relationship with us or any of our officers, directors or other controlling persons, except with respect to its contractual relationship with us pursuant to the underwriting agreement entered into in connection with this offering.

NASDAQ NATIONAL MARKET LISTING

We have applied to have our common stock approved for quotation on the Nasdaq National Market under the symbol "HBIO."

DISCRETIONARY ACCOUNTS

The underwriters do not expect sales of shares of common stock offered by this prospectus to any accounts over which they exercise discretionary authority to exceed five percent of the shares offered.

SHORT SALES, STABILIZING TRANSACTIONS AND PENALTY BIDS

In order to facilitate this offering, persons participating in this offering may engage in transactions that stabilize, maintain or otherwise affect the price of our common stock during and after this offering. Specifically, the underwriters may engage in the following activities in accordance with the rules of the U.S. Securities and Exchange Commission.

SHORT SALES. Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in the offering. "Covered" short sales are sales made in an amount not greater than the underwriters' option to purchase additional shares from the issuer in the offering. The underwriters may close out any covered short position by either exercising their option to purchase shares or purchasing shares in the open market. In determining the source of shares to close out the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the over-allotment option. "Naked" short sales are any sales in excess of such over-allotment option. The underwriters must close out

any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market after pricing that could adversely affect investors who purchase in the offering.

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STABILIZING TRANSACTIONS. The underwriters may make bids for or purchases of the shares for the purpose of pegging, fixing or maintaining the price of the shares, so long as stabilizing bids do not exceed a specified maximum.

PENALTY BIDS. If the underwriters purchase shares in the open market in a stabilizing transaction or syndicate covering transaction, they may reclaim a selling concession from the underwriters and selling group members who sold those shares as part of this offering. Stabilization and syndicate covering transactions may cause the price of the shares to be higher than it would be in the absence of these transactions. The imposition of a penalty bid might also have an effect on the price of the shares if it discourages resales of the shares.

The transactions above may occur on the Nasdaq National Market or otherwise. Neither we nor the underwriters make any representation or prediction as to the effect that the transactions described above may have on the price of the shares. If these transactions are commenced, they may be discontinued without notice at any time.

LEGAL MATTERS

The validity of the shares of common stock offered hereby will be passed upon for us by Goodwin, Procter & Hoar LLP, Boston, Massachusetts. Various legal matters related to the sale of the common stock offered hereby will be passed upon for the underwriters by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Boston, Massachusetts.

EXPERTS

The consolidated financial statements of Harvard Apparatus, Inc. and subsidiaries as of December 31, 1998, 1999 and September 30, 2000, and for each of the years ended December 31, 1997, 1998 and 1999, and for the nine months ended September 30, 2000, have been included herein and in the registration statement in reliance upon the report of KPMG LLP, independent certified public accountants, appearing elsewhere herein, and the authority of said firm as experts in auditing and accounting.

The audited consolidated financial statements of Pharmacia & Upjohn (Cambridge) Limited as of December 31, 1997 and 1998, and for each of the years ended December 31, 1997 and 1998, have been included herein and in the registration statement in reliance upon the report of PricewaterhouseCoopers, independent chartered accountants, appearing elsewhere herein, and the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the Securities and Exchange Commission, or SEC, a registration statement on Form S-1 (including the exhibits and schedules thereto) under the Securities Act and the rules and regulations thereunder, for the registration of the common stock offered hereby. This prospectus is part of the registration statement. This prospectus does not contain all the information included in the registration statement because we have omitted certain parts of the registration statement as permitted by the SEC rules and regulations. For further information about us and our common stock, you should refer to the registration statement. Statements contained in this prospectus as to any contract, agreement or other document referred to are not necessarily complete. Where the contract or other document is an exhibit to the registration statement, each statement is qualified by the provisions of that exhibit.

You can inspect and copy the registration statement at the public reference facility maintained by the SEC at Room 1024, 450 Fifth Street, N.W., Washington, D.C. 20549, and at the SEC's regional offices at Seven World Trade Center, 13th Floor, New York, New York 10048 and 500 West Madison

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Street, Suite 1400, Chicago, Illinois 60661. You may call the SEC at

1-800-732-0330 for further information about the operation of the public reference rooms. Copies of all or any portion of the registration statement can be obtained from the Public Reference Section of the SEC, 450 Fifth Street, N.W., Washington, D.C. 20549, at prescribed rates. In addition, the registration statement is publicly available through the SEC's site on the Internet's World Wide Web, located at <http://www.sec.gov>.

We will also file annual, quarterly and current reports, proxy statements and other information with the SEC. You can also request copies of these documents, for a copying fee, by writing to the SEC. We intend to furnish to our stockholders annual reports containing audited financial statements for each fiscal year.

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INDEPENDENT AUDITORS' REPORT

The Board of Directors
Harvard Apparatus, Inc.:

We have audited the accompanying consolidated balance sheets of Harvard Apparatus, Inc. and subsidiaries (the "Company") as of September 30, 2000, December 31, 1999 and 1998, and the related consolidated statements of operations, stockholders' equity (deficit) and comprehensive income (loss), and cash flows for the nine months ended September 30, 2000 and for each of the years in the three-year period ended December 31, 1999. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements. An audit also includes

assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall consolidated financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of Harvard Apparatus, Inc. and subsidiaries at September 30, 2000, December 31, 1999 and 1998, and the results of their operations and their cash flows for the nine months ended September 30, 2000 and for each of the years in the three-year period ended December 31, 1999, in conformity with accounting principles generally accepted in the United States of America.

/s/ KPMG LLP
 KPMG LLP
 October 19, 2000, except as to
 note 20 which is
 as of October 25, 2000
 Boston, Massachusetts

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HARVARD APPARATUS, INC. AND SUBSIDIARIES
 CONSOLIDATED BALANCE SHEETS

	DECEMBER 31, 1998	DECEMBER 31, 1999	SEPTEMBER 30, 2000
	-----	-----	-----
ASSETS (NOTES 6 AND 7)			
Current assets:			
Cash and cash equivalents.....	\$ 956,771	\$ 2,396,053	\$ 2,148,880
Trade accounts receivable, net of reserve for uncollectible accounts of \$61,004 and \$87,642 at December 31, 1998 and 1999, respectively, and \$88,648 at September 30, 2000.....	1,659,766	4,191,850	3,878,152
Other receivables and other assets.....	49,716	201,946	223,090
Inventories (note 4).....	1,656,318	2,849,670	3,679,735
Catalog costs.....	450,087	66,829	394,558
Prepaid expenses.....	202,916	593,348	265,340
Deferred tax asset (note 13).....	96,736	987,853	344,714
	-----	-----	-----
Total current assets.....	5,072,310	11,287,549	10,934,469
	-----	-----	-----
Property, plant and equipment, net (notes 5 and 10)....	969,905	1,559,922	1,513,098
	-----	-----	-----
Other assets:			
Catalog costs, less current portion.....	163,497	165,419	193,712
Deferred tax asset (note 13).....	28,182	432,797	344,304
Deferred initial public offering costs.....	--	--	596,365
Goodwill, net of accumulated amortization of \$27,661, \$395,896 and \$902,891 at December 31, 1998 and 1999 and September 30, 2000, respectively (note 3).....	925,973	6,583,354	9,148,744
Other assets (notes 3 and 12).....	60,626	580,829	505,387
	-----	-----	-----
Total other assets.....	\$1,178,278	\$ 7,762,399	\$10,788,512
	-----	-----	-----
	\$7,220,493	\$20,609,870	\$23,236,079
	=====	=====	=====

See accompanying notes to consolidated financial statements.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES
 CONSOLIDATED BALANCE SHEETS

	DECEMBER 31, 1998	DECEMBER 31, 1999	SEPTEMBER 30, 2000
Current liabilities:			
Short-term debt (note 6).....	\$1,050,000	\$ 2,200,000	\$ 3,150,000
Current installments of long-term debt (note 7)....	190,389	794,173	1,556,618
Trade accounts payable.....	751,338	1,880,246	2,107,838
Accrued income taxes payable (note 13).....	162,726	957,834	638,862
Accrued expenses (note 17).....	586,289	1,399,523	2,266,547
Other liabilities.....	101,271	272,731	183,478
Current deferred income tax liability.....	24,524	--	6,011
Total current liabilities.....	2,866,537	7,504,507	9,909,354
Long-term debt, less current installments (note 7)...	638,466	5,072,941	5,730,313
Deferred income tax liability (note 13).....	37,601	48,649	--
Total long-term liabilities.....	676,067	5,121,590	5,730,313
Commitments and contingencies (notes 8, 9, 10, 11, and 18)			
Preferred stock, 600,000 shares authorized (note 8); Redeemable series "A" 469,300 shares issued and outstanding.....	1,500,000	1,500,000	1,500,000
Convertible and redeemable series "B" 48,500 shares issued and outstanding.....	--	1,000,000	1,000,000
Common stock warrants (note 9).....	1,500,352	31,194,371	102,114,613
Total redeemable preferred stock and common stock warrants.....	3,000,352	33,694,371	104,614,613
Stockholders' equity (deficit) (notes 9 and 14):			
Common stock, par value \$.01 per share, 80,000,000 shares authorized; 10,259,410 shares issued and outstanding at December 31, 1998 and 1999, 13,727,365 shares issued and outstanding at September 30, 2000.....	102,604	102,604	137,274
Accumulated other comprehensive loss.....	(34,720)	(54,690)	(713,265)
Additional paid-in capital--stock options.....	--	3,283,164	3,292,593
Additional paid-in capital--common stock.....	--	--	14,838,792
Retained earnings (accumulated deficit).....	1,277,398	(28,373,931)	(112,357,900)
Notes receivable.....	--	--	(1,547,950)
Treasury stock, 4,660,784 common shares, at cost...	(667,745)	(667,745)	(667,745)
Total stockholders' equity (deficit).....	677,537	(25,710,598)	(97,018,201)
	\$7,220,493	\$ 20,609,870	\$ 23,236,079
	=====	=====	=====

See accompanying notes to financial statements.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

	YEARS ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30,	
	1997	1998	1999	1999	2000
				(UNAUDITED)	
Revenues (notes 15 and 19).....	\$11,464,157	\$12,154,025	\$ 26,177,814	\$18,469,913	\$ 22,069,026
Cost of goods sold.....	5,127,709	5,351,271	13,546,933	9,359,160	11,461,610
Stock compensation expense (note					

14).....	--	--	--	--	151,200
Gross profit.....	6,336,448	6,802,754	12,630,881	9,110,753	10,456,216
General and administrative expense.....	2,338,423	2,317,021	4,146,564	2,926,818	3,733,613
Sales and marketing expense.....	1,672,388	1,721,606	2,448,505	1,841,771	2,358,965
Research and development.....	206,497	324,792	1,187,584	840,767	1,207,522
Stock compensation expense (note 14).....	--	--	3,283,164	937,138	13,180,743
Amortization of goodwill (note 3).....	--	27,661	368,235	251,843	423,126
Operating (loss) income.....	2,119,140	2,411,674	1,196,829	2,312,416	(10,447,753)
Other (expense) income:					
Foreign currency (loss) gain.....	(96,549)	21,418	(47,982)	60,967	(456,393)
Common stock warrant interest expense (note 9).....	(116,574)	(1,379,460)	(29,694,019)	(7,402,457)	(70,920,242)
Interest expense.....	(238,669)	(221,932)	(679,122)	(484,330)	(689,066)
Interest income.....	16,176	12,567	22,767	16,159	34,536
Amortization of deferred financing costs.....	--	--	(63,442)	(44,437)	(56,102)
Other.....	106,013	10,067	(17,468)	(14,813)	27,830
Other expense, net.....	(329,603)	(1,557,340)	(30,479,266)	(7,868,911)	(72,059,437)
(Loss) income before income taxes.....	1,789,537	854,334	(29,282,437)	(5,556,495)	(82,507,190)
Income taxes (note 13).....	682,329	783,192	137,480	649,392	1,354,351
Net (loss) income.....	1,107,208	71,142	(29,419,917)	(6,205,887)	(83,861,541)
Preferred stock dividends.....	(121,668)	(121,666)	(156,586)	(115,444)	(122,428)
Net (loss) income available to common shareholders.....	\$ 985,540	\$ (50,524)	\$ (29,576,503)	\$ (6,321,331)	\$ (83,983,969)
(Loss) income per share (note 16):					
Basic.....	\$ 0.13	\$ (0.01)	\$ (5.28)	\$ (1.13)	\$ (13.11)
Diluted.....	\$ 0.06	\$ (0.01)	\$ (5.28)	\$ (1.13)	\$ (13.11)
Weighted average common shares:					
Basic.....	7,406,486	5,598,626	5,598,626	5,598,626	6,407,682
Diluted.....	17,500,194	5,598,626	5,598,626	5,598,626	6,407,682

See accompanying notes to consolidated financial statements.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY (DEFICIT) AND COMPREHENSIVE
INCOME (LOSS)

	COMMON STOCK	ACCUMULATED OTHER COMPREHENSIVE LOSS	ADDITIONAL PAID-IN CAPITAL-- STOCK OPTIONS	ADDITIONAL PAID-IN CAPITAL-- COMMON STOCK	RETAINED EARNINGS (ACCUMULATED DEFICIT)	NOTES RECEIVABLE
Balance at December 31, 1996.....	\$102,604	\$ 71,183	\$ --	\$ --	\$ 342,382	\$ --
Preferred stock dividends.....	--	--	--	--	(121,668)	--
Purchase of treasury stock.....	--	--	--	--	--	--
Comprehensive income (loss):						
Net income.....	--	--	--	--	1,107,208	--
Translation adjustments.....	--	(97,444)	--	--	--	--
Total comprehensive income.....	-----	-----	-----	-----	-----	-----
Balance at December 31, 1997.....	102,604	(26,261)	--	--	1,327,922	--
Preferred stock dividends.....	--	--	--	--	(121,666)	--

Comprehensive income (loss):						
Net income.....	--	--	--	--	71,142	--
Translation adjustments.....	--	(8,459)	--	--	--	--
Total comprehensive income.....	-----	-----	-----	-----	-----	-----
Balance at December 31, 1998.....	102,604	(34,720)	--	--	1,277,398	--
Preferred stock dividends.....	--	--	--	--	(156,586)	--
Preferred stock issuance costs.....	--	--	--	--	(74,826)	--
Stock compensation expense.....	--	--	3,283,164	--	--	--
Comprehensive income (loss):						
Net loss.....	--	--	--	--	(29,419,917)	--
Translation adjustments.....	--	(19,970)	--	--	--	--
Total comprehensive income (loss).....	-----	-----	-----	-----	-----	-----
Balance at December 31, 1999.....	102,604	(54,690)	3,283,164	--	(28,373,931)	--
Preferred stock dividends.....	--	--	--	--	(122,428)	--
Issuance of common stock.....	34,670	--	(13,322,514)	14,838,792	--	(1,547,950)
Stock compensation expense.....	--	--	13,331,943	--	--	--
Comprehensive income (loss):						
Net loss.....	--	--	--	--	(83,861,541)	--
Translation adjustments.....	--	(658,575)	--	--	--	--
Total comprehensive income (loss).....	-----	-----	-----	-----	-----	-----
Balance at September 30, 2000.....	<u>\$137,274</u>	<u>\$ (713,265)</u>	<u>\$ 3,292,593</u>	<u>\$14,838,792</u>	<u>\$ (112,357,900)</u>	<u>\$ (1,547,950)</u>

	TREASURY STOCK	TOTAL STOCKHOLDERS' EQUITY (DEFICIT)
	-----	-----
Balance at December 31, 1996.....	\$ --	\$ 516,169
Preferred stock dividends.....	--	(121,668)
Purchase of treasury stock.....	(667,745)	(667,745)
Comprehensive income (loss):		
Net income.....	--	1,107,208
Translation adjustments.....	--	(97,444)
Total comprehensive income.....	-----	1,009,764
Balance at December 31, 1997.....	(667,745)	736,520
Preferred stock dividends.....	--	(121,666)
Comprehensive income (loss):		
Net income.....	--	71,142
Translation adjustments.....	--	(8,459)
Total comprehensive income.....	-----	62,683
Balance at December 31, 1998.....	(667,745)	677,537
Preferred stock dividends.....	--	(156,586)
Preferred stock issuance costs.....	--	(74,826)
Stock compensation expense.....	--	3,283,164
Comprehensive income (loss):		
Net loss.....	--	(29,419,917)
Translation adjustments.....	--	(19,970)
Total comprehensive income (loss).....	-----	(29,439,887)
Balance at December 31, 1999.....	(667,745)	(25,710,598)
Preferred stock dividends.....	--	(122,428)
Issuance of common stock.....	--	2,998
Stock compensation expense.....	--	13,331,943
Comprehensive income (loss):		
Net loss.....	--	(83,861,541)
Translation adjustments.....	--	(658,575)
Total comprehensive income (loss).....	-----	(84,520,116)
Balance at September 30, 2000.....	<u>\$ (667,745)</u>	<u>\$ (97,018,201)</u>

See accompanying notes to consolidated financial statements.

	YEARS ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30,	
	1997	1998	1999	1999	2000
				(UNAUDITED)	
Cash flows from operating activities:					
Net (loss) income.....	\$1,107,208	\$ 71,142	\$(29,419,917)	\$(6,205,887)	\$(83,861,541)
Adjustments to reconcile net (loss) income to net cash provided by operating activities:					
Common stock warrant interest expense.....	116,574	1,379,460	29,694,019	7,402,457	70,920,242
Stock compensation expense.....	--	--	3,283,164	937,138	13,331,943
Depreciation.....	127,555	154,776	331,822	219,965	284,747
Amortization of catalog costs.....	328,713	525,600	493,428	481,488	228,978
Loss (gain) on sale of fixed assets.....	(33,980)	(4,075)	7,584	(7,584)	--
Provision for bad debts.....	14,321	(41,388)	26,877	2,901	2,480
Amortization of goodwill.....	--	27,661	368,235	226,250	423,126
Amortization of deferred financing costs.....	--	--	63,442	44,437	56,102
Deferred income taxes.....	(106,321)	(16,277)	(1,310,325)	(504,188)	669,584
Changes in operating assets and liabilities, net of effects of business acquisition:					
(Increase) decrease in accounts receivable.....	(193,547)	46,214	(2,282,344)	(1,758,222)	22,884
(Increase) decrease in other receivables.....	(2,741)	57,711	(113,949)	(134,915)	(40,785)
(Increase) decrease in inventories.....	58,631	80,430	215,152	165,203	(777,071)
(Increase) decrease in prepaid expenses and other assets.....	(19,306)	(5,514)	(260,285)	(115,048)	304,718
(Increase) decrease in other assets.....	112,716	(184,534)	(202,460)	(162,220)	74,237
Increase (decrease) in trade accounts payable.....	(211,303)	(115,065)	541,065	371,739	351,636
Increase (decrease) in accrued income taxes payable.....	27,247	(191,013)	797,633	488,632	(224,673)
Increase (decrease) in accrued expense.....	(178,965)	19,874	666,637	406,952	366,788
Increase (decrease) in other liabilities.....	(30,881)	1,388	26,663	(23,912)	(106,253)
Net cash provided by operating activities.....	1,115,921	1,806,390	2,926,441	1,835,186	2,027,142
Cash flows from investing activities:					
Additions to property, plant and equipment.....	(389,543)	(87,405)	(332,474)	(247,748)	(363,716)
Additions to catalog costs.....	(429,207)	(250,183)	(121,644)	(73,853)	(606,069)
Proceeds from sales of fixed assets.....	165,528	8,173	34,566	41,946	--
Acquisition of businesses, net of cash acquired.....	--	(1,090,553)	(8,126,656)	(7,164,454)	(3,682,482)
Net cash used in investing activities.....	(653,222)	(1,419,968)	(8,546,208)	(7,444,109)	(4,652,267)
Cash flows from financing activities:					
Proceeds from short-term debt.....	275,000	600,000	2,300,000	1,050,000	1,350,000
Repayments of short-term debt.....	--	(300,000)	(1,150,000)	(650,000)	(400,000)
Proceeds from long-term debt.....	--	--	5,500,000	5,500,000	2,000,000
Repayments of long-term debt.....	(263,050)	(283,433)	(460,663)	(336,313)	(282,778)
Dividends paid.....	(218,667)	(121,666)	(121,666)	(91,000)	(91,000)
Net proceeds from issuance of preferred stock.....	--	--	925,174	925,174	--
Treasury stock purchase.....	(667,745)	--	--	--	--
Issuance of common stock.....	--	--	--	--	2,998
Deferred initial public offering costs paid.....	--	--	--	--	(63,905)
Net cash provided by (used in) financing activities.....	(874,462)	(105,099)	6,992,845	6,397,861	2,515,315
Effect of exchange rate changes on cash.....	30,572	(31,505)	66,204	(57,867)	(137,363)
Increase (decrease) in cash and cash equivalents.....	(381,191)	249,818	1,439,282	731,071	(247,173)
Cash and cash equivalents at beginning of period.....	1,088,144	706,953	956,771	956,771	2,396,053
Cash and cash equivalents at end of period.....	\$ 706,953	\$ 956,771	\$ 2,396,053	\$1,687,842	\$ 2,148,880
Supplemental disclosures of cash flow information:					
Cash paid for interest.....	\$ 227,747	\$ 241,002	\$ 671,452	\$ 392,414	\$ 634,089
Cash paid for income taxes.....	\$ 761,251	\$ 1,128,929	\$ 686,675	\$ 617,076	\$ 697,049

See accompanying notes to consolidated financial statements.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(1) ORGANIZATION

On March 15, 1996, HAI Acquisition Corp. and its subsidiary, Guell Limited, purchased certain assets and assumed certain liabilities of the former Harvard Apparatus, Inc. and its subsidiary in the United Kingdom, Harvard Apparatus, Ltd. (the "Purchase"). For cash consideration of approximately \$3,342,000 (including \$342,000 of acquisition related expenses). The costs of the acquisition were allocated based on the fair market value of the assets acquired. The assets acquired consisted principally of cash of \$441,000, accounts receivable of \$1,397,000, inventories of \$1,661,000, miscellaneous prepaid assets of \$241,000, fixed assets of \$846,000, and catalog costs of \$366,000. The Company assumed liabilities of approximately \$1,605,000. The acquisition was financed principally by issuing preferred stock of \$1,500,000 and debt of \$1,750,000. Assets acquired at the time of the purchase included 79% of the capital stock of Ealing Scientific Ltd. (Canada) and Ealing S.A.R.L., now

Harvard Apparatus S.A.R.L. (France). The remainder of the capital stock of Ealing Scientific Ltd. and Ealing S.A.R.L. was also acquired directly from the stockholder at the time of the Purchase. After the date of the Purchase, HAI Acquisition Corp. and Guell Limited legally changed their names to Harvard Apparatus, Inc. and Harvard Apparatus, Ltd., respectively.

The Company manufactures and distributes syringe pumps, ventilators, cell injectors, diffusion chambers and other products principally used in the toxicology, metabolism and efficacy testing of new drugs, as well as spectrophotometers and amino acid analyzers primarily used in molecular biology which are manufactured by Biochrom Ltd., a wholly owned subsidiary acquired during 1999.

(2) SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

(A) PRINCIPLES OF CONSOLIDATION

The consolidated financial statements include the accounts of Harvard Apparatus, Inc. and its subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

(B) INTERIM CONSOLIDATED FINANCIAL STATEMENTS

The interim consolidated financial statements for the nine months ended September 30, 1999 are unaudited. In the opinion of management, all adjustments, consisting only of normal recurring adjustments, necessary for the fair presentation of the financial position and results of operations have been included in such unaudited consolidated financial statements. The results of operations for the nine months ended September 30, 2000 are not necessarily indicative of the results to be expected for the entire year.

(C) CASH AND CASH EQUIVALENTS

For purposes of the consolidated statements of cash flows, the Company considers all highly liquid instruments with original maturities of three months or less to be cash equivalents.

(D) INVENTORIES

Inventories are stated at the lower of cost or market. Cost is determined using a standard costing system which approximates the first-in, first-out (FIFO) method.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(2) SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(E) PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are stated at cost. Equipment under capital leases is stated at the present value of the minimum lease payments at the lease agreement date. Property, plant and equipment is depreciated using the straight-line method over the estimated useful lives of the assets as follows:

Buildings.....	40 years
Machinery and equipment.....	3-10 years
Computer equipment.....	3-7 years
Furniture and fixtures.....	5-10 years
Automobiles.....	4-6 years

(F) CATALOG COSTS

Significant costs of product catalog design, development and production are capitalized and amortized over the expected useful life of the catalog (usually two to three years). Costs of drawings and design that

were acquired at the purchase on March 15, 1996 are being amortized over their estimated useful life of six years.

(G) INCOME TAXES

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted tax rates expected to be applied to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date.

(H) FOREIGN CURRENCY TRANSLATION

All assets and liabilities of the Company's foreign subsidiaries are translated at exchange rates in effect at year-end. Income and expenses are translated at rates which approximate those in effect on the transaction dates. The resulting translation adjustment is recorded as a separate component of stockholders' equity in other comprehensive income.

(I) STOCK OPTIONS

The Company accounts for stock options granted to employees in accordance with the requirements of Statement of Financial Accounting Standards (SFAS) No. 123, ACCOUNTING FOR STOCK-BASED COMPENSATION. As is permitted by this Statement, the Company has elected to account for stock options in accordance with the provisions of APB Opinion No. 25, ACCOUNTING FOR STOCK ISSUED TO EMPLOYEES and provide the additional disclosures that are required by SFAS No. 123.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(2) SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(J) USE OF ESTIMATES

The preparation of financial statements in conformity with generally accepted accounting principles requires the use of management's estimates. Such estimates include the determination and establishment of certain accruals and provisions, including those for inventory obsolescence, catalog cost amortization and reserves for bad debts. Actual results could differ from those estimates.

(K) REVENUE RECOGNITION

The Company recognizes revenue from product sales at the time of shipment. Product returns are estimated and provided for based on historical experience.

(L) GOODWILL

Goodwill, which represents the excess of purchase price over fair value of net assets acquired, is amortized on a straight-line basis over the expected periods to be benefited, ranging from 5 to 15 years. The Company continually evaluates whether events or circumstances have occurred that indicate that the remaining useful life of goodwill may warrant revision or that the remaining balance may not be recoverable. When factors indicate that goodwill should be evaluated for possible impairment, the Company estimates the undiscounted cash flow of the business segment, net of tax, over the remaining life of the asset in determining whether the asset is recoverable. Charges for impairment of goodwill would be recorded to the extent unamortized book value exceeds the related future discounted cash flow, net of tax. The discount factor would be the long-term debt rate currently obtainable by the Company.

(M) IMPAIRMENT OF LONG-LIVED ASSETS AND LONG-LIVED ASSETS TO BE DISPOSED OF

The Company uses the provisions of SFAS No. 121, ACCOUNTING FOR THE IMPAIRMENT OF LONG-LIVED ASSETS AND FOR LONG-LIVED ASSETS TO BE DISPOSED OF. This statement requires that long-lived assets and certain identifiable intangibles be reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to undiscounted future net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the fair value of the assets. Assets to be disposed of are reported at the lower of the carrying amount or fair value less costs to sell.

(N) EFFECT OF ACCOUNTING CHANGES

In 1998, the Financial Accounting Standards Board issued SFAS 133, ACCOUNTING FOR DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES. SFAS 133, which was deferred through the issuance of SFAS 137 and subsequently amended by SFAS 138, is effective for fiscal years beginning after June 15, 2000. SFAS 133 will be adopted on January 1, 2001. Its impact on the consolidated financial statements is still being evaluated, but is not expected to be material.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(2) SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(O) FAIR VALUE OF FINANCIAL INSTRUMENTS

The carrying value of the Company's cash and cash equivalents, trade accounts receivable, trade accounts payable and accrued expenses approximate their fair values because of the short maturities of those instruments. The carrying value of the Company's debt approximates its fair value because of the short maturities and/or interest rates which are comparable to those available to the Company on similar terms.

(3) ACQUISITION OF BUSINESSES

On June 30, 1998, the Company acquired certain assets of Medical Systems Corporation, a manufacturer and product developer of research medical equipment. Cash consideration of approximately \$1,000,000 plus certain acquisition costs was paid for the assets. The costs of the acquisition were allocated on the basis of the estimated fair market value of the assets acquired. The net purchase price resulted in an allocation of \$784,047 to goodwill and \$281,506 to tangible net assets.

On February 26, 1999, the Company acquired substantially all of the assets and certain liabilities of Pharmacia Biotech (Biochrom) Ltd. ("Biochrom"), a UK manufacturer and developer of spectrophotometers, amino acid analyzers and other related research equipment. Cash consideration of approximately \$6,981,000 (including \$502,000 of acquisition related expenses) was paid for the assets. The costs of the acquisition allocated on the basis of estimated fair market value of the assets acquired using the purchase method of accounting resulted in an allocation of \$5,446,000 to goodwill and other intangibles. The assets acquired consisted of approximately \$61,000 of accounts receivable, \$1,039,000 of inventory, \$100,000 of prepaid expenses, \$612,000 of fixed assets, \$372,000 of pension assets and liabilities assumed totaled approximately \$649,000.

On September 10, 1999, the Company acquired certain assets of Clark Electromedical Instruments, a manufacturer of glass capillaries and distributor of research equipment. Cash consideration of approximately \$349,000 was paid for the assets. The costs of the acquisition allocated on the basis of estimated fair market value of the assets acquired using the purchase method of accounting resulted in an allocation of \$288,000 to goodwill and other intangibles.

On November 19, 1999, the Company acquired the NaviCyte diffusion chamber systems product line from NaviCyte, a wholly-owned subsidiary of Trega Biosciences, Inc. Cash consideration of approximately \$390,000 (including \$33,000 of acquisition related expenses) was paid for the assets. The costs of

the acquisition allocated on the basis of estimated fair market value of the assets acquired and the purchase method of accounting resulted in an allocation of \$333,000 to goodwill and other intangibles.

On November 30, 1999, the Company acquired substantially all of the assets and certain liabilities of Hugo Sachs Elektronik a developer and manufacturer of perfusion systems for research. Cash consideration of approximately \$568,000 was paid for the assets, net of cash acquired of \$31,000. The costs of the acquisition allocated on the basis of estimated fair market value of the assets acquired and the purchase method of accounting resulted in an allocation of \$89,000 to goodwill and other intangibles.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(3) ACQUISITION OF BUSINESSES (CONTINUED)

On May 19, 2000, the Company acquired substantially all of the assets of Biotronik, a manufacturer of Amino Acid Analyzers. Cash consideration of approximately \$469,000 was paid for the assets (including approximately \$12,000 of acquisition related expenses). The cost of the acquisition was allocated on the basis of fair market value of the assets acquired and the purchase method of accounting resulted in an allocation of \$335,000 to goodwill.

On July 14, 2000, the Company acquired substantially all of the assets of Amika Corporation, a manufacturer and distributor of sample preparation devices and consumables. Cash consideration of \$3,096,000 was paid for the assets including approximately \$61,000 of acquisition related expenses. The cost of the acquisition allocated on the basis of fair market value of the assets acquired and the purchase method of accounting resulted in an allocation of \$3,011,000 to goodwill and other intangibles. The assets acquired consisted of approximately \$85,000 of inventory. In addition, the Company acquired the right of first refusal to all new technologies developed and offered for sale by the predecessor Company for a period of four years on a fair value licensing arrangement.

All acquisitions have been accounted for by the purchase method of accounting for business combinations. Accordingly, the accompanying consolidated statements of operations do not include any revenues or expenses related to these acquisitions prior to the respective acquisition dates.

The following unaudited pro forma results of operations gives effect to the acquisition of Biochrom as if it had occurred at the beginning of fiscal 1998 (the effect of the other acquisitions are considered insignificant). Such pro forma information reflects certain adjustments including amortization of goodwill, interest expense, income tax effect and an increase in the number of weighted average shares outstanding. The pro forma information does not necessarily reflect the results of operations that would have occurred had the acquisition taken place as described and is not necessarily indicative of results that may be obtained in the future.

	YEARS ENDED DECEMBER 31,	
	----- 1998	1999 -----
	(UNAUDITED)	
Pro forma revenues.....	\$23,942,973	\$ 27,590,714
	=====	=====
Pro forma net earnings (loss).....	\$ (120,186)	\$ (29,415,046)
	=====	=====
Pro forma basic net earnings (loss) per share:		
Basic.....	\$ (0.04)	\$ (5.25)
	=====	=====
Diluted.....	\$ (0.04)	\$ (5.25)
	=====	=====
Pro forma weighted average common shares:		
Basic.....	5,598,626	5,598,626

Diluted.....	5,598,626	5,598,626
--------------	-----------	-----------

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(4) INVENTORIES

Inventories consist of the following:

	DECEMBER 31,		SEPTEMBER 30, 2000
	1998	1999	
Finished goods.....	\$ 686,555	\$ 857,202	\$1,194,810
Work in process.....	335,150	359,505	448,744
Raw materials.....	634,613	1,632,963	2,036,181
	-----	-----	-----
	\$1,656,318	\$2,849,670	\$3,679,735
	=====	=====	=====

(5) PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment consists of the following:

	DECEMBER 31,		SEPTEMBER 30, 2000
	1998	1999	
Land and buildings.....	\$ 654,172	\$ 636,250	\$ 576,366
Machinery and equipment.....	126,891	726,933	913,617
Computer equipment.....	103,218	378,400	398,639
Furniture and fixtures.....	234,882	326,978	348,022
Automobiles.....	190,354	123,113	122,051
	-----	-----	-----
	1,309,517	2,191,674	2,358,695
Less accumulated depreciation.....	339,612	631,752	845,597
	-----	-----	-----
	\$ 969,905	\$1,559,922	\$1,513,098
	=====	=====	=====

(6) SHORT-TERM DEBT

At September 30, 2000, December 31, 1999 and 1998, short-term debt consisted of an amount outstanding under a bank line of credit that is secured by a first priority security interest in all assets of the Company and a pledge of 65% of the capital stock of the Company's subsidiaries. Interest on the line of credit is payable monthly, in arrears, at the related bank's "base rate" plus 1% (10.5%, 9.5% and 8.75% at September 30, 2000, December 31, 1999 and 1998, respectively). Borrowings under the line of credit are limited to an available amount determined by an accounts receivable and inventory based formula, \$3,750,000, \$3,750,000 and \$2,000,000 at September 30, 2000, December 31, 1999 and 1998, respectively. This line of credit is due to mature on January 29, 2002. At September 30, 2000, December 31, 1999 and 1998, borrowings under the line of credit were \$3,150,000, \$2,200,000 and \$700,000, respectively.

At December 31, 1998, short-term debt also included a note from the same bank in the amount of \$350,000 with interest payable monthly, in arrears at the bank's "base rate" plus 1.5% (9.25%). This debt was rolled into long-term debt

on March 2, 1999 as part of the financing arrangement to acquire Biochrom in March 1999 (see notes 3 and 7).

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(7) LONG-TERM DEBT

Long-term debt consists of the following:

	DECEMBER 31,		SEPTEMBER 30,
	1998	1999	2000
Subordinated debentures, at 13%, payable in quarterly installments through March 15, 2003.....	\$787,500	\$ 727,500	\$ 477,500
Notes payable.....	--	5,125,000	6,800,000
Capital lease obligations (note 10).....	41,355	14,614	9,431
	828,855	5,867,114	7,286,931
Less current installments.....	190,389	794,173	1,556,618
	\$638,466	\$5,072,941	\$ 5,730,313
	=====	=====	=====

On March 2, 1999, the Company entered into two loan agreements with two banks to borrow up to \$5.5 million. The purpose of the loan agreements was to partially finance the acquisition of Biochrom (see note 3). Principal and interest are being paid in quarterly installments, with the final payment due in January 2002. The interest rate is determined by one of the banks base rate plus 1%, (10.5% and 9.5% at September 30, 2000 and December 31, 1999, respectively). The loans are secured by substantially all of the Company's assets. The loan agreements contain covenants relating to net income, debt service coverage and cash flow coverage. At September 30, 2000 and December 31, 1999, the Company was not in compliance with certain of its covenants. The Company has either received waivers from its banks or had the covenants amended by its banks.

Financing costs of \$221,074 were incurred in 1999. These costs were capitalized and are being amortized over the term of the loans. Amortization expense was \$56,102 for the nine months ended September 30, 2000 and \$63,442 for the year ended December 31, 1999.

Aggregate annual principal payments on all long-term debt, excluding capital lease obligations, for the next five years and thereafter at September 30, 2000 are as follows:

2001.....	\$ 1,550,004
2002.....	4,449,996
2003.....	777,500
2004.....	500,000
Thereafter.....	--

	\$ 7,277,500
	=====

(8) CONVERTIBLE AND REDEEMABLE PREFERRED STOCK

During 1999, 48,500 shares of Series B convertible and redeemable preferred stock were issued to partially finance the acquisition of Biochrom (note 3). The net proceeds from this issuance were \$925,174. The Company's Series B convertible redeemable preferred stock has a dividend preference over the

Series A preferred stock, and as a result, no dividends shall be paid in respect of shares of

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(8) CONVERTIBLE AND REDEEMABLE PREFERRED STOCK (CONTINUED)

Series A preferred stock unless all accrued dividends that become payable in respect of Series B preferred stock have been paid. The Series B redeemable convertible preferred stock is convertible at the option of the holder, at any time, into shares of common stock of the Company at a conversion rate of 19.71 shares of common stock for each share of Series B redeemable convertible preferred stock, subject to adjustment for subdivision of Series B preferred stock or any issuance of additional shares of Series B preferred stock.

Redeemable preferred Series A stock pays quarterly cumulative dividends in arrears at a rate of approximately \$0.26 per share. On March 3, 2000, convertible and redeemable preferred "B" stock started to accrue dividends at a rate of \$1.44 that will be payable a year in arrears on March 3, 2001, and thereafter quarterly in arrears.

In the event of any liquidation of the Company, the holders of the Company's redeemable preferred stock are entitled to be paid from the assets available for distribution to holders of the Company's capital stock \$2,500,000, plus any related dividends that are accrued but unpaid at such time, prior to other stock distributions.

Mandatory redemption requirements for the preferred stock are as follows:

	SERIES "A"	SERIES "B"
	-----	-----
March 15, 2002.....	\$ 500,000	\$ 333,320
March 15, 2003.....	500,000	333,320
March 15, 2004.....	500,000	333,320
	-----	-----
	\$1,500,000	\$1,000,000
	=====	=====

(9) COMMON STOCK WARRANTS

At September 30, 2000, December 31, 1999 and 1998, there were outstanding 8,509,905 warrants, which enable the holders to purchase a like amount of the Company's common stock for \$0.0005 per share. The warrants were issued in connection with the issuance of Series A redeemable preferred stock (6,046,510 warrants) and subordinated debentures (2,463,395 warrants) that occurred on March 15, 1996.

Commencing on March 15, 2002, the holders of the warrants may at any time require the Company to repurchase the warrants, or any common shares previously acquired from exercise of the warrants, for their fair market value as determined in good faith by the Company's board of directors. Such repurchase price would be repaid in 12 equal quarterly installments beginning on the first business day of the month following the surrender of the warrants or applicable shares of common stock. In 1999, 1998 and 1997 and for the nine months ended September 30, 2000 and 1999, \$29,694,019, \$1,379,460, \$116,574, \$70,920,242 and \$7,402,457, respectively, has been recorded as interest expense to accrue the estimated amount of this potential liability in accordance with EITF 96-13, ACCOUNTING FOR DERIVATIVE FINANCIAL INSTRUMENTS INDEXED TO AND POTENTIALLY SETTLED IN, A COMPANY'S OWN STOCK. Future changes in the fair value of common stock warrants will also be recorded as interest expense.

In September 2000, the holders of the warrants agreed to automatically terminate the requirement of the Company to repurchase the warrants in the event of an initial public offering of the Company's Common Stock.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(10) LEASES

The Company leases automobiles under various leases that are classified as capital leases. The carrying value of automobiles under capital leases at September 30, 2000, December 31, 1999 and 1998 was \$9,502, \$14,532 and \$40,795, respectively, which is net of \$48,871, \$68,602 and \$76,352, respectively, of accumulated depreciation.

The Company has noncancelable operating leases for office and warehouse space expiring at various dates through 2009. Rent expense for the nine months ended September 30, 2000 and for the years ended December 31, 1999, 1998 and 1997 was approximately \$439,000, \$484,000, \$134,000 and \$151,262, respectively.

Future minimum lease payments for both capital and operating leases, with initial or remaining terms in excess of one year at September 30, 2000, are as follows:

	CAPITAL LEASES	OPERATING LEASES
	-----	-----
2001.....	\$ 9,116	\$ 660,861
2002.....	1,157	417,710
2003.....	--	372,238
2004.....	--	352,806
2005 and thereafter.....	--	--
	-----	-----
Net minimum lease payments.....	10,273	\$1,803,615
		=====
Less amount representing interest.....	842	

Present value of net minimum lease payments.....	\$ 9,431	
	=====	

(11) RELATED PARTY TRANSACTIONS

The Company paid an annual consulting fee to a former stockholder who formerly served on its board of directors and, by written agreement, provided no less than five days of consulting services each month. The agreement was scheduled to expire on March 15, 2001 or at the time of any initial public offering of the Company's stock or other sale of a material portion of the Company's stock or assets, if such a transaction occurred before that date. As of September 30, 2000, the agreement with the former stockholder was rescinded. The related consulting expense amounted to \$294,583 for the nine months ended September 30, 2000 and \$258,437, \$262,040 and \$268,030 for the years ended December 31, 1999, 1998 and 1997, respectively.

(12) EMPLOYEE BENEFIT PLANS

The Company sponsors a profit sharing retirement plan for its U.S. employees, which includes an employee savings plan established under Section 401(k) of the U.S. Internal Revenue Code. The plan covers substantially all full-time employees who meet certain eligibility requirements. Contributions to the profit sharing retirement plan are at the discretion of management. For the nine months ended September 30, 2000 and for the years ended December 31, 1999, 1998 and 1997, the Company contributed approximately \$60,000, \$67,000, \$41,000 and \$27,000, respectively, to the plan.

(12) EMPLOYEE BENEFIT PLANS (CONTINUED)

Certain of the Company's subsidiaries in the United Kingdom (UK), Harvard Apparatus Limited, and Biochrom Limited maintain contributory, defined benefit pension plans for substantially all of their employees.

The components of the Company's pension expense, primarily for Biochrom, for the nine months ended September 30, 2000 and for the year ended December 31, 1999 follow:

	DECEMBER 31, 1999	SEPTEMBER 30, 2000
	-----	-----
Components of net periodic benefit cost:		
Service cost.....	\$ 288,640	\$ 182,376
Interest cost.....	250,437	197,263
Expected return on plan assets.....	(364,684)	(291,771)
Net amortization gain.....	6,965	(9,364)
	-----	-----
Net periodic benefit cost.....	\$ 181,358	\$ 78,504
	=====	=====

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(12) EMPLOYEE BENEFIT PLANS (CONTINUED)

The funded status of the Company's defined benefit pension plans and the amount recognized in the balance sheet at September 30, 2000 and December 31, 1999 follow:

	DECEMBER 31, 1999	SEPTEMBER 30, 2000
	-----	-----
Change in benefit obligation:		
Balance at beginning of period.....	\$1,215,000	\$5,829,403
Acquisitions.....	4,848,552	--
Service cost.....	288,640	182,376
Interest cost.....	250,437	197,263
Participants' contributions.....	60,745	45,931
Actuarial (gain)/loss.....	(824,672)	571,532
Benefits paid.....	(9,299)	(42,993)
Currency translation adjustment.....	--	(594,437)
	-----	-----
Balance at end of period.....	5,829,403	6,189,075
	-----	-----
Change in fair value of plan assets:		
Balance at beginning of period.....	1,158,138	7,062,645
Acquisitions.....	5,231,470	--
Actual return on plan assets.....	440,606	(39,627)
Participants' contributions.....	60,745	45,931
Employer contributions.....	180,985	153,275
Benefits paid.....	(9,299)	(42,993)
Currency translation adjustment.....	--	(673,592)
	-----	-----
Balance at end of period.....	7,062,645	6,505,639
	-----	-----
Funded status:		
Plan assets greater than benefit obligation.....	1,233,242	316,564
Unrecognized (gain) loss.....	(881,299)	73,808
	-----	-----
Prepaid pension expense in consolidated balance sheet.....	\$ 351,943	\$ 390,372

=====

The weighted average assumptions used in determining the net pension cost for the Company's plans follows:

	DECEMBER 31, 1999	SEPTEMBER 30, 2000
	-----	-----
Weighted average assumptions:		
Discount rate.....	5.5%	6.5-8.5%
Expected return on assets.....	7.0-8.0%	7.0-8.0%
Rate of compensation increase.....	3.8-4.0%	4.5%

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(13) INCOME TAXES

The significant components of the Company's deferred tax assets and liabilities at September 30, 2000, December 31, 1999 and 1998 are as follows:

	DECEMBER 31,		SEPTEMBER 30,
	-----	-----	-----
	1998	1999	2000
	-----	-----	-----
Deferred tax assets:			
Accounts receivable.....	\$ --	\$ 31,755	\$ 31,755
Inventory.....	111,676	129,097	141,113
Operating loss carryforward.....	28,182	34,417	387,188
Accrued expenses.....	(14,940)	1,196,338	135,398
Goodwill.....	--	37,679	46,567
Catalog costs.....	--	8,503	--
Total deferred tax assets.....	124,918	1,437,789	742,021
Deferred tax liabilities:			
Catalog costs.....	24,524	--	6,011
Pension fund asset.....	15,051	18,461	16,725
Property, plant and equipment.....	22,053	42,632	36,278
Other.....	497	4,695	--
Total deferred tax liabilities.....	62,125	65,788	59,014
Net deferred tax assets.....	\$ 62,793	\$1,372,001	\$ 683,007
	=====	=====	=====

In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. Based upon the level of historical taxable income and projections for future taxable income over the periods during which deferred tax assets are deductible, management believes it is more likely than not that the Company will realize the benefits of these deductible differences.

Income tax expense is based on the following pre-tax income (loss) for the nine months ended September 30, 2000 and for the years ended December 31, 1999, 1998 and 1997:

	DECEMBER 31,			SEPTEMBER 30,
	-----	-----	-----	-----
	1997	1998	1999	2000

	-----	-----	-----	-----
Domestic.....	\$1,253,916	\$115,418	\$(32,040,219)	\$(83,771,998)
Foreign.....	535,621	738,916	2,757,782	1,264,808
	-----	-----	-----	-----
	\$1,789,537	\$854,334	\$(29,282,437)	(82,507,190)
	=====	=====	=====	=====

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(13) INCOME TAXES (CONTINUED)

Income tax expense (benefit) for the nine months ended September 30, 2000 and for the years ended December 31, 1999, 1998 and 1997 consisted of:

	DECEMBER 31,			SEPTEMBER 30,
	-----	-----	-----	-----
	1997	1998	1999	2000
	-----	-----	-----	-----
Current income tax expense:				
Federal and state.....	\$ 584,239	\$579,152	\$ 403,149	\$ --
Foreign.....	208,103	214,112	1,043,539	506,532
	-----	-----	-----	-----
	792,342	793,264	1,446,688	506,532
	-----	-----	-----	-----
Deferred income tax (benefit) expense:				
Federal and state.....	(56,939)	(19,380)	(1,238,399)	840,106
Foreign.....	(53,074)	9,308	(70,809)	7,713
	-----	-----	-----	-----
	(110,013)	(10,072)	(1,309,208)	847,819
	-----	-----	-----	-----
Total income tax expense...	\$ 682,329	\$783,192	\$ 137,480	\$ 1,354,351
	=====	=====	=====	=====

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(13) INCOME TAXES (CONTINUED)

Income tax expense for the nine months ended September 30, 2000 and for the years ended December 31, 1999, 1998 and 1997 differed from the amount computed by applying the U.S. federal income tax rate of 34% to pretax income as a result of the following:

	DECEMBER 31,			SEPTEMBER 30,
	-----	-----	-----	-----
	1997	1998	1999	2000
	-----	-----	-----	-----
Computed "expected" income tax (benefit) expense.....	\$608,443	\$ 290,474	\$(9,956,029)	\$(28,052,445)
Increase (decrease) in income taxes resulting from:				
Foreign tax rate and regulation differential.....	(3,625)	(27,811)	35,804	85,909
State income taxes, net of				

federal income tax benefit.....	73,757	86,068	(154,569)	130,804
Interest expense (common stock warrants).....	39,564	469,002	10,254,946	24,177,992
Foreign Subsidiary Corporation tax benefits.....	--	(27,804)	(28,761)	(32,876)
Other.....	9,220	(6,737)	(13,911)	7,698
Stock compensation expense in excess of allowable tax benefits on exercise of options.....	--	--	--	5,037,269
Decrease in deferred tax valuation allowance.....	(45,030)	--	--	--
	-----	-----	-----	-----
Total.....	\$682,329	\$ 783,192	\$ 137,480	\$ 1,354,351
	=====	=====	=====	=====

Undistributed earnings of the Company's foreign subsidiaries amounted to approximately \$4,013,000, \$3,185,000 and \$1,565,000 at September 30, 2000, December 31, 1999 and 1998, respectively. Those earnings are considered to be indefinitely reinvested and, accordingly, no related provision for U.S. federal and state income taxes has been provided. Upon distribution of those earnings in the form of dividends or otherwise, the Company will be subject to both U.S. income taxes (subject to an adjustment for foreign tax credits) and withholding taxes in the various foreign countries.

(14) STOCK OPTION PLAN

The Company has adopted a stock option plan (the "Plan") pursuant to which the Company's Board of Directors may grant stock options to employees. The Plan authorizes grants of options to purchase up to 4,072,480 shares of authorized but unissued stock.

For the nine months ended September 30, 2000, and for the years ended December 31, 1999 and 1998, 2,254,272, 1,119,725 and 1,119,725 "Incentive Stock Options," and 1,812,295, 1,812,295 and 895,780 "Non-qualified Stock Options," respectively, had been granted to employees. The Incentive Stock Options become fully vested over a four year period, on a pro rata basis. The Non-qualified

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(14) STOCK OPTION PLAN (CONTINUED)

Stock Options granted prior to 1999 only become vested if, prior to the end of the year 2000: a sale of substantially all of the Company's assets or capital stock occurs; or an initial public offering of the Company's common stock at a net price of not less than \$1.42 per share; or the fair market value of the Company's common stock is otherwise determined to be, on a fully diluted basis, not less than \$1.42 per common share. For non-qualified options granted under the plan during 1999, prior to an amendment to the plan dated September 29, 2000, the options were deemed to be vested and exercisable upon either (i) the sale of all or substantially all of the assets or capital stock of the Company for an actual or implied price per share of not less than \$2.09 or (ii) an initial public offering of the Company's stock with a price per share of not less than \$2.09 and gross proceeds to the Company of at least \$15 million. On September 29, 2000, the vesting schedule was amended so that the options are vested and exercisable upon either (i) a sale of all or substantially all of the assets or capital stock of the Company for an actual or implied net price per share of Common Stock of not less than \$2.09 or (ii) if the fair market value of the Company at any time prior to December 31, 2000 results in a per share valuation, on a fully diluted basis, of not less than \$2.09 per share. As a result of the Plan amendment, the related options vested immediately as a per share valuation of \$2.09 was attained.

The Company applies APB Opinion No. 25 in accounting for the Plan. APB No. 25 requires no recognition of compensation expense for stock option awards when on the date of grant the exercise price is equal to the estimated fair market value of the Company's common stock and the number of options granted is

fixed. During the nine months ended September 30, 2000, 1,134,547 stock options were granted to employees at an exercise price of \$1.05 which was estimated to be less than the fair market value of the Company's common stock on the date of grant. Accordingly, compensation expense of \$3,292,593 was recognized on these stock option grants. Additional compensation expense will be recognized in future periods over the four year vesting period of the options. The Company's 1996 and 1999 Non-qualified Stock Option awards are considered variable awards as the number of shares to be acquired by the employees is indeterminable at the date of grant. Accordingly, in 1999 and for the nine months ended September 30, 1999, the Company recognized compensation expense of \$3,283,164 and \$937,138, respectively, on the non-qualified Stock Options granted in 1996. At December 31, 1999, all non-qualified stock options granted in 1996 were fully vested because a per share valuation of \$1.42 was attained. For the nine months ended September 30, 2000, the Company recognized compensation expense of \$10,039,350 on the non-qualified options granted in 1999.

On September 29, 2000, two employees exercised 563,942 non-vested options that were granted during 2000 for 563,942 shares of restricted common shares for cash consideration of \$286 and two promissory notes amounting to \$589,652 payable to the Company. The notes have a three-year maturity and a fixed interest rate of 10% per annum, compounded annually. The restricted stock becomes fully vested over a four-year period, on a pro rata basis. The estimated fair market value of the shares awarded on the original option date grant and on the date of exercise was estimated to be \$6,767,310 of which \$2,412,865 has been recognized as stock compensation expense for the nine months ended September 30, 2000. The remaining unearned compensation is being amortized to expense over the four year vesting period. Also on September 29, 2000, two employees of the Company exercised 916,514 fully vested options for cash of \$465 and two promissory notes amounting to \$958,298 payable to the Company. The notes have a three-year maturity and a fixed interest rate of 10% per annum, compounded annually.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(14) STOCK OPTION PLAN (CONTINUED)

The following is a summary of stock option activity.

	EMPLOYEE STOCK OPTIONS	
	OPTIONS OUTSTANDING	WEIGHTED AVERAGE EXERCISE PRICE
Balance at December 31, 1996.....	1,903,533	\$0.0005
Options granted.....	111,972	0.0147
	-----	-----
Balance at December 31, 1997.....	2,015,505	0.0152
Options granted.....	--	--
	-----	-----
Balance at December 31, 1998.....	2,015,505	0.0152
Options granted.....	916,515	1.0462
	-----	-----
Balance at December 31, 1999.....	2,932,020	0.3278
	-----	-----
Options exercised.....	(3,467,955)	0.4475
Options granted.....	1,134,547	1.0462
	-----	-----
Balance at September 30, 2000.....	598,612	\$0.9980
	=====	=====

During 1999, 1998 and 1997 and the first nine months of 2000, there were no other additional options exercised, canceled, expired or forfeited, or changes in any option terms, including exercise prices. The weighted-average fair value of options granted during the nine months ended September 30, 2000 and fiscal 1999 and 1997 was \$9.73, \$1.05 and \$0.01, respectively. No options were granted during 1998.

The following is a summary of information relating to stock options outstanding at September 30, 2000 (no options were exercisable at September 30, 2000):

OPTIONS OUTSTANDING			
RANGE OF EXERCISE PRICE	NUMBER OUTSTANDING AT SEPTEMBER 30, 2000	WEIGHTED-AVERAGE REMAINING CONTRACTUAL LIFE	WEIGHTED AVERAGE EXERCISE PRICE
\$ 0.01	28,008	6.3 years	\$ 0.01
\$ 1.05	570,605	9.5 years	1.05
\$ 0.01-\$1.05	598,613	9.4 years	\$ 1.00

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(14) STOCK OPTION PLAN (CONTINUED)

Had the Company determined compensation cost based on the fair value of the options at the grant date, as is permitted by SFAS No. 123, the Company's net income would have been as follows:

	YEARS ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30, 2000
	1997	1998	1999	
Net income (loss) as reported.....	\$1,107,208	\$71,142	\$(29,419,917)	\$(83,861,541)
Pro forma net income (loss).....	\$1,106,988	\$70,922	\$(29,420,033)	\$(83,926,155)
Basic net income (loss) per share.....	\$ 0.13	\$ (0.01)	\$ (5.28)	\$ (13.11)
Pro forma basic net income (loss) per share.....	\$ 0.13	\$ (0.01)	\$ (5.28)	\$ (13.12)
Diluted net income (loss) per share.....	\$ 0.06	\$ (0.01)	\$ (5.28)	\$ (13.11)
Diluted pro forma net income (loss) per share.....	\$ 0.06	\$ (0.01)	\$ (5.28)	\$ (13.12)

The fair value of each option grant for the Company's plans is estimated on the date of the grant using the minimum value pricing model, with the following weighted average assumptions used for grants in 2000, 1999 and 1997. There were no grants of options in 1998.

	DECEMBER 31,		SEPTEMBER 30, 2000
	1997	1999	
Risk free interest rates.....	6.4%	5.6%	6.1%
Expected option lives.....	7 years	7 years	2 years

Expected dividend yields..... 0% 0% 0%

(15) SEGMENT AND RELATED INFORMATION

The Company operates in one significant business segment.

Revenues by geographic area consists of the following:

	YEARS ENDED			NINE MONTHS ENDED	
	DECEMBER 31, 1997	DECEMBER 31, 1998	DECEMBER 31, 1999	SEPTEMBER 30, 1999	SEPTEMBER 30, 2000
				(UNAUDITED)	
United States.....	\$ 6,263,264	\$ 7,347,907	\$ 8,169,470	\$ 6,266,620	\$ 6,867,515
United Kingdom.....	2,668,300	2,458,772	15,353,761	10,344,187	11,549,083
Canada and Europe.....	2,532,593	2,347,346	2,654,583	1,859,106	3,652,428
	-----	-----	-----	-----	-----
	\$11,464,157	\$12,154,025	\$26,177,814	\$18,469,913	\$22,069,026
	=====	=====	=====	=====	=====

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(15) SEGMENT AND RELATED INFORMATION (CONTINUED)

Long lived assets by geographic area consists of the following:

	DECEMBER 31, 1998	DECEMBER 31, 1999	SEPTEMBER 30, 2000
United States.....	\$260,977	\$ 307,286	\$ 259,430
United Kingdom.....	677,889	1,189,269	1,197,896
Canada and Europe.....	31,039	63,367	55,772
	-----	-----	-----
	\$969,905	\$1,559,922	\$1,513,098
	=====	=====	=====

(16) INCOME (LOSS) PER SHARE

Basic income (loss) per share is based upon net income less dividends on preferred stock divided by the weighted average common shares outstanding during each year. The calculation of diluted net income (loss) per share assumes conversion of convertible preferred stock, stock options and common stock warrants into common stock, and also adjusts net income (loss) for the effect of converting convertible preferred stock and common stock warrants into common stock. Net income (loss) and shares used to compute net income per share, basic and diluted, are reconciled below:

	YEARS ENDED			NINE MONTHS ENDED	
	DECEMBER 31, 1997	DECEMBER 31, 1998	DECEMBER 31, 1999	SEPTEMBER 30, 1999	SEPTEMBER 30, 2000
				(UNAUDITED)	
Net income (loss) available to common shareholders.....	\$ 985,540	\$ (50,524)	\$ (29,576,503)	\$ (6,321,331)	\$ (83,983,969)
Effect of dilutive securities:					

Common stock warrants.....	116,574	--	--	--	--
Net income (loss), assuming dilution.....	\$1,102,114	\$ (50,524)	\$ (29,576,503)	\$ (6,321,331)	\$ (83,983,969)
Weighted average common shares outstanding during the year.....	7,406,486	5,598,626	5,598,626	5,598,626	6,407,682
Effect of dilutive securities:					
Common stock warrants.....	8,509,911	--	--	--	--
Common stock options.....	1,583,797	--	--	--	--
	17,500,194	5,598,626	5,598,626	5,598,626	6,407,682

For the years ended December 31, 1999 and 1998, and for the nine months ended September 30, 2000 and 1999, common equivalent shares of 11,378,110, 9,688,766, 10,628,401 and 11,446,996, respectively, resulting from stock options, warrants and restricted stock were not included in the computation of diluted earnings per share because to do so would have been antidilutive.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(17) ACCRUED EXPENSES

Accrued expenses consist of:

	DECEMBER 31,		SEPTEMBER 30, 2000
	1998	1999	
Accrued compensation and payroll.....	\$392,066	\$ 736,021	\$ 955,543
Accrued interest.....	8,062	158,101	153,682
Accrued legal and professional fees.....	128,812	251,926	720,599
Other.....	57,349	253,475	436,723
	\$586,289	\$1,399,523	\$2,266,547

(18) CONTINGENCIES

The Company is subject to legal proceedings and claims arising out of its normal course of business. Management, after review and consultation with counsel, considers that amounts accrued for in connection therewith are adequate.

(19) CONCENTRATION OF CREDIT RISK

One commercial customer accounted for 44% of revenues for the year ended December 31, 1999 and 39% and 41% for the nine months ended September 30, 2000 and 1999, respectively. At September 30, 2000 and 1999, and December 31, 1999, one customer accounted for 41%, 46% and 48% of accounts receivable, respectively. Except as noted above, no other individual customer accounted for more than 10% of revenues for the nine months ended September 30, 2000 and 1999 and for the years ended December 31, 1999, 1998, and 1997. In addition, except as noted above, no other individual customer accounted for more than 10% of account receivable at September 30, 2000, December 31, 1999 and December 31, 1998.

(20) STOCK SPLIT

On October 25, 2000, the Board of Directors approved a merger, subject to stockholder approval, of the Company with and into its wholly-owned subsidiary, Harvard Bioscience, Inc., to be effected prior to the consummation of the anticipated initial public offering ("IPO"). In the merger each share of common

stock of the Company will be exchanged for one share of Harvard Bioscience, Inc. The Board of Directors of Harvard Bioscience, Inc. has approved a 19.71:1 stock split effective immediately after consummation of the merger. All common stock share and per share data have been restated in these financial statements for all periods presented to reflect this split.

(21) SUBSEQUENT EVENT

Subsequent to September 30, 2000, 5,913 stock options were granted to employees resulting in deferred compensation of approximately \$65,000.

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HARVARD APPARATUS, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

SEPTEMBER 30, 2000, DECEMBER 31, 1999 AND 1998

(22) UNASSERTED LEGAL CLAIM (UNAUDITED)

On November 7, 2000 the Company received correspondence from counsel to Harvard University claiming that the Company's use of the term "Harvard Bioscience" and other terms containing or consisting of the term "Harvard" constitutes trademark infringement, false designation of origin, unfair competition and cybersquatting. Counsel to Harvard University has threatened legal action if the Company does not take certain steps, including ceasing and permanently refraining from using these terms. Management denies the allegations contained in the above correspondence, and intends to vigorously seek to protect the Company's rights should such claims be asserted against the Company.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED
FORMERLY
PHARMACIA BIOTECH (BIOCHROM) LIMITED

REPORT OF THE DIRECTORS

FOR THE YEAR ENDED 31ST DECEMBER 1998

The Directors present their report and the audited financial statements for the year ended 31st December 1998.

TRADING RESULTS FOR THE YEAR AND OUTLOOK

The trading results for the year are set out on page F-29 of the accounts. The year was satisfactory.

Following the Company's disposal of the majority of its net assets on the 26th February 1999, (note 23), the Company will cease to trade.

PRINCIPAL ACTIVITIES

During the year the Company developed, manufactured and marketed scientific instruments and associated chemicals.

DIRECTORS

The Directors throughout the year were as listed below. None of the Directors holds any beneficial interest in the share capital of the Company.

W.B. Brown	--	Managing	Resigned	01/03/99
J.G. Lee	--		Joined	23/12/98
K.T. Krzywicki	--		Joined	23/12/98

YEAR 2000 AND EUROPEAN MONETARY UNION

As the Company ceased to trade on the 26th February 1999 the directors are satisfied that there are no risks associated with the impact of the Year 2000 date change or European Monetary Union.

RESEARCH AND DEVELOPMENT

It is the Company's policy to carry out research and development to develop products in the fields of spectrophotometry and amino acid analysis. Our objective is the rapid creation of products utilising Biochrom's strengths in electronic, software, optical and mechanical design plus production skills.

Expenditure on research and development is set out in the profit and loss accounts on page F-29.

CLOSE COMPANY PROVISIONS

As far as the Directors are aware the close company provisions of the Income and Corporation Taxes Act 1988 as amended do not apply to the Company. There has been no change in this respect since the end of the financial year.

POST BALANCE SHEET EVENT

Effective 26th February 1999, the Company sold the majority of its net assets to Biochrom Limited.

(See note 23).

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED
FORMERLY
PHARMACIA BIOTECH (BIOCHROM) LIMITED

REPORT OF THE DIRECTORS

FOR THE YEAR ENDED 31ST DECEMBER 1998

AUDITORS

Our auditors, Coopers & Lybrand, merged with Price Waterhouse on 1 July 1998, following which Coopers & Lybrand resigned and the directors appointed the new firm, PricewaterhouseCoopers, as auditors.

A resolution to reappoint PricewaterhouseCoopers as auditors to the company will be proposed at the annual general meeting.

BY ORDER OF THE BOARD

J.G. LEE
DIRECTOR

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED
FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

YEAR ENDED 31ST DECEMBER 1998

STATEMENT OF DIRECTORS' RESPONSIBILITIES

Company law requires the directors to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the company and of the profit or loss of the company for that period. In preparing these financial statements, the directors are required to:

- * Select suitable accounting policies and then apply them consistently;
- * Make judgements and estimates that are reasonable and prudent;
- * State whether applicable accounting standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- * Prepare the financial statements on the going concern basis unless it is inappropriate to presume that the company will continue in business.

The directors are responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the company and to enable them to ensure that the financial statements comply with the Companies Act 1985. They are also responsible for safeguarding the assets of the company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

BY ORDER OF THE BOARD

/s/ J.G. Lee

Director

9 April 1999

Date

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REPORT OF THE AUDITORS TO THE MEMBERS OF
PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

REPORT OF INDEPENDENT ACCOUNTANTS

To the Directors of Pharmacia & Upjohn (Cambridge) Limited:

In our opinion, the accompanying balance sheet, profit and loss account and statement of cash flows present fairly, in all material respects, the financial position of Pharmacia & Upjohn (Cambridge) Limited as at 31 December 1997 and 1998 and the profit and loss accounts and cash flows for the years ended 31 December 1997 and 1998 in conformity with generally accepted accounting principles in the United Kingdom, which differ in certain respects from those accepted in the United States (see note 24 to the financial statements).

These financial statements are the responsibility of Pharmacia & Upjohn (Cambridge) Limited's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audit of these statements in accordance with generally accepted auditing standards in the United Kingdom and the United States. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management and evaluating the overall financial statements presentation. We believe that our audit provides a reasonable basis for the opinion expressed above.

PRICEWATERHOUSECOOPERS

Chartered Accountants and Registered Auditors
Cambridge, England

February 26, 1998 (year ended December 31, 1997)
and April 9, 1999 (year ended December 31, 1998),
except for Note 24, which is as of September 15, 2000.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED
FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

PROFIT AND LOSS ACCOUNT

YEAR ENDED 31ST DECEMBER 1998

NOTES	1998		1997	
	L	L	L	L
TURNOVER.....	2	7,101,776		8,699,944
Cost of sales.....		(5,160,296)		(6,252,278)
GROSS PROFIT.....		1,941,480		2,447,666
Distribution costs.....	(457,939)		(421,254)	
Administration costs.....	(604,918)		(493,374)	

Research and Development costs.....		(395,569)	(418,000)
		-----	-----
Other operating income.....	4	(1,458,426) 48,808	(1,332,628) 61,019
		-----	-----
NET OPERATING EXPENSES.....		(1,409,618)	(1,271,609)
		-----	-----
OPERATING PROFIT.....	3	531,862	1,176,057
Interest receivable.....	5	83,095	114,392
		-----	-----
PROFIT ON ORDINARY ACTIVITIES BEFORE TAXATION.....		614,957	1,290,449
Tax on profit on ordinary activities...	6	(194,935)	(444,323)
		-----	-----
PROFIT FOR THE YEAR.....		420,022	846,126
Dividend Paid Net.....		--	(2,349,827)
		-----	-----
PROFIT (LOSS) RETAINED FOR THE YEAR.....		L420,022	L(1,503,701)
		=====	=====

Reserves statement see note 15

All activities are discontinued (note 23).

The company has no recognised gains and losses other than those included in the profits above, and therefore no separate statement of total recognised gains and losses has been presented.

There is no difference between the profit on ordinary activities before taxation and the retained profit for the year stated above and historical cost equivalents.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

BALANCE SHEET

31ST DECEMBER 1998

	NOTES	1998		1997	
		L	L	L	L
FIXED ASSETS					
Tangible assets.....	9		415,900		455,504
CURRENT ASSETS					
Stock.....	10	636,556		706,141	
Debtors.....	11	1,603,559		1,537,499	
Cash at bank and in hand.....		1,545,230		1,026,766	
		3,785,345		3,270,406	
CREDITORS: Amounts falling due within one year.....	12	888,747		804,784	
		-----		-----	
NET CURRENT ASSETS.....			2,896,598		2,465,622
			-----		-----
TOTAL ASSETS LESS CURRENT LIABILITIES.....			L3,312,498		L2,921,126
PROVISIONS FOR LIABILITIES AND CHARGES....	13		46,350		75,000
			-----		-----
NET ASSETS.....			L3,266,148		L2,846,126
			=====		=====
CAPITAL AND RESERVES					
Called up share capital.....	14		2,000,000		2,000,000
Profit and loss account.....	15		1,266,148		846,126
			-----		-----
EQUITY SHAREHOLDERS' FUNDS.....	16		L3,266,148		L2,846,126
			=====		=====

The financial statements on pages F-29 to F-43 were approved by the Board of Directors on 9 April 1999 and were signed on its behalf by:

/s/ J.G. Lee

Director

9 April 1999

Date

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST DECEMBER 1998

	1998	1997
	-----	-----
See note 19		
	L	L
Operating Activities		
Net cash in flow from operating activities.....	742,243	1,355,841
RETURNS ON INVESTMENTS AND SERVICING OF FINANCE		
Interest received.....	81,764	118,918
	-----	-----
TAXATION		
UK Corporation Tax paid.....	(160,915)	(576,323)
Advance Corporation Tax paid.....	--	(587,457)
	-----	-----
	(160,915)	(1,163,780)
	-----	-----
CAPITAL EXPENDITURE AND FINANCIAL INVESTMENT		
Purchase of tangible fixed assets.....	(144,628)	(123,966)
Sale of tangible fixed assets.....	--	350
	-----	-----
	(144,628)	(123,616)
	-----	-----
Equity Dividends Paid Net.....	--	(2,349,827)
	-----	-----
INCREASE/(DECREASE) IN CASH IN THE PERIOD.....	518,464	(2,162,464)
	=====	=====

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS

YEAR ENDED 31ST DECEMBER 1998

1. ACCOUNTING POLICIES

(a) BASIS OF ACCOUNTING

Although it is intended that the Company shall cease to trade following the sale of its net assets on the 26th February 1999 (note 23), the accounts have been prepared on the going concern basis. This is because in the directors' opinion there is no material difference between the recoverable amounts of the assets and liabilities and their values in the balance sheet. The accounts have been prepared on the historical cost basis and in accordance with applicable Accounting Standards in the United Kingdom. A summary of the more important accounting policies which have been applied consistently is set out below:

(b) DEPRECIATION OF TANGIBLE FIXED ASSETS

The cost of fixed assets is their purchase cost, together with any incidental costs of acquisition.

Depreciation is calculated using the straight line method to write off the fixed assets over their estimated useful lives as follows:

Leasehold improvements.....	--	7 years
Plant, machinery, equipment and tooling.....	--	3-7 years
Computer equipment.....	--	5 years

(c) DEFERRED TAXATION

Provision is made using the liability method for the tax effect of all material timing differences between profits computed for taxation purposes and those stated in the accounts, except insofar as the timing differences are expected to continue for the foreseeable future.

(d) FOREIGN CURRENCY

Assets and liabilities in foreign currencies are translated to sterling at the rates of exchange ruling at the end of the financial year. Exchange differences resulting from changes in foreign currency rates are written off to the profit and loss account.

(e) RESEARCH AND DEVELOPMENT EXPENDITURE

Expenditure on research and development is written off to the profit and loss account during the year in which it is incurred.

(f) OPERATING LEASES

Costs in respect of operating leases are charged on a straight line basis in arriving at the operating profit.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS

YEAR ENDED 31ST DECEMBER 1998

1. ACCOUNTING POLICIES (CONTINUED)

(g) STOCKS AND WORK IN PROGRESS

Stocks are stated at the lower of cost and net realisable value. Cost in this context includes all attributable costs in getting each item to its present location and condition and, for finished goods and work in progress, a proportion of attributable overheads based on a normal level of activity. Net realisable value is the price at which stock can be sold in the normal course of business after allowing for the costs of realisation, and where appropriate, the costs of conversion from their existing state to a finished condition. Provision is made for obsolete, slow moving and defective stocks.

(h) PENSION COSTS

The Company operates a funded defined benefit pension scheme which is contracted out of the state scheme. The fund is valued every three years by a professionally qualified independent actuary, the rates of contribution payable being determined by the actuary. Pension costs are accounted for on the basis of charging the expected cost of providing pensions over the period during which the company benefits from the employees' services. The effects of variations from regular cost are spread over the expected average remaining service lives of members of the scheme.

2. TURNOVER

Turnover represents the invoiced value of goods and services supplied during the year, less trade discounts and trade commissions, excluding Value Added Tax.

Turnover arises from the principal activity of the Company and was derived

from the following geographical areas by destination:

	1998	1997
	-----	-----
	L	L
Europe.....	4,519,415	5,280,673
Asia and Australasia.....	831,277	978,144
The Americas.....	1,693,897	2,301,527
Middle East and Africa.....	57,187	139,600
	-----	-----
Turnover is all UK by origin.....	7,101,776	8,699,944
	=====	=====

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS

YEAR ENDED 31ST DECEMBER 1998

3. OPERATING PROFIT

	1998	1997
	-----	-----
	L	L
Operating profit has been arrived at after charging:-		
Auditors remuneration--audit services.....	22,030	19,350
--non audit services.....	13,325	15,175
Operating lease rentals:-		
Machinery, equipment and vehicles.....	51,753	58,987
Premises.....	231,333	227,000
Depreciation.....	190,915	212,740

4. OTHER OPERATING INCOME

	1998	1997
	-----	-----
	L	L
Miscellaneous income.....	48,808	61,019
	-----	-----
	L48,808	L61,019
	=====	=====

5. INTEREST RECEIVABLE

	1998	1997
	-----	-----
	L	L
On bank current account cash balance.....	83,095	114,392
	-----	-----
	L83,095	L114,392
	=====	=====

6. TAXATION

	1998	1997
	-----	-----
	L	L
United Kingdom corporation tax at 31%		
Current.....	193,000	439,000
Under provision in respect of prior years;		
Current.....	1,935	5,323
	-----	-----
	L194,935	L444,323
	=====	=====

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS

YEAR ENDED 31ST DECEMBER 1998

7. EMPLOYEES

	1998	1997
	-----	-----
	NO.	NO.
The average number of employees, (including the executive Director) was made up as follows:		
Manufacturing, production and development.....	48	48
Distribution.....	7	8
Administration.....	5	5
	-----	-----
	60	61
	=====	=====
	L	L
Staff costs, including full time working Directors amounted to:		
Salaries and bonuses.....	1,308,728	1,368,189
National insurance.....	105,959	107,986
Pension costs.....	127,348	118,317
	-----	-----
	L1,542,035	L1,594,492
	=====	=====

8. DIRECTORS` EMOLUMENTS

	1998	1997
	-----	-----
	L	L
Emoluments of Directors of Pharmacia & Upjohn (Cambridge) Limited		
Fees.....	--	--
Other emoluments--salary, bonus and benefits in kind.....	73,705	68,244
	-----	-----
	73,705	68,244
	=====	=====

Retirement benefits are accruing to one Director under a defined benefit scheme (1997:one).

PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

9. TANGIBLE FIXED ASSETS

	COMPUTER EQUIPMENT	LEASEHOLD BUILDING IMPROVEMENTS	PLANT MACHINERY EQUIPMENT & TOOLING	TOTAL
	L	L	L	L
COST				
At 1st January 1998.....	428,534	227,692	1,263,370	1,919,596
Disposals during year.....	(45,949)	--	(12,929)	(58,878)
Additions.....	42,429	--	108,882	151,311
At 31st December 1998.....	425,014	227,692	1,359,323	2,012,029
DEPRECIATION				
At 1st January 1998.....	323,582	203,176	937,334	1,464,092
Disposals during year.....	(45,949)	--	(12,929)	(58,878)
Charge for the year.....	43,780	6,475	140,660	190,915
At 31st December 1998.....	321,413	209,651	1,065,065	1,596,129
NET BOOK VALUE				
At 31st December 1998.....	103,601	18,041	294,258	415,900
At 31st December 1997.....	104,952	24,516	326,036	455,504

10. STOCK

	1998	1997
	L	L
Components, materials and supplies.....	528,408	636,259
Work in progress.....	32,002	3,053
Finished goods.....	76,146	66,829
	L636,556	L706,141

The Directors do not believe that the current replacement cost of stock is materially different from its historical cost.

PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

11. DEBTORS

	1998	1997
	-----	-----
	L	L
Advance Corporation Tax Recoverable.....	307,437	306,187
Trade debtors.....	1,093,118	1,038,502
Amounts owed by holding company and fellow subsidiaries.....	4,145	2,814
Other debtors and prepayments.....	198,859	189,996
	-----	-----
	L1,603,559	L1,537,499
	=====	=====

12. CREDITORS--AMOUNTS FALLING DUE WITHIN ONE YEAR

	1998	1997
	-----	-----
	L	L
Trade creditors.....	484,770	526,387
Other creditors.....	181,806	86,986
Other taxation and social security.....	29,171	33,681
Corporation tax.....	193,000	157,730
	-----	-----
	888,747	L804,784
	=====	=====

13.(A) PROVISIONS FOR LIABILITIES AND CHARGES

	1998	1997
	-----	-----
	L	L
Pension fund liability.....	46,350	--

Following the net asset sale dated 26th February 1999 a pension fund liability may crystallise when the Company's pension fund transfers scheme assets to Biochrom Limited's new pension scheme in 1999.

	1998	1997
	-----	-----
	L	L
Building lease dilapidation provision.....	--	75,000

The dilapidation provision was released to the Profit and Loss account in the light of the surrender without penalty of the building lease on the sale of net assets of the Company described in note 23.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

13.(B) DEFERRED TAXATION

The provision for deferred taxation, and the full potential asset, are made up as follows:-

	1998		1997	
	FULL POTENTIAL (ASSET)/LIABILITY	PROVISION MADE	FULL POTENTIAL (ASSET)/LIABILITY	PROVISION MADE
	L	L	L	L
Accelerated capital allowances.....	(45,713)	--	(43,881)	--
Short term timing differences.....	(738)	--	(22,499)	--
	-----	-----	-----	-----
	L(46,451)	L--	L(66,380)	L--
	=====	=====	=====	=====

14. CALLED UP SHARE CAPITAL

	1998	1997
	-----	-----
AUTHORISED		
Ordinary shares of L1 each.....	L2,000,000	L2,000,000
	=====	=====
ALLOTTED, CALLED UP AND FULLY PAID		
Ordinary shares of L1 each.....	L2,000,000	L2,000,000
	=====	=====

15. STATEMENT OF RESERVES

	1998	1997
	-----	-----
	L	L
At 1st January 1998.....	846,126	2,349,827
Retained Profit/(Loss) for the year.....	420,022	(1,503,701)
	-----	-----
At 31st December 1998.....	1,266,148	846,126
	=====	=====

16. RECONCILIATION OF MOVEMENTS IN SHAREHOLDERS' FUNDS

	1998	1997
	-----	-----
	L	L
Profit for the year.....	420,022	846,126
Appropriation, net dividend on ordinary shares.....	--	(2,349,827)
	-----	-----
Net addition/(reduction) to shareholders' funds.....	420,022	(1,503,701)
Opening shareholders' funds.....	2,846,126	4,349,827
Closing shareholders' funds.....	3,266,148	2,846,126
	=====	=====

YEAR ENDED 31ST DECEMBER 1998

17. CAPITAL COMMITMENTS

	1998	1997
	----- L	----- L
Future capital expenditure contracted, but not provided for:.....	--	--
	=====	=====

18. CONTINGENT LIABILITIES AND FINANCIAL COMMITMENTS

	1998	1997
	----- L	----- L
Amount of performance bonds.....	944	944
Guarantee given to H.M. Customs & Excise in respect of import duty & VAT.....	120,000	120,000
	-----	-----
	L120,944	L120,944
	=====	=====

- a) The Directors do not expect liabilities to arise from the performance bonds issued.
- b) The company has entered into a composite accounting agreement with Barclays Bank PLC., along with other members of the Pharmacia & Upjohn Limited group. As a member of the Pharmacia & Upjohn Limited group cash pool, the company has a contingent liability of L10 million (1997 L10 million) in respect of overdrafts of the other members in the group cash pool.
- c) At 31st December 1998, the Company had financial commitments in respect of operating leases for vehicles, equipment and premises, terminating in 1999 and thereafter. The total amount payable in the next year under these leases is as follows:-

	1998		1997	
	LAND AND BUILDINGS	OTHER	LAND AND BUILDINGS	OTHER
	----- L	----- L	----- L	----- L
Leases expiring between				
Less than one year.....	170,250	3,870	--	2,894
One to two years.....	--	2,497	227,000	4,992
Two and five years inclusive.....	--	42,048	--	34,356
	-----	-----	-----	-----
	L170,250	L48,415	L227,000	L42,242
	=====	=====	=====	=====

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

19. CASH FLOW STATEMENT

(a) Reconciliation of operating profit to net cash inflow from operating activities:

	1998	1997
	L	L
Operating profit.....	531,862	1,176,057
Depreciation charges.....	190,915	212,740
(Gain) on sale of tangible fixed assets.....	--	(215)
Decrease/(Increase) in stocks.....	69,585	59,566
(Increase) in debtors.....	(63,479)	(63,377)
Increase/(Decrease) in creditors.....	13,360	(28,930)
Net cash inflow from operating activities.....	L742,243	L1,355,841

(b) Analysis of changes in net funds and movement during the year

	1998	1997
	L	L
Balance at 1st January 1998.....	1,026,766	3,189,230
Net cash inflow/(outflow).....	518,464	(2,162,464)
Balance at 31st December 1998.....	L1,545,230	L1,026,766

(c) Analysis of the balances of cash shown in the balance sheet

	1998	1997	CHANGE IN YEAR
	L	L	L
Cash at bank and in hand.....	1,545,230	1,026,766	518,464

20. PENSION OBLIGATIONS

The Company participates in a pension fund operated by Pharmacia Biotech UK, a branch office of Pharmacia Biotech Europe GmbH (previously Pharmacia Limited) providing benefits based on final pensionable pay. The assets of the fund are held separately from those of the Company being invested with investment managers in a managed fund.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

20. PENSION OBLIGATIONS (CONTINUED)

The total pension cost for the company is set out in note 7. The pension cost is assessed in accordance with the advice of an independent qualified actuary using the projected unit method. The most recent actuarial valuation adopted by the Trustees of the Pharmacia Limited Staff Superannuation Fund was as at 1 January 1997. The assumptions which had the most significant effect on the results of the valuation were those relating to:

- a) the future rate of investment return on the fund;
- b) the future rate at which members' salaries would increase;
- c) the rate of withdrawal from service.

It was assumed that the long term rate of investment return would be at an average of 9% per annum and the rate of future salary increases would be at 7.5% per annum. The rate of withdrawal from service was selected at a rate slightly less than the rate experienced over the inter-valuation period.

The most recent actuarial valuation adopted by the Trustees showed that the market value of the fund's assets was L5,564,000 and that the actuarial value of those assets represented 112% of the benefits that had accrued to members, after allowing for expected future increases in basic salary.

The existing pension fund was formed in 1986 by the amalgamation of the Pharmacia Biotech Limited and Pharmacia LKB Biochrom Limited schemes. Following the net asset sale on 26 February 1999 (note 23), all Pharmacia Biotech active members (staff formerly employed by Pharmacia Biotech Limited) will transfer into the Nycomed Amersham Scheme. The remaining "Biochrom" active members will have the choice to transfer into the new Biochrom Limited pension scheme. All current and deferred members will remain in the Pharmacia Biotech UK Pension Fund which will be administered by Pharmacia & Upjohn at Milton Keynes.

21. RELATED PARTY TRANSACTIONS

As a wholly owned subsidiary, whose results are included in the consolidated financial statements of Pharmacia & Upjohn, Inc. (see note 22), the company is exempt from the requirement to disclose details of transactions with other group companies.

The Director regards Amersham Pharmacia Biotech AB ("APB") as a related party by virtue of the fact that the company's ultimate parent undertaking Pharmacia & Upjohn Inc. holds a 45% interest in APB and that there are certain common directorships. Sales to APB group companies amounted to L6,608,485 and the company was owed L1,010,761 as at 31 December 1998 in relation to trading balances.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

22. ULTIMATE AND IMMEDIATE PARENT UNDERTAKING

The directors regard Pharmacia & Upjohn, Inc, a company incorporated in the USA, as the ultimate parent and controlling undertaking. Copies of the ultimate parent's consolidated financial statements may be obtained from:

Pharmacia & Upjohn, Inc
7000 Portage Road, Kalamazoo
Michigan 49001, USA

According to the register kept by the company, Pharmacia & Upjohn Limited, a company registered in England and Wales, has a 100% interest in the equity capital of the company at 31 December 1998.

23. POST BALANCE SHEET EVENTS

On the 26th February 1999, the Company sold the majority of its net assets to Biochrom Limited for a consideration of US Dollars 6,362,574. Following this, the Company will cease to trade.

24. SUMMARY OF DIFFERENCES BETWEEN UK AND US GENERALLY ACCEPTED ACCOUNTING PRINCIPLES ("GAAP")

The company has prepared financial statements in accordance with UK GAAP.

There are no reconciling differences between US and UK GAAP related to the equity shareholders' funds as of 31 December 1997 and 1998 and the net income for the years ended 31 December 1997 and 1998. The financial statements reflect all costs of doing business including costs incurred by other group companies on behalf of the Company. As of 31 December 1997 and 1998 the following other differences exist:

DEFERRED TAXATION

Under UK GAAP, provision for deferred tax is only required to the extent that it is probable that a taxation liability or asset will crystallise, in the foreseeable future, as a result of timing differences between taxable profits and accounting profit, with provision made at the known tax rate.

Under US GAAP, full provision for deferred tax is required to the extent that accounting profit differs from taxable profit due to temporary differences. Provision is made at the tax rate in effect at the time the difference is likely to reverse. A valuation adjustment is made against deferred tax assets when it is more likely than not that a deferred tax asset will not be realised. As such, provision for the taxable losses carried forward of L46,451 would be provided with a valuation allowance for the full amount, resulting in no net impact on the profit and loss account or shareholders' equity, as of 31 December 1998. Provision for the taxable losses carried forward of L66,380 would be provided with a valuation allowance for the full amount, resulting in no net impact on the profit and loss account or shareholders' equity, as of 31 December 1997.

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PHARMACIA & UPJOHN (CAMBRIDGE) LIMITED

FORMERLY

PHARMACIA BIOTECH (BIOCHROM) LIMITED

NOTES TO THE ACCOUNTS (CONTINUED)

YEAR ENDED 31ST DECEMBER 1998

24. SUMMARY OF DIFFERENCES BETWEEN UK AND US GENERALLY ACCEPTED ACCOUNTING PRINCIPLES ("GAAP") (CONTINUED)
CASH FLOW STATEMENTS

The cash flow statement is prepared in accordance with United Kingdom Financial Reporting Standard 1 "FRS 1 (Revised 1996)", whose objective and principles are similar to those set out in SFAS No.95, "Statement of Cash Flows". The principal differences between the standards relate to classification. Under FRS 1 (Revised 1996), the company presents its cash flows for (a) operating activities, (b) returns on investments and servicing of finance, (c) taxation, (d) capital expenditure and financial investment, (e) equity dividends paid, (f) management of liquid resources and (g) financing. SFAS No.95 requires only three categories of cash flow activity being (a) operating, (b) investing and (c) financing.

Cash flows from taxation and returns on investments and servicing of finance under FRS 1 (Revised 1996) would be included as operating activities under SFAS No.95, capital expenditure and financial investment would be included as investing activities, and equity dividends paid would be included as a financing activity under SFAS No.95. Under FRS 1 (Revised 1996) cash comprises cash in hand and deposits repayable on demand, less overdrafts repayable on demand, and liquid resources comprise current asset investments held as readily disposable stores of value. Under SFAS No.95 cash equivalents, comprising short-term highly liquid investments, generally with original maturities of three months or less, are grouped together with cash. Cash equivalents exclude overdrafts. There are no differences between cash as stated under UK GAAP and cash and cash equivalents as stated under US GAAP at 31 December 1997 and 1998.

Set out below, for illustrative purposes, is a summary of cash flows under US GAAP.

YEAR ENDED 31 DECEMBER	
1998	1997
-----	-----
-----	-----

	L'000	L'000
Net cash provided by operating activities.....	663,092	310,979
Net cash used in investing activities.....	(144,628)	(123,616)
Net cash used in financing activities.....	--	(2,349,827)
	-----	-----
Net increase/(decrease) in cash and cash equivalents.....	518,464	(2,612,464)
Cash and cash equivalents at beginning of period.....	1,026,766	3,639,230
Cash and cash equivalents at end of period.....	1,545,230	1,026,766
	-----	-----
Supplement cash flow information:		
Cash paid for interest.....	--	--
Cash paid for income taxes.....	(160,915)	(1,163,780)
	-----	-----

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PROSPECTUS ,2000

[THOMAS WEISEL PARTNERS LLC LOGO]

[HARVARD BIOSCIENCE LOGO]

6,422,450 SHARES
COMMON STOCK

THOMAS WEISEL PARTNERS LLC
DAIN RAUSCHER WESSELS
ING BARINGS

Neither we nor any of the underwriters have authorized anyone to provide information different from that contained in this prospectus. When you make a decision about whether to invest in our common stock, you should not rely upon any information other than the information in this prospectus. Neither the delivery of this prospectus nor the sale of our common stock means that information contained in this prospectus is correct after the date of this prospectus. This prospectus is not an offer to sell or solicitation of an offer to buy these shares of common stock in any circumstances under which the offer or solicitation is unlawful.

Until , 2000 (25 days after commencement of this offering), all dealers that buy, sell or trade these shares of common stock, whether or not participating in this offering, may be required to deliver a prospectus. This is an addition to the dealers' obligation to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

ITEM 13. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION

The following table sets forth the estimated expenses payable by us in connection with the offering (excluding underwriting discounts and commissions):

NATURE OF EXPENSE	AMOUNT
-----	-----
SEC Registration Fee.....	\$ 25,260
NASD Filing Fee.....	8,000
Nasdaq National Market Listing Fee.....	95,000
Accounting Fees and Expenses.....	550,000
Legal Fees and Expenses.....	600,000
Printing Expenses.....	200,000
Blue Sky Qualification Fees and Expenses.....	5,000
Transfer Agent's Fee.....	5,000
Miscellaneous.....	11,740

TOTAL.....	\$1,500,000

The amounts set forth above, except for the Securities and Exchange

Commission, National Association of Securities Dealers, Inc. and Nasdaq National Market fees, are in each case estimated.

ITEM 14. INDEMNIFICATION OF DIRECTORS AND OFFICERS

In accordance with Section 145 of the Delaware General Corporation Law, Article VII of our certificate of incorporation provides that none of our directors will be personally liable to us or our stockholders for monetary damages for breach of fiduciary duty as a director, except for liability (1) for any breach of the director's duty of loyalty to us or our stockholders, (2) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (3) in respect of unlawful dividend payments or stock redemptions or repurchases, or (4) for any transaction from which the director derived an improper personal benefit. In addition, our certificate of incorporation provides that if the Delaware General Corporation Law is amended to authorize the further elimination or limitation of the liability of directors, then the liability of a director of the corporation shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended.

Article V of our by-laws provides for our indemnification of our officers and certain non-officer employees under certain circumstances against expenses, including attorneys' fees, judgments, fines and amounts paid in settlement, reasonably incurred in connection with the defense or settlement of any threatened, pending or completed legal proceeding in which any such person is involved by reason of the fact that such person is or was an officer or employee of the registrant if such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to our best interests, and, with respect to criminal actions or proceedings, if such person had no reasonable cause to believe his or her conduct was unlawful.

Prior to the offering, we will have entered into indemnification agreements with each of our directors. The form of indemnification agreement provides that we will indemnify our directors for expenses incurred because of their status as a director to the fullest extent permitted by Delaware law, our certificate of incorporation and our by-laws.

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ITEM 15. RECENT SALES OF UNREGISTERED SECURITIES

Set forth in chronological order below is information regarding the number of shares of capital stock issued by us since October 15, 1997. Also included is the consideration, if any, received by us for such shares. There was no public offering in any such transaction and we believe that each transaction was exempt from the registration requirements of the Securities Act of 1933 by reason of Section 4(2) thereof, based on the private nature of the transactions and the financial sophistication of the purchasers, all of whom had access to complete information concerning us and acquired the securities for investment and not with a view to the distribution thereof. In addition, we believe that the transactions described below with respect to issuances and option grants to our employees and directors were exempt from the registration requirements of said Act by reason of Section 4(2) of said Act or Rule 701 promulgated thereunder.

(a) ISSUANCE OF CAPITAL STOCK

- (i) In 1999, we issued an aggregate of 48,500 shares of our series B convertible preferred stock to Ascent Venture Partners, L.P. (formerly known as Pioneer Capital Corp.) and Citizens Capital, Inc. for an aggregate purchase price of \$1,000,000.
- (ii) In March 2000, we issued 1,091,716 shares of our common stock upon the exercise of previously granted stock options at an aggregate exercise price of \$1,792.14.
- (iii) In September 2000, we issued 2,376,236 shares of our common stock upon the exercise of previously granted stock options at an aggregate exercise price of \$1,549,155.40.

(b) GRANTS OF STOCK OPTIONS

- (i) As of October 15, 2000, options to purchase 599,096 shares of common stock were outstanding under our 1996 Stock Option and Grant Plan. None of these options is exercisable within 60 days of such date. All such options were granted between March 1996 and October 2000 to our

officers, directors, employees and consultants.

ITEM 16. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(A) EXHIBITS. The following is a complete list of exhibits filed or incorporated by reference as part of this Registration Statement.

- *1.1 Form of Underwriting Agreement.
- **2.1 Asset Purchase Agreement dated March 2, 1999 by and among Biochrom Limited and Pharmacia Biotech Limited and Pharmacia & Upjohn, Inc. and Harvard Apparatus, Inc. (Excluding schedules and exhibits which Registrant agrees to furnish supplementally to the Commission upon request.)
- **2.2 Asset Purchase Agreement dated July 14, 2000 by and between Harvard Apparatus, Inc., AmiKa Corporation and Ashok Shukla. (Excluding schedules and exhibits which Registrant agrees to furnish supplementally to the Commission upon request.)
- **3.1 Form of Amended and Restated Certificate of Incorporation of the Registrant.
- **3.2 Form of Second Amended and Restated Certificate of Incorporation of the Registrant.
- **3.3 Form of Amended and Restated By-laws of the Registrant.
- **4.1 Specimen certificate for shares of Common Stock, \$0.01 par value, of the Registrant.
- **4.2 Amended and Restated Securityholders' Agreement dated as of March 2, 1999 by and among Harvard Apparatus, Inc., Pioneer Ventures Limited Partnership, Pioneer Ventures Limited Partnership II, Pioneer Capital Corp., First New England Capital, L.P. and Citizens Capital, Inc. and Chane Graziano and David Green.
- 5.1 Opinion of Goodwin, Procter & Hoar LLP as to the legality of the securities offered.

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- **10.1 Harvard Apparatus, Inc. 1996 Stock Option and Grant Plan.
- **10.2 Harvard Bioscience, Inc. 2000 Stock Option and Incentive Plan.
- **10.3 Harvard Bioscience, Inc. Employee Stock Purchase Plan.
- +10.4 Distribution Agreement dated March 2, 1999 by and between Biochrom Limited and Amersham Pharmacia Biotech AB.
- **10.5 Form of Employment Agreement between Harvard Bioscience and Chane Graziano.
- **10.6 Form of Employment Agreement between Harvard Bioscience and David Green.
- **10.7 Form of Employment Agreement between Harvard Bioscience and James L. Warren.
- **10.8 Form of Director Indemnification Agreement.
- **10.9 Lease Agreement dated December 16, 1996 between Seven October Hill LLC and Harvard Apparatus, Inc.
- **10.10 First Amendment to Lease dated November 13, 1998 to Lease Agreement dated December 16, 1996 between Seven October Hill LLC and Harvard Apparatus, Inc.
- **10.11 Lease of Unit 22 Phase I Cambridge Science Park, Milton Road, Cambridge dated March 3, 1999 between The Master Fellows and Scholars of Trinity College Cambridge, Biochrom Limited and Harvard Apparatus, Inc.
- **10.12 Lease Agreement for Commercial Premises dated November 26, 1999 made between Mr. Heinz Dehnert, Grunstrabe 1, 79232 March-Hugstetten, Lessor and the Company of Harvard Apparatus GmbH, Lessee.
- 10.13 Amended and Restated Loan and Security Agreement dated March 2, 1999 between Brown Brothers Harriman & Co., BankBoston N.A. and Harvard Apparatus, Inc.
- 10.14 Amendment and Waiver dated December 31, 1999 to Amended and Restated Loan and Security Agreement between Brown Brothers

- Harriman & Co., Fleet National Bank (formerly known as BankBoston N.A.) and Harvard Apparatus, Inc.
- 10.15 Second Amendment dated July 14, 2000 to Amended and Restated Loan and Security Agreement between Brown Brothers Harriman & Co., and Fleet National Bank (formerly known as BankBoston N.A.) and Harvard Apparatus, Inc.
- 10.16 Third Amendment dated October 25, 2000 to Amended and Restated Loan and Security Agreement between Brown Brothers Harriman & Co., and Fleet National Bank (formerly known as BankBoston N.A.) and Harvard Apparatus, Inc.
- **21.1 Subsidiaries of the Registrant.
- 23.1 Consent of Goodwin, Procter & Hoar LLP (included in Exhibit 5.1 hereto).
- 23.2 Consent of KPMG LLP.
- 23.3 Consent of PricewaterhouseCoopers.
- **24.1 Powers of Attorney for Messrs. Graziano, Warren, Green, Dick and Klaffky.
- **24.2 Powers of Attorney for Messrs. Dishman, Kennedy and Lewis.
- **27.1 Financial Data Schedule.
- **99.1 Consent of Robert Dishman to be named as a person to be appointed a director of Registrant in this Registration Statement.
- **99.2 Consent of Earl R. Lewis to be named as a person to be appointed a director of Registrant in this Registration Statement.
- **99.3 Consent of John F. Kennedy to be named as a person to be appointed a director of Registrant in this Registration Statement.

* To be filed by amendment to this registration statement.

** Previously filed.

+ Confidential treatment requested as to this previously filed exhibit.

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(B) FINANCIAL STATEMENT SCHEDULES

All schedules have been omitted because they are not required or because the required information is given in the consolidated financial statements or notes to those statements.

ITEM 17. UNDERTAKINGS

The undersigned registrant hereby undertakes to provide to the underwriters at the closing specified in the Underwriting Agreement certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a

*By: /s/ JAMES WARREN

James Warren
Attorney-in-fact

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EXHIBIT INDEX

EXHIBIT NO.	DESCRIPTION
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*1.1	Form of Underwriting Agreement.
**2.1	Asset Purchase Agreement dated March 2, 1999 by and among Biochrom Limited and Pharmacia Biotech Limited and Pharmacia & Upjohn, Inc. and Harvard Apparatus, Inc. (Excluding schedules and exhibits which Registrant agrees to furnish supplementally to the Commission upon request.)
**2.2	Asset Purchase Agreement dated July 14, 2000 by and between Harvard Apparatus, Inc., AmiKa Corporation and Ashok Shukla. (Excluding schedules and exhibits which Registrant agrees to furnish supplementally to the Commission upon request.)
**3.1	Form of Amended and Restated Certificate of Incorporation of the Registrant.
**3.2	Form of Second Amended and Restated Certificate of Incorporation of the Registrant.
**3.3	Form of Amended and Restated By-laws of the Registrant.
**4.1	Specimen certificate for shares of Common Stock, \$0.01 par value, of the Registrant.
**4.2	Amended and Restated Securityholders' Agreement dated as of March 2, 1999 by and among Harvard Apparatus, Inc., Pioneer Ventures Limited Partnership, Pioneer Ventures Limited Partnership II, Pioneer Capital Corp., First New England Capital, L.P. and Citizens Capital, Inc. and Chane Graziano and David Green.
5.1	Opinion of Goodwin, Procter & Hoar LLP as to the legality of the securities offered.
**10.1	Harvard Apparatus, Inc. 1996 Stock Option and Grant Plan.
**10.2	Harvard Bioscience, Inc. 2000 Stock Option and Incentive Plan.
**10.3	Harvard Bioscience, Inc. Employee Stock Purchase Plan.
+10.4	Distribution Agreement dated March 2, 1999 by and between Biochrom Limited and Amersham Pharmacia Biotech AB.
**10.5	Form of Employment Agreement between Harvard Bioscience and Chane Graziano.
**10.6	Form of Employment Agreement between Harvard Bioscience and David Green.
**10.7	Form of Employment Agreement between Harvard Bioscience and James L. Warren.
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23.1	Consent of Goodwin, Procter & Hoar LLP (included in Exhibit 5.1 hereto).
23.2	Consent of KPMG LLP.

EXHIBIT
NO.

DESCRIPTION

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* To be filed by amendment to this registration statement.

** Previously filed.

+ Confidential treatment requested as to this previously filed exhibit.

GOODWIN, PROCTER & HOAR LLP
COUNSELLORS AT LAW
EXCHANGE PLACE
BOSTON, MASSACHUSETTS 02109-2881

November 29, 2000

Harvard Bioscience, Inc.
84 October Hill Road
Holliston, Massachusetts 01746-1371

Ladies and Gentlemen:

Re: REGISTRATION STATEMENT ON FORM S-1

This opinion is delivered in our capacity as special counsel to Harvard Bioscience, Inc. (the "Company") in connection with the preparation and filing with the Securities and Exchange Commission under the Securities Act of 1933 of a Registration Statement on Form S-1 (the "Registration Statement") relating to 7,359,950 shares of Common Stock, par value \$.01 per share (the "Registered Shares"), including 6,250,000 primary shares to be sold by the Company (the "Primary Shares"), and 937,500 shares to be sold by the Company which the underwriters have an option to purchase solely for the purpose of covering over-allotments (the "Company Option Shares" and, together with the Primary Shares, the "Company Shares") and 172,450 shares to be sold by a stockholder of the Company named in the Registration Statement (the "Stockholder Shares"). The Registered Shares are to be sold to the several underwriters (the "Underwriters") of which Thomas Weisel Partners LLC, Dain Rauscher Incorporated and ING Barings LLC are the representatives (the "Representatives") pursuant to an Underwriting Agreement (the "Underwriting Agreement") to be entered into between the Company and the Representatives of the Underwriters.

As counsel for the Company, we have examined the form of the proposed Underwriting Agreement being filed as an exhibit to the Registration Statement, the Company's Amended and Restated Certificate of Incorporation and the Company's Amended and Restated By-laws, each as will be in effect at the time of the issuance of the Registered Shares, and such records, certificates and other documents of the Company as we have deemed necessary or appropriate for the purposes of this opinion.

We are attorneys admitted to practice in The Commonwealth of Massachusetts. We express no opinion concerning the laws of any jurisdiction other than the laws of the United States of America, the laws of The Commonwealth of Massachusetts and the General Corporation Law of the State of Delaware ("DGCL"), which includes applicable provisions of the Delaware Constitution and reported judicial decisions interpreting the DGCL and the Delaware Constitution.

Harvard Bioscience, Inc.
November 29, 2000
Page 2

Based on the foregoing, we are of the opinion that (i) the Stockholder Shares are duly authorized, legally issued, fully paid and non-assessable by the Company under the DGCL and (ii) when the Underwriting Agreement is completed (including the insertion therein of pricing terms) and executed by the Company and on behalf of the Underwriters, and the Company Shares are sold to the Underwriters and paid for pursuant to the terms of the Underwriting Agreement, the Company Shares will be duly authorized, legally issued, fully paid and non-assessable by the Company under the DGCL.

We hereby consent to being named as counsel to the Company in the Registration Statement, to the references therein to our firm under the caption

"Legal Matters," and to the inclusion of this opinion as an exhibit to the Registration Statement.

Very truly yours,

/s/ GOODWIN, PROCTER & HOAR LLP

GOODWIN, PROCTER & HOAR LLP

AMENDED AND RESTATED
LOAN AND SECURITY AGREEMENT

BROWN BROTHERS HARRIMAN & CO.
AGENT FOR
THE LENDERS REFERENCED HEREIN

AND

HARVARD APPARATUS, INC.

THE BORROWER

.....

AMENDED AND RESTATED
LOAN AND SECURITY AGREEMENT

BROWN BROTHERS HARRIMAN & CO.,
AS AGENT FOR LENDERS
REFERENCED HEREIN

March 2, 1999

Harvard Apparatus, Inc., a Massachusetts corporation with a principal place of business at 84 October Hill Road, Holliston, Massachusetts (hereinafter, the "Borrower") , and Brown Brothers Harriman & Co., a New York limited partnership, with offices at 40 Water Street, Boston, Massachusetts (hereinafter, in such capacity, the "Agent"), as agent for the ratable benefit of the "Lenders," who are, at present, Brown Brothers Harriman & Co., and BankBoston, N.A., a national banking association with its principal offices at 100 Federal Street, Boston, Massachusetts and who in the future are those Persons (if any) who become "Lenders" in accordance with the provisions of Section 1-14, below, make this agreement in consideration of the mutual covenants contained herein and benefits to be derived herefrom.

This Agreement amends and restates a certain Loan and Security Agreement dated September 9, 1996 entered into by and between Brown Brothers Harriman & Co. and the Borrower.

ARTICLE 1 - THE REVOLVING CREDIT AND LENDERS' COMMITMENTS

1-1. ESTABLISHMENT OF REVOLVING CREDIT.

(a) The Lenders hereby establish a revolving line of credit (hereinafter, the "Revolving Credit") in the Borrower's favor pursuant to which the Lenders shall make loans and advances and otherwise provide financial accommodations to and for the account of the Borrower as provided herein for working capital purposes and from time to time to fund a revolving note to Biochrom Limited in the maximum principal amount of \$1,500,000.00. The amount of the Revolving Credit shall be determined by the Agent by reference to the

Borrower's Availability (as defined below), as determined by the Agent from time to time hereafter. All loans made by the Lenders under this Agreement, and all of the Borrower's other Liabilities (as defined below; to "he Lenders under or pursuant to this Agreement, as provided herein.

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(b) As used herein, the term "Availability refers at any time to the lesser of (i) or (ii), below:

(i) (A) Three Million Seven Hundred Fifty Thousand Dollars

(\$3,750,000.00),

minus

(B) the aggregate amounts then undrawn on all outstanding letters of credit, acceptances, or any other accommodations issued or incurred by the Lenders for the account and/or the benefit of the Borrower under this Agreement.

(ii) (A) eighty percent (80%) of the face amount of each of the Borrower's Acceptable Accounts (as defined below),

plus

(B) Thirty five percent (35%) of the value of the Borrower's Acceptable Inventory, as defined below (Acceptable inventory being valued at the lower of cost or market, all as determined by the Agent in its sole discretion),

minus

(C) the aggregate amounts then undrawn on all outstanding letters of credit, acceptances, or any other accommodations issued or incurred by the Lenders for the account and/or the benefit of the Borrower, under the Loan Agreement.

1-2. ACCEPTABLE ACCOUNTS.

(a) As used herein, the term "Acceptable Accounts" means and refers to such of the Borrower's and its Subsidiary's Accounts and Accounts Receivable (as defined below) as arise in the ordinary course of the Borrower's and its Subsidiary's business for goods sold and/or services rendered by the Borrower or a Subsidiary, from Holliston, Massachusetts, and/or the United Kingdom, and/or Quebec, Canada, and/or France, which Accounts and Accounts Receivable have been reasonably determined by the Agent to be satisfactory and have been earned by performance and are owed to the Borrower or a Subsidiary by such of the Borrower's or such Subsidiary's trade customers as the Agent reasonably determines to be satisfactory, in the Agent's sole discretion in each instance.

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(b) The following is a partial listing of those types of accounts or accounts receivable which are not Acceptable Accounts:

(i) Any which is equal to or more than ninety (90) days past invoice, as shown on the agings of the Borrower's and Subsidiary's accounts receivable furnished the Agent from time to time (each of which agings shall be prepared in accordance with generally accepted accounting standards).

(ii) Any which arises out of the sale by the Borrower or Subsidiary of goods consigned or delivered to the Borrower or Subsidiary or to the Account Debtor on sale or return terms (whether or not compliance has been made with Section 2-326 of the Uniform Commercial Code).

(iii) Any which arises out of any sale made on a basis other than upon terms usual to the business of the Borrower or Subsidiary.

- (iv) Any which arises out of any sale made on a "bill and hold," dating, or delayed shipping basis.
- (v) Any which is owed by any Related Entity (as defined herein).
- (vi) Any as to which the Account Debtor holds or is entitled to any claim, counterclaim, set off, or chargeback.
- (vii) Any which is evidenced by a promissory note.
- (viii) Any which is owed by any person employed by, or a salesperson of, the Borrower or any Subsidiary.
- (ix) Any which the Agent reasonably considers unacceptable.

1-3. ACCEPTABLE INVENTORY. As used herein, the term "Acceptable Inventory" means and refers to such of the Borrower's and its Subsidiary's Inventory, at such locations, and of such types and qualities, as the Agent in its sole discretion from time to time reasonably determines to be acceptable for borrowing. Notwithstanding the foregoing, Acceptable Inventory shall be the net finished goods and net raw materials inventory held at the Borrower's warehouse in Holliston, Massachusetts or the Subsidiary's locations in the United Kingdom, Quebec, Canada and/or France.

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1-4. ADVANCES IN EXCESS OF AVAILABILITY. No Lender has any obligation to make any loan or advance, or otherwise to provide any credit for the Borrower in excess of Availability. The making of loans, advances, and credits by the Lenders in excess of Availability is for the benefit of the Borrower and does not affect the obligations of the Borrower hereunder; such loans constitute Liabilities. The making of any such loans, advances, and credits in excess of Availability on any one occasion shall not obligate the Lenders to make any such loans, credits, or advances on any other occasion nor to permit such loans, credits., or advances to remain outstanding.

1-5. RISKS OF VALUE OF ACCOUNTS AND OF INVENTOR. The Agent's reference to a given asset of the Borrower or any Subsidiary for monitoring concerning the Lenders, making of loans, credits, and advances under the Revolving Credit shall not be deemed a determination by the Agent or any Lender relative to the actual value of the asset in question. All risks concerning the creditworthiness of all Accounts and Accounts Receivable and the salability of all Inventory of the Borrower or Subsidiary are and remain upon the Borrower or such Subsidiary. Reference by the Agent or any Lender to a particular Account from a particular Account Debtor for monitoring purposes shall not obligate the Agent or any Lender to rely upon any other Accounts owed by the same Account Debtor to be acceptable for borrowing nor to continue rely upon that Account. All Collateral secures the prompt, punctual, and faithful performance by the Borrower of its Liabilities to the Lenders whether or not relied upon by the Agent or any Lender in connection with the making of loans, credits, and advances under the Revolving Credit.

1-6. PROCEDURES FOR BORROWING.

(a) The Borrower may request loans pursuant to the Revolving Credit from time to time hereafter in accordance with the procedures set forth in Section 1-6(c), below.

(b) At the time of each loan made under or pursuant to this Agreement, the Borrower shall immediately become indebted to the Lenders for the

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amount thereof. Each loan made by the Lenders may, at the Agent's option, within one (1) business day after receipt of notice pursuant to Section 1-6 (c), below, if received prior to 12:00 noon or within two (2) business days after receipt of such notice if received after 12:00 noon, be (i) credited by the Agent to any deposit account of the Borrower with the Agent; (ii) credited by the Agent to a deposit account designated by the Borrower; (iii) paid to a person designated by the Borrower; (iv) paid to the Borrower; or (v) applied to any Liability (each of the foregoing of which may be by check, draft, or other written order or by bank wire or other transfer).

(c) The Borrower may request loans under the Revolving Credit in such manner as may from time to time be acceptable to the Agent, and which may include, without limitation, (i) telephone notice by an authorized person of the Borrower to such person as may be designated by the Agent or (ii) written notice by an authorized person of the Borrower.

(d) Upon the making of any request by or on behalf of the Borrower for a loan, advance, or credit under the Revolving Credit, the Borrower shall be deemed to have certified that as of the date of such request, the following representations above, are each true and correct:

(i) there has been no material adverse change in the Borrower's financial condition from the most recent financial information furnished the Agent pursuant to this Agreement; and

(ii) no Suspension Event (as that term is defined herein) is then occurring; and

(iii) no event has occurred nor failed to occur which occurrence or failure is, or with the passage of time or giving of notice (or both), would constitute, an Event of Default (as described herein), whether or not the Agent has exercised any of its rights upon such occurrence or failure.

(e) Upon the occurrence from time to time and during the continuation of any Suspension Event (as defined herein) the Agent may suspend the Revolving Credit immediately and the Agent and Lenders shall not be obligated, during such suspension, to make any loans or advances hereunder until the matter giving rise to such Suspension Event has been cured or waived.

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1-7. THE MASTER NOTES. All loans and advances made by the Lenders to the Borrower pursuant to the Revolving Credit, and all repayments thereof made by the Borrower to the Lenders, shall be evidenced by the Borrower's Master Notes (hereinafter, the "Master Notes") executed this day and delivered to the Lenders each in the amount of such Lender's Dollar Commitment for the Revolving Credit (which Master Notes are substantially in the form of EXHIBIT 1-7, annexed hereto). In the event any Master Note is lost, destroyed, or mutilated at any time prior to the expiration to the within Agreement, the Borrower shall execute a new Master Note substantially in the form of such Master Note provided the Lender delivers to the Borrower an affidavit of lost note. The Master Note shall not be necessary to establish the indebtedness of the Borrower to a Lender on account of such loans, advances, and repayments.

1-8. REPAYMENTS. The Borrower may repay the outstanding principal balance owed on account of loans under the Revolving Credit at any time and from time to time without premium or penalty with the entire Revolving Credit due and payable in full upon the earlier of W January 29, 2002 or (ii) the occurrence of an Event of Default as further set forth in Section 12-1, below. In the event that the amount of the Availability decreases below the then principal balance of such loans, the Borrower shall, unless otherwise agreed by the parties, in writing, immediately pay to the Agent for the account of the Lenders, the amount by which such principal balance exceeds the Availability.

1-9. STATEMENTS RENDERED BY AGENT. Any statement rendered by the Agent to the Borrower concerning the Liabilities shall be considered correct absent manifest error and accepted by the Borrower and shall be conclusively binding upon the Borrower unless the Borrower provides the Agent with written objection thereto within twenty (20) days from the receipt of such statement, which written objection shall indicate, with particularity, the reason for such objection. The Agent's books and records concerning the loan arrangement contemplated herein and the Borrower's Liabilities shall be prima facie evidence and proof of the items described therein absent manifest error.

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1-10. INTEREST. All loans and advances made to the Borrower under the Revolving Credit shall bear interest, until repaid, at the aggregate of the Agent's Base Rate (the Agent's Base Rate being the Base Rate as so announced by

the Agent from time to time) plus one percent (1%) per annum, calculated based upon a 360-day year and actual days elapsed. For the purpose of the calculation of interest hereunder, changes in the Base Rate shall be effective when made effective generally by the Agent and whether or not notice is given to the Borrower. The Agent shall provide notice of such changes to the Borrower. Interest shall be charged monthly in arrears on the first business day of each month. From and after the occurrence of an Event of Default (whether or not the Agent has accelerated the time for payment of the Revolving Credit), interest on principal and overdue interest shall, at the option of the Agent: be payable on demand at a rate per annum equal to 2% per annum above the rate of interest otherwise payable hereunder.

1-11. FEES.

(a) The Borrower shall pay the Agent a facility fee equal of \$92,500.00 upon the execution of this Agreement to be distributed by the Agent to the Lenders on a pro rata basis.

(b) In order to compensate the Lenders for establishing and maintaining the Revolving Credit, the Borrower shall pay to the Agent, for distribution to the Lenders on a pro rata basis, quarterly in arrears, on the first day of each calendar quarter commencing May 1, 1999, a maintenance charge equal to one-half of one percent (.50% per annum of the average daily amount of, during the quarter just ended, of the unborrowed portion of the Revolving Credit.

(c) The Borrower shall pay to the Agent, for its own account, an agency fee in an amount as determined between the Agent and the Borrower.

1-12. REPAYMENTS OF LETTERS OF CREDIT AND OTHER FINANCIAL ACCOMMODATIONS. Unless otherwise provided for by the Lenders and the Borrower, the honoring by the Lenders of any letters of credit, acceptances, or other accommodations issued by the Lenders for the account and/or benefit of the Borrower pursuant to this Agreement shall constitute a corresponding advance under the Revolving Credit, unless indicated otherwise by the Lenders, in writing.

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1-13. CHARGING OF BORROWER'S ACCOUNT. In addition to the Agent's and Lenders, right of set off set forth in Section 13-1, below, the Borrower authorizes the Agent, without prior notice, to charge any account which the Borrower maintains with the Agent for any payments due from the Borrower to the Lenders on account of the Liabilities. The Agent shall provide the Borrower with prompt notice of any such charge.

1-14. LENDERS' COMMITMENTS.

(a) The obligations of each Lender are several and not joint. No Lender shall have any obligation to make any loan or advance under the Revolving Credit in excess of that Lender's Commitment Percentage of the subject loan or advance and further subject to the Agent's calculation of Availability.

(b) No Lender shall have any liability to the Borrower on account of the failure of any other Lender to provide any loan or advance under the Revolving credit nor any obligation to make up any shortfall which may be created by such failure.

(c) The Commitment Percentages, and identities of the Lenders (but not the overall Commitment) may be changed, from time to time by the reallocation or assignment of Commitment Percentages amongst the Lenders or with other Persons who determine to become "Lenders", PROVIDED, HOWEVER,

(i) Unless an Event of Default has occurred (in which event, no consent of the Borrower is required) any assignment to a Person not then a Lender shall be subject to the prior consent of the Borrower (not to be unreasonably withheld), which consent will be deemed given unless the Borrower provides the Agent with written objection, not more than Ten (10) business days after the Agent shall have given the Borrower written notice of a proposed assignment).

(ii) Any such assignment or reallocation shall be in an amount of not less than \$1,000,000 and on a pro-rata basis such that

each reallocated or assigned Commitment Percentage to any Person remains the same percentage of the overall Commitment (in terms of dollars) as the reallocated Commitment Percentage is to such Person.

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(d) Upon written notice given the Borrower from time to time by the Agent, of any assignment or allocation referenced in Section 1-14(c):

(i) The Borrower shall execute replacement one or more Master Notes or Term Notes to reflect such changed Commitment Percentages, and identities and shall deliver such replacement Master Notes and Term Notes to the Agent (which promptly thereafter shall deliver to the Borrower the Master Notes and Term Notes (as defined below) so replaced) provided however, in the event that a Master Note or Term Note is to be exchanged following its acceleration or the entry of an order for relief under the bankruptcy code with respect to the Borrower, the Agent, in lieu of causing the Borrower to execute one or more new Master Notes or Term Notes, may issue a certificate confirming the resulting Commitment Percentages.

(ii) Such change shall be effective from the effective date specified in such written notice and any Person added as a Lender shall have all rights and privileges of a Lender hereunder thereafter as if such Person had been a signatory to this Agreement and any other Loan Document to which a Lender is a signatory and any person removed as a Lender shall be relieved of any obligations or responsibilities of a Lender hereunder thereafter.

(e) The Borrower recognizes that the Agent's exercise of any discretion accorded to the Agent herein and of its rights, remedies, powers, privileges, and discretions with respect to the Borrower is subject to a certain Agency Agreement amongst the Agent and the Lenders dated as of the date hereof and any amendments, modifications, substitutions or replacements thereof.

ARTICLE 2 - TERM LOANS

2-1. TERM NOTES. Upon satisfaction by the Borrower of all conditions precedent to the effectiveness of this Agreement, the Lenders shall make loans to the Borrower in the aggregate amount of \$2,100,000.00 to be repaid in accordance with the terms and conditions of certain Commercial Promissory Notes of even date in the form of EXHIBIT 2-1 (the "Term Notes").

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2-2. PREPAYMENTS. In addition to the payments required under the Term Notes, the Borrower shall prepay, to the Agent, for the benefit of the Lenders, in inverse order of maturity, the Term Notes and the Acquisition Loans by amounts equal to 50% of Excess Cash Flow per annum to be applied to the Acquisition Loans and the Term Notes proportionately based on the amount of Excess Cash Flow attributable to the Maker of such notes, which payments shall be made within thirty (30) days of the delivery by the Borrower to the Agent of its annual consolidated, audited financial statement.

ARTICLE 3 - GRANT OF SECURITY INTEREST

3-1. GRANT OF SECURITY INTEREST. To secure the Borrower's prompt, punctual, and faithful performance of all and each of the Borrower's Liabilities, the Borrower hereby grants to the Agent, for the benefit of the Lenders, a continuing security interest in and to, and assigns to the Agent, for the benefit of the Lenders, the following, and each item thereof, whether now owned or now due, or in which the Borrower has an interest, or hereafter, at any time in the future, acquired, arising, or to become due, or in which the Borrower obtains an interest, and all products, proceeds, substitutions, and accessions of or to any of the following (all of which, together with any other property in which the Agent, for the benefit of the Lenders, may in the future be granted a security interest, is referred to herein as the "Collateral"):

(a) All Accounts and Accounts Receivable;

(b) All Inventory;

- (c) All Contract Rights;
- (d) All General Intangibles;
- (e) All Equipment;
- (f) All Goods;
- (g) All Fixtures;
- (h) All Chattel Paper;
- (i) All Farm Products;
- (j) All books, records, and information relating to the Collateral and/or to the operation of the Borrower's business, and all rights of access to such books, records, and information, and all property in which such books, records, and information are stored, recorded, and maintained;

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- (k) All Instruments, Documents of Title, Documents, policies and certificates of insurance, Securities, deposits, deposit accounts, money, cash, or other property;
- (l) All federal, state, and local tax refunds and/or abatement to which the Borrower is, or becomes entitled, no matter how or when arising, including, but not limited to any loss carryback tax refunds;
- (m) All insurance proceeds, refunds, and premium rebates, including, without limitation, proceeds of fire and credit insurance, whether any of such proceeds, refunds, and premium rebates arise out of any of the foregoing (a through l), or otherwise, but specifically excluding "key-man" life insurance proceeds, refunds and premiums;
- (n) All liens, guaranties, rights, remedies, and privileges pertaining to any of the foregoing (a through m) including the right of stoppage in transit.

3-2. DURATION OF SECURITY INTEREST. The within grant of a security interest is in addition to, and supplemental of, any security interest previously, or hereafter, granted by the Borrower to the Agent, for the benefit of the Lenders, and shall continue in full force and effect applicable to all Liabilities until all Liabilities have been paid and/or satisfied in full. Upon such termination, the Agent shall promptly execute discharges of its UCC-1 financing statements and release all other collateral granted to the Agent securing the Revolving Credit.

3-3. PROCEEDS. "Proceeds" include, without limitation, "Proceeds" as defined in the Uniform Commercial Code as adopted in Massachusetts (hereinafter, the "UCC") and also, insurance proceeds (with the exception of proceeds from keyman life insurance) , and each type of property described in Sections 3 -1 (a) through and including 3-1(n), above.

ARTICLE 4 - DEFINITIONS

As herein used, the following terms have the following meanings or are defined in the section of the within Agreement so indicated:

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"Acceptable Accounts": is defined in Section 1-2(a).

"Acceptable Inventory": is defined in Section 1-3.

"Accounts" and "Accounts Receivable" include, without limitation, "accounts" as defined in the UCC, and also all: accounts, accounts receivable, notes, drafts, acceptances, and other forms of obligations and receivables and rights to payment for credit extended and for

goods sold or leased, or services rendered, whether or not yet earned by performance; all Inventory which gave rise thereto, and all rights associated with such Inventory, including the right of stoppage in transit; all reclaimed, returned, rejected or repossessed Inventory (if any) the sale of which gave rise to any Account.

"Account Debtor": has the meaning given that term in the UCC.

"Acquisition Loans" : certain loans payable by Biochrom Limited to the Lenders of even date in the aggregate original principal amount of \$3,400,000.00 evidenced by, among other documents, a certain Tranche B Loan Agreement of even date between Biochrom Limited and the Lenders, the payment and performance of which have been guaranteed by the Borrower.

"Adjusted EBITDA": determined on a consolidated basis, an amount equal to the Borrower's EBITDA for such period, minus W all capital expenditures, (ii) capitalized catalogue costs, and (iii) all cash taxes paid during such period, each as determined in accordance with Generally Accepted Accounting Principles.

"Agent": is defined in the Preamble.

"Agent's Rights and Remedies": is defined in Article 10.

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"Availability": is defined in Section 1-1(b).

"Base Rate": is defined in Section 1-10.

"Biochrom Limited": a wholly-owned subsidiary of the Borrower.

"Borrower": is defined in the Preamble.

"Borrowing Base Certificate": is a certificate prepared by the Borrower for the Agent containing financial information required by the Agent with respect to the Borrower, including, without limitation, the Borrower's compliance with the financial covenants contained herein.

"Chattel Paper": has the meaning given that term in the UCC.

"Collateral": is defined in Section 2-1.

"Commitment": \$5,850,000.00 plus Acquisition Loans

"Commitment Percentage": subject to Section 1-14
Brown Brothers Harriman & Co.- 50%; and
BankBoston, N.A. - 50%.

"Contract Rights" includes, without limitation, "contract rights" as now or formerly defined in the UCC and also any right to payment under a contract not yet earned by performance and not evidenced by an instrument or Chattel Paper.

"Costs of Collection" includes, without limitation, all reasonable attorneys' fees, and reasonable out-of-pocket expenses incurred by the Agent's or any Lender's attorneys, and all reasonable costs incurred by

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the Agent or any Lender in the administration of the Liabilities, this Agreement, and all other instruments and agreements executed in connection with or relating to the Liabilities including, without limitation, costs and expenses associated with travel on behalf of the Agent or any Lender. Costs of Collection also includes, without limitation, all reasonable attorneys' fees, reasonable out-of-pocket expenses incurred by the Agent's or any Lender's attorneys, and all reasonable costs and expenses incurred by the Agent or any Lender, including, without limitation, costs and expenses associated with travel on behalf of the Agent or any Lender, which costs and expenses

are directly or indirectly related to or in respect of the Agent's efforts to preserve, protect, collect, or enforce the Collateral, the Liabilities and/or the Agent's Rights and Remedies or any of the Agent's rights and remedies against or in respect of any guarantor or other person liable in respect of the Liabilities (whether or not suit is instituted in connection with such efforts). The Costs of Collection are Liabilities and shall bear interest, to the extent unpaid, as if such had been lent, advanced, and credited by the Lenders to, or for the benefit of, the Borrower, commencing thirty (30) days after notice to Borrower of such Costs of Collection, may be added to the Agent's books and records as Liabilities or charged to any account of the Borrower.

"Debt": the aggregate amount of unsubordinated indebtedness of the Borrower which may be classified as "liabilities" in accordance with Generally Accepted Accounting Principles consistently applied (including without limitation, all deferred items) and on a consolidated basis.

"Debt Service": for any period and on a consolidated basis, an amount equal to (i) all interest expense for such period, plus (ii) all regularly scheduled payments of principal of Debt for such period (including any required payments under the Securityholders' Agreement), each as determined in accordance with Generally Accepted Accounting Principles.

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"Documents": has the meaning given that term in the UCC.

"Documents of Title": has the meaning given that term in the UCC.

"EBITDA": the Borrower's and its Subsidiary's earnings before interest, taxes, depreciation and amortization, each as determined in accordance with Generally Accepted Accounting Principles and on a consolidated basis.

"Employee Benefit Plan": is defined in Section 6-15.

"Equipment" includes, without limitation, "equipment" as defined in the UCC, and also all motor vehicles, rolling stock, machinery, office equipment, plant equipment, tools, dies, molds, store fixtures, furniture, and other goods, property, and assets which are used and/or were purchased for use in the operation or furtherance of the Borrower's business, and any and all accessions, additions thereto, and substitutions therefor.

"ERISA": is defined in Section 6-15.

"Events of Default": is defined in Article 8.

"Excess Cash Flow": for any fiscal year, an amount equal to Adjusted EBITDA minus (i) Debt Service for such year, and (ii) up to \$1,500,000.00 of increases in the working capital for the Borrower's fiscal year 1999.

"Farm Products": has the meaning given that term in the UCC.

"Fixtures": has the meaning given that term in the UCC.

"Funded Debt": any and all Debt of the Borrower or any Subsidiary evidenced by any capitalized lease agreements, promissory notes, or debentures.

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"Generally Accepted Accounting Principles": generally accepted accounting principles which are consistent with the principles promulgated or adopted by the Financial Accounting Standards Board and/or its predecessors and in effect for the Borrower's fiscal year during which this Agreement is executed such that a certified public accountant would be in a position to deliver an unqualified opinion with respect to the Borrower's annual financial statement prepared by that accountant insofar as the rendering of such an opinion would require the use of such accounting principles.

"General Intangibles" includes, without limitation, "general intangibles" as defined in the UCC; and also all: rights to payment for credit extended; deposits; amounts due to the Borrower; credit memoranda in favor of the Borrower; warranty claims; all means and vehicles of investment or hedging, including, without limitation, options, warrants, and futures contracts; records; customer lists; telephone numbers; goodwill; causes of action; judgments; payments under any settlement or other agreement; literary rights; rights to performance; royalties; license fees, franchise fees; rights of admission; licenses, franchises; permits, certificates of convenience and necessity, and similar rights granted by any governmental authority; patents, patent applications, patents pending, and other intellectual property; developmental ideas and concepts; proprietary processes; blueprints, drawings, designs, diagrams, plans, reports, and charts; catalogs; manuals; technical data; all computer software programs, including the source and object codes therefor; all tapes, disks, semi-conductors chips and printouts; all trade secrets rights, copyrights, mask work

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rights and interests, and derivative works and interests; all user, technical reference and other manuals and materials; trade names, trademarks, service marks, all good will relating thereto; all applications for registration of the foregoing; license agreements, including all rights of the Borrower to enforce same; and all other general intangible property of the Borrower in the nature of intellectual property; computer records, computer software, rights of access to computer record service bureaus, service bureau computer contracts, and computer data; proposals; costs estimates, and reproductions on paper, or otherwise, of any and all concepts or ideas, and any matter related to, or connected with, the design, development, manufacture, sale, marketing, leasing, or use of any or all property produced, sold, or leased, by the Borrower or credit extended or services performed, by the Borrower, whether intended for an individual customer or the general business of the Borrower, or used or useful in connection with research by the Borrower.

"Goods": has the meaning given that term in the UCC.

"Government Contract" refers to any agreement with, or purchase order (a) from the United States, or any instrumentality thereof, or (b) with any other governmental entity as to whose contracts, the assignment thereof is subject to any limitation or prohibition, and, as to both (a) or (b) provides for or may give rise to any Account or other right to payment.

"Guaranty" refers to a certain instrument of Unlimited Guaranty of even date pursuant to which the Borrower unconditionally guarantied the payment and performance of all obligations and liabilities of Biochrom Limited to the Agent and the Lenders.

"Instruments": has the meaning given that term in the UCC.

"Inventory" includes, without limitation, "inventory" as defined in the UCC and also all: goods, wares, merchandise, raw materials, work in process, finished goods, and all packaging, advertising, and shipping materials and documents related to any of the foregoing, and all labels, and other devices, names or marks affixed or to be affixed thereto for identifying or selling the same, and other personal property of every description held for sale or lease or furnished or to be furnished under a contract or contracts of sale or service by the

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Borrower, or used or consumed or to be used or consumed in the Borrower's business, and all goods of said description which are in transit, and all returned, repossessed and rejected goods of said description, and all such goods of said description which are detained from or rejected for entry into the United States, and all documents

(whether or not negotiable) which represent any of the foregoing.

"Lenders" is defined in the Preamble.

"Liability" and "Liabilities" include, without limitation, any and all liabilities, debts, and obligations of the Borrower to the Lenders or any of them, and any and all liabilities, debts, and obligations of every endorser, guarantor, and surety of the Borrower to the Lenders, each of every kind, nature and description, now existing or hereafter arising, whether under this Agreement, the Guaranty or otherwise. "Liabilities" also includes, without limitation, each obligation to repay all loans, advances, indebtedness, notes, obligations, overdrafts, and amounts now or hereafter at any time owing by the Borrower to the Lenders (including all future advances or the like, whether or not given pursuant to a commitment by the Lenders), whether or not any of such are liquidated, unliquidated, primary, secondary, secured, unsecured, direct, indirect, absolute, contingent, or of any other type, nature, or description, or by reason of any cause of action which the Lenders may now or hereafter hold against the Borrower. "Liabilities" also includes, without limitation, all notes and other obligations of the Borrower now or hereafter assigned to or held by the Lenders, each of every kind, nature, and description. "Liabilities" also includes, without limitation, all interest and other amounts which now or

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hereafter may be charged to the Borrower and/or which may be due from the Borrower to the Lenders from time to time; all fees and charges in connection with any account now or hereafter maintained by the Borrower with the Lenders or any service now or hereafter rendered by the Lenders; and all costs and expenses incurred or paid by the Bank in respect of this and any other agreement between the Borrower and the Lenders or instrument now or hereafter furnished by the Borrower to the Lenders (including, without limitation, Costs of Collection, attorneys' reasonable fees, and all court and litigation costs and expenses relating to Liabilities under this Agreement). "Liabilities" also includes, without limitation, any and all obligations of the Borrower to act or to refrain from acting in accordance with the terms, provisions, and covenants of this Agreement and of any other agreement between the Borrower and the Lenders or instrument now or hereafter furnished by the Borrower to the Lenders. As used herein, the term "indirect" includes, without limitation, all obligations and liabilities which the Lenders may incur or become liable for, on account of, or as a result of, any transactions between the Lenders and the Borrower including, without limitation, any which may arise out of any letter of credit or acceptance, or similar instrument issued or obligation now or hereafter incurred by the Lenders for the account and/or benefit of the Borrower; any which now or hereafter may arise out of any action brought or threatened against the Lenders by the Borrower, any guarantor or endorser of the Liabilities of the Borrower, or by any other person in connection with the Liabilities; and any obligation of the Borrower which now or hereafter may arise as endorser or guarantor of any third party, or as obligor to any third party which obligation has been endorsed, participated, or assigned to the Lenders. The term "indirect" also refers to any direct or contingent liability of the Borrower now or hereafter to make payment towards any obligation held by the Lenders (including, without limitation, on account of any industrial revenue bond) to the extent so held by the Lenders. The Agent's books and records shall be prima facie evidence of the Liabilities.

"Master Notes": are defined in Section 1-7.

"Person": any natural person, corporation, limited liability company, trust, partnership, joint venture, or other enterprise or entity.

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"Receivables Collateral": refers to that portion of the Collateral which consists of the Borrower's Accounts, Accounts Receivable, Contract

Rights, General Intangibles, Chattel Paper, Instruments, Documents of Title, Documents, Securities, letters of credit, and bankers' acceptances, and any rights to payment now held or in which the Borrower has an interest, or hereafter acquired, or in which the Borrower obtains an interest.

"Related Entity": refers to any corporation, trust, partnership, joint venture, or other enterprise which: is a parent, brother-sister, subsidiary, or affiliate, of the Borrower; could have such enterprise's tax returns or financial statements consolidated with the Borrower's; or could be a member of the same controlled group of corporations (within the meaning of Section 1563 of the Internal Revenue Code of 1986) of which the Borrower is a member.

"Revolving Credit": is defined in Section 1-1(a).

"Securities": has the meaning given that term in the UCC.

"Securityholders' Agreement": shall mean a certain Amended and Restated Securityholders' Agreement of even date by and among the Borrower, Pioneer Ventures Limited Partnership, Pioneer Ventures Limited Partnership II, Pioneer Capital Corp. , First New England Capital, L.P., Citizens Capital, Inc., Chane Graziano and David Green.

"Subordination Agreement": shall mean a certain Amended and Restated Subordination Agreement, of even date by and among the Borrower, Pioneer Ventures Limited Partnership, Pioneer ventures Limited Partnership II, Pioneer Capital Corp., First New England Capital, L.P., Citizens Capital, Inc., Chane Graziano and David Green, and the Agent.

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"Subsidiary": shall mean, individually and collectively, the following subsidiaries of the Borrower: (a) Ealing Scientific LTD., (b) Harvard Apparatus LTD., (c) Harvard Apparatus France, and (d) Biochrom Limited.

"Suspension Event": means and refers to any occurrence (A) which is an Event of Default or (B) which would become an Event of Default if the notice and/or the running of the period of time specified for that occurrence were to be given and/or were to run and such occurrence were not cured within any applicable grace period.

"Term Notes": are defined in Section 2-1.

"UCC": refers to the Uniform Commercial Code as presently in effect in Massachusetts (Mass. Gen. Laws, Ch. 106).

"Year 2000 Compliant": computer applications, imbedded microchips, and other systems and subsystems which properly recognize and perform their intended function without any adverse effect on account of their respective inability to recognize certain dates prior to, on, and after December 31, 1999 or on account of their treating any date prior to, on, or after December 31, 1999 other than as the specific date in question.

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ARTICLE 5 - CONDITIONS PRECEDENT

Precedent to the effectiveness of this Agreement and to the establishment of the Revolving Credit, the following documents, each in form and substance satisfactory to the Agent shall have been delivered to the Agent, and the following conditions shall have been satisfied:

5-1. CORPORATE ACTION BY BORROWER. A certified copy of all corporate action taken by the Borrower to authorize the execution and delivery of this Agreement and of any and all other agreements and documents which have been or are to be executed and delivered as part of the loan arrangement contemplated hereby.

5-2. OPINION. An opinion of counsel to the Borrower covering such

matters with respect to the Borrower, the Subsidiary (and each of them), the stock to be pledged as provided in section 5-4 below, and the loan arrangement contemplated hereby, as the Agent may request.

5-3. PLEDGE AGREEMENT. A Pledge Agreement delivered to the Agent by the Borrower, pledging to the Agent for the benefit of the Lenders sixty-five percent (65.0%) of all stock in the Borrower's subsidiaries, which are Ealing Scientific LTD., Harvard Apparatus LTD., Harvard Apparatus France and Biochrom Limited.

5-4. SUBORDINATION AGREEMENTS. Subordination Agreements from all acceptable holders of notes or other evidence of indebtedness, in form and substance satisfactory to the Agent.

5-5. MASTER NOTES. The Master Notes in the form of EXHIBIT 1-7 hereof.

5-6. TERM NOTES. The Term Notes in the form of EXHIBIT 2-1 hereof.

5-7. ASSIGNMENT DOCUMENTS. Certain instruments of Assignment of Intercompany Note and Security Documents in the form of EXHIBIT 5-7(a) and EXHIBIT 5-7(b) hereof.

5-8. LANDLORD'S WAIVER. A landlord's waiver in form and substance satisfactory to the Agent.

5-9. EQUITY INFUSION. Evidence satisfactory to the Agent that an additional \$1,000,000 has been infused in the Borrower as equity on terms and conditions satisfactory to the Agent.

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5-10. ACQUISITION LOANS. The Tranche B Loan Agreement in the form of EXHIBIT 5-10.

5-11. OFFICER'S CERTIFICATE. A Certificate executed by the President or the Treasurer of the Borrower and stating that the representations and warranties made by the Borrower to the Agent in this Agreement are true and correct as of the date of such Certificate, and that no event has occurred, or failed to occur which constitutes or which, solely with the passage of time or the giving of notice (or both) would constitute, an Event of Default hereunder.

5-12. NO EVENT OF DEFAULT. No event shall have occurred, or failed to occur, which constitutes, or which, solely with the passage of time or the giving of notice (or both) would constitute, an Event of Default hereunder or under any other agreement between the Borrower and the Lenders or instrument furnished by the Borrower to the Lenders.

5-13. NO ADVERSE CHANGE. No event shall have occurred or failed to occur, which occurrence or failure is or could have a materially adverse effect upon the Borrower's financial condition.

5-14. PAYMENT OF FEES. Payment of all reasonable attorneys' fees and expenses incurred to date by the Agent and the Lenders (which attorneys, fees incurred by BankBoston, N.A. to be reimbursed by the Borrower shall not exceed \$5,000.00).

ARTICLE 6 - GENERAL REPRESENTATIONS, WARRANTIES AND COVENANTS.

To induce the Lenders to establish the loan arrangement contemplated herein and to make the term loans referred to in Section 2-1 and to make loans under the Revolving Credit (each of which loans shall be deemed to have been made in reliance thereupon) the Borrower, in addition to all other representations, warranties, and covenants made to the Borrower herein or in any other agreement, instrument, or paper, makes those representations, warranties, and covenants included in Article 6 through and including Article 10, hereof.

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6-1. PAYMENT AND PERFORMANCE OF LIABILITIES. The Borrower shall pay each Liability when demanded (or when due if not payable on demand) and shall

promptly, punctually, and faithfully perform each Liability.

6-2. DUE ORGANIZATION AND CORPORATE AUTHORIZATION.

(a) The Borrower presently is and shall hereafter remain in good standing as a corporation in that State indicated in the Preamble of this Agreement and is and shall hereafter remain duly qualified and in good standing in every other State in which, by reason of the nature or location of the Borrower's assets or operation of the Borrower's business, such qualification may be necessary. The execution and delivery of this Agreement and of any other documents, instruments, and agreements executed in connection herewith constitute representations by the individual acting on behalf of the Borrower signing this Agreement and said instruments and by the Borrower that such execution and delivery have received all such corporate authorization as may be necessary to permit such execution and delivery to, and that they do, bind the Borrower.

(b) Each Related Entity is listed on EXHIBIT 6-2, annexed hereto. The Borrower shall provide the Agent with prior written notice of any entity's becoming or ceasing to be a Related Entity.

6-3. NO CONFLICTING AGREEMENTS. There is no provision in the Articles of organization or By-laws of the Borrower, or in any document by which the Borrower may be bound which prohibits the execution, and delivery of this Agreement or of any other instrument, agreement, or paper which relates to the Borrower's relationship with the Agent or which prohibits or adversely affects the Borrower's carrying out of the terms thereof.

6-4. TRADE NAMES.

(a) EXHIBIT 6-4, annexed hereto, constitutes a listing of:

(i) all trade names and trade styles under which the Borrower presently conducts or ever conducted its business;

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(ii) all legal names and legal statuses (such as a corporation or partnership) under which the Borrower ever conducted its business;

(iii) all entities and/or persons with whom the Borrower ever consolidated or merged, or from whom the Borrower ever acquired in a single transaction or in a series of related transactions substantially all of such entity's or person's assets.

(b) Except upon not less than twenty-one (21) days prior written notice given the Agent, the Borrower will not undertake or commit to undertake any action such that the results of that action, if undertaken prior to the date of this Agreement, would have been reflected on EXHIBIT 6-4.

6-5. LOCATION OF COLLATERAL. The Collateral (to the extent capable of being physically possessed) , and the books, records, and papers of Borrower pertaining thereto, are kept and maintained solely at, and, for the last four (4) months, have never been kept or maintained at any location other than, the chief executive offices of Borrower stated in the Preamble of this Agreement, and at those locations which are listed on EXHIBIT 6-5, annexed hereto, which EXHIBIT includes all service bureaus with which any such records are maintained. Except to accomplish sales of Inventory in the ordinary course of business, the Borrower shall not remove any Collateral from said chief executive offices or those locations listed on EXHIBIT 6-5.

6-6. TITLE TO ASSETS. The Borrower is, and shall hereafter remain, the owner of the Collateral free and clear of all liens, encumbrances, attachments, security interests, purchase money security interests in excess of \$50,000.00, in the aggregate, mortgages, and charges with the exceptions of (a) the security interest created herein, and (b) the security interests and other encumbrances (if any) listed on EXHIBIT 6-6, annexed hereto, and does not presently, and shall not hereafter, have possession of any property on consignment to the Borrower. The Borrower shall timely pay all of the Borrower's indebtedness which is secured by any security interest, mortgage, lien, or other encumbrance which is superior to that granted to the Agent herein. The Borrower shall not sell any of the Collateral other than W for the sale of Inventory in the ordinary course of the Borrower's business or other Collateral for not more than \$10,000 in the ordinary course of business, and (ii) for the sale of the Borrower's sheet metal Equipment and machine shop Equipment.

6-7. INDEBTEDNESS. The Borrower does not and shall not hereafter have any indebtedness with the exceptions of (a) any indebtedness to the Lenders hereunder; (b) the indebtedness (if any) listed on EXHIBIT 6-7, annexed hereto; (c) ordinary trade indebtedness incurred in the normal course of the Borrower's business; (d) indebtedness in respect of the Borrower's guaranty of the lease obligations of Biochrom Limited; and (e) indebtedness approved by the Agent in writing and specifically subordinated to the Liabilities and rights and remedies hereunder.

6-8. INSURANCE POLICIES. EXHIBIT 6-8, annexed hereto, is a schedule of all insurance policies owned by the Borrower or under which the Borrower is the named insured.

6-9. LICENSES. EXHIBIT 6-9, annexed hereto, consists of copies of all presently effective license, distributor, franchise, and similar agreements issued to, or to which the Borrower is a party.

6-10. STATUTORY COMPLIANCE. The Borrower is in compliance with, and shall hereafter comply with and use its assets in compliance with, all statutes, regulations, ordinances, directives, and orders of every federal, state, municipal, and other governmental authority which has or claims jurisdiction over the Borrower, any of the Borrower's assets, or any person in any capacity for which the Borrower would be responsible for the conduct of such person, except where failure to so comply could not have material adverse effect on the Borrower.

6-11. BANK ACCOUNTS. To permit the Agent to monitor the financial condition of the Borrower, the Borrower shall maintain with the Agent the Borrower's primary operating accounts (with the exception of payroll and freight accounts).

6-12. MAINTAIN PROPERTIES. The Borrower shall

- (a) keep the Collateral in good order and repair, consistent with its current business practice;
- (b) not waste or destroy or suffer the waste or destruction of the Collateral or any part thereof; and
- (c) not use any of the Collateral in violation of any policy of insurance thereon.

6-13. PAY TAXES. The Borrower has, and hereafter shall: pay, as they become due and payable, all taxes and unemployment contributions and other charges of any kind or nature levied, assessed or claimed against the Borrower or the Collateral (unless being disputed in good faith) by any person or entity whose claim could result in a lien upon the assets of the Borrower or by any governmental authority, including, without limitation, liens arising in connection with hazardous material, as described in Section 5-16, hereof; properly exercise any trust responsibilities imposed upon the Borrower by reason of withholding from employees' pay; timely make all contributions and other payments as may be required pursuant to any Employee Benefit Plan now or hereafter established by the Borrower; and timely file all tax and other returns and other reports with each governmental authority to whom the Borrower is obligated to so file. At the Agent's option, upon the occurrence and continuance of an Event of Default, the Agent may, but shall not be obligated to, pay any taxes, unemployment contributions, and any and all other charges levied or assessed upon the Borrower or the Collateral by any person or entity or governmental authority, and make any contributions or other payments on account of the Borrower's employee benefit plan as the Agent, in the Agent's discretion, may deem necessary or desirable, to protect, maintain, preserve, collect, or realize upon any or all of the Collateral or the value thereof or any right or remedy pertaining thereto.

6-14. REGULATION U. The Borrower is not engaged in the business of extending credit for the purpose of purchasing or carrying any margin stock (within the meaning of Regulation U of the Board of Governors of the Federal Reserve System of the United States). No part of the proceeds of any borrowing

hereunder will be used at any time to purchase or carry any such margin stock or to extend credit to others for the purpose of purchasing or carrying any such margin stock.

6-15. ERISA.

(a) The Borrower shall not

(i) violate or fail to be in material compliance with the Borrower's Employee Benefit Plan. As used herein, the term "Employee Benefit Plan" has the same meaning given it in Section 3(3) of the Employee Retirement Insurance Security Act of 1974, P.L. 93-406 (September 2, 1974) (hereinafter referred to as "ERISAI") with the exception of any requirement of any relationship to interstate commerce imposed thereon;

(ii) fail timely to file all reports and filings required by ERISA to be filed by the Borrower;

(iii) engage in any "prohibited transactions" or "reportable events" (respectively as described in ERISA);

(iv) engage in, or commit, any act such that a tax or penalty could be imposed upon the Borrower on account thereof pursuant to ERISA:

(v) accumulate any material funding deficiency within the meaning of ERISA;

(vi) terminate any Employee Benefit Plan such that a lien could be asserted against any assets of the Borrower on account thereof pursuant to ERISA.

6-16. HAZARDOUS MATERIALS. The Borrower has never: occupied or operated a site or vessel on which any hazardous material or hazardous oil was stored or transported during Borrower's occupation or operation without compliance in all material respects with all statutes, regulations, ordinances, directives, and orders of every federal, state, municipal and other governmental authority which has or claims jurisdiction relative thereto, (site, vessel, and hazardous material respectively being defined in Mass. Gen. Laws Ch.21E); disposed of, transported, or arranged for the transport of any hazardous material or

hazardous oil without compliance in all material respects with all such statutes, regulations, ordinances, directives, and orders; been legally responsible for any release or threat of release of any hazardous material or hazardous oil; received written notification of any potential or known release or threat of release of any hazardous material or hazardous oil from any site or vessel occupied or operated by the Borrower and/or of the incurrence of any expense or loss in connection with the assessment, containment, or removal of any release or threat of release of any hazardous material or hazardous oil from any such site or vessel.

(b) The Borrower shall: not dispose of any hazardous material or hazardous oil on any site or vessel occupied or operated by the Borrower; not store on any site or vessel occupied or operated by the Borrower, or transport or arrange for the transport of any hazardous material or hazardous oil except if such storage or transport is in the ordinary course of the Borrower's business and is in compliance with all such statutes, regulations, ordinances, directives and orders. The Borrower represents that no hazardous material or hazardous oil is or ever was disposed of on any site or vessel occupied or operated by the Borrower during Borrower's occupation or operation; upon the Borrower's obtaining knowledge or notice of any potential or known release or threat of release of any hazardous material or hazardous oil in violation of law at or from any site or vessel occupied or operated by the Borrower; and/or upon the Borrower's obtaining knowledge of any incurrence of any expense or loss by any governmental authority in connection with the assessment, containment, or removal of any hazardous material or oil for which expense or loss the Borrower may be liable.

6-17. LITIGATION. Except as set forth in Exhibit 6-17, there is not presently pending or threatened by or against the Borrower any suit, action,

proceeding, or investigation which, if determined adversely to the Borrower, would have a material adverse effect upon the Borrower's financial condition or ability to conduct its business as such business is presently conducted.

6-18. DIVIDENDS OR INVESTMENTS. The Borrower shall not, without the Agent's prior written consent:

(a) pay any dividend, other than a common stock dividend of the Borrower's own capital stock or preferred stock dividends in accordance with the terms of the Borrower's Articles of Organization, as amended to date;

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(b) own, redeem, retire, purchase, or acquire any of the Borrower's capital stock or options (except in connection with the termination of an employee who does not own more than two percent (2.0%) of the Borrower's shares of stock);

(c) invest in or purchase any stock or securities or rights to purchase any such stock or securities, of any corporation or other entity, except investments in investment -grade short-term securities, or the Agent's mutual funds;

(d) merge or consolidate or be merged or consolidated with or into any other corporation or other entity other than those identified on Exhibit 6-2;

(e) consolidate any of the Borrower's operations with those of any other corporation or other entity;

(f) organize or create any Related Entity;

(g) subordinate any debts or obligations owed to the Borrower by any third party to any other debts owed by such third party to any other party.

6-19. CORPORATE LOANS. The Borrower shall not make any loans or advances individual, firm, corporation, or other entity including, without limitation, any Related Entity, officer, employee, director, shareholder, or salesperson of the Borrower with the exceptions of

(a) advance payments made to the Borrower's suppliers in the ordinary course;

(b) advances to the Borrower's officers, employees, and salespersons with respect to reasonable expenses to be incurred by such officers, employees, and salespersons for the benefit of the Borrower, which expenses are properly substantiated by the person seeking such advance and properly reimbursable by the Borrower;

(c) a revolving loan facility of even date to Biochrom Limited in the maximum amount of \$1,500,000.00, which loan and collateral therefor have been assigned to the Agent on behalf of the Lenders as additional security for repayment of the Liabilities; and

(d) intercompany loans not in excess of \$100,000.00.

6-20. GOVERNMENT CONTRACTS. All Government Contracts to which the Borrower is a party, if any, are listed on EXHIBIT 6-20, annexed hereto. In the

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event that the Borrower is, or hereafter becomes, party to any Government Contract, the Borrower shall execute all such instruments, documents, and papers as may be requested by the Agent to comply with any applicable statute dealing with the payment of the proceeds therefrom to the Agent.

6-21. PATENTS. All patents, patents pending, patents assigned to the Borrower and trademarks and tradenames owned by or assigned to the Borrower are listed on EXHIBIT 6-21, annexed hereto. The Borrower shall provide the Agent with prompt written notice of each application for patent, patent pending, and patent assigned to the Borrower hereafter, and each trademark and tradename owned by or assigned to the Borrower hereafter, and upon request of the Agent shall execute and deliver to the Agent, all such instruments, documents and

papers as may be reasonably requested by the Agent to perfect the Agent's security interest in any application for patent, patent pending, patent, trademark, or tradename.

6-22. PROTECTION OF ASSETS. The Borrower agrees that the Agent may, at the Agent's discretion from time to time, discharge any tax, lien, or encumbrance on any of the Collateral, or take any other action that the Agent may deem appropriate to repair, insure, maintain, or preserve any of the Collateral. The Borrower shall pay to the Agent, on demand, or the Agent, in its sole discretion, may charge to Borrower, all amounts paid or incurred by the Agent pursuant to this section. The obligation of the Borrower to pay such amounts shall be included as Liabilities.

6-23. LINE OF BUSINESS. The Borrower shall not engage in any business other than the business in which it is currently engaged, or a business reasonably related thereto.

6-24. PAYMENTS TO RELATED ENTITIES. Except as set forth on EXHIBIT 6-24, the Borrower and its Subsidiaries shall not make any payment, nor give any value to any-Related Entity except for goods and services actually purchased by the Borrower from, or sold by the Borrower or such Subsidiary to, such Related Entity for a price which shall (a) be competitive and shall be fully deductible as an "ordinary and necessary business expense,, and/or fully depreciable under the Internal Revenue Code of 1986 and Treasury Regulations promulgated thereunder and (b) not differ from that which are being currently charged to Related Entities, as adjusted in the ordinary course of business.

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6-25. INSURANCE.

(a) The Borrower shall have and maintain at all times insurance covering such risks, in such amounts, containing such terms, in such form, for such periods, and written by such companies as may be reasonably satisfactory to the Agent. All such insurance shall provide for a minimum of twenty (20) days' written notice of cancellation to the Agent and all such insurance which covers the Collateral shall include such endorsement in favor of the Agent as the Agent may specify. Each such endorsement shall provide that the insurance, to the extent of the Agent's interest therein, shall not be impaired or invalidated, in whole or in -part, by reason of any act or neglect of the Borrower or by the failure of the Borrower to comply with any warranty or condition of the policy. In the event of the failure by the Borrower to provide and maintain insurance as herein provided, the Agent may, at its option, provide such insurance. The Borrower shall furnish to the Agent certificates or other evidence satisfactory to the Agent regarding compliance by the Borrower with the foregoing insurance provisions. originals of all such policies shall be delivered to and held by the Agent upon the occurrence of an Event of Default. The Borrower shall advise the Agent of each claim made by the Borrower under any policy of insurance which covers the Collateral and will permit the Agent, at the Agent's option in each instance upon the occurrence of an Event of Default (which has not been cured to the satisfaction of the Agent), to the exclusion of the Borrower, to conduct the adjustment of each such claim. The Agent shall not be liable on account of any exercise pursuant to said power except for any exercise in actual willful misconduct, gross negligence, or bad faith. The Agent may apply any proceeds of such insurance against the Liabilities, whether or not such have matured, in such order of applicant ion as the Agent may determine.

(b) The Borrower shall also maintain key man life insurance with respect to David Green and Chane Graziano, in minimum amounts of \$1,000,000.00, respectively, naming the Borrower as beneficiary and which beneficial interest shall not be assigned, pledged or otherwise encumbered.

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6-26. PERFECTION OF SECURITY INTEREST. The Borrower shall execute and deliver to the Agent such instruments, documents, and papers, and shall do all such things from time to time hereafter as the Agent may request to carry into effect the provisions and intent of this Agreement; to protect and perfect the Agent's security interest in the Collateral for the benefit of the Lenders; and to comply with all applicable statutes and laws, and facilitate the collection of the Receivables Collateral. Contemporaneous with the execution of this

Agreement, the Borrower shall execute all such instruments as may be required by the Agent with respect to the perfection of the security interests granted herein, including without limitation, financing statements in such form and to be filed in accordance with the provisions of the Uniform Commercial Code in such State or States as the Agent may determine, and applications for notations of the Agent as lien holder, mortgagee, or the like, on such certificates or similar instruments as may have been issued with respect to the Borrower's ownership of one or more items of the Collateral. A carbon, photographic, or other reproduction of this Agreement or of any financing statement or other instrument executed pursuant to this section shall be sufficient for filing to perfect the security interests granted herein.

6-27. ADEQUACY OF DISCLOSURE.

(a) All financial statements of the Borrower furnished to the Agent by the Borrower have been prepared in accordance with Generally Accepted Accounting Principles (except where only unaudited financial statements are required, for the omission of footnotes and year-end adjustments) consistently applied which fairly present the condition of the Borrower at the date(s) thereof. Except in connection with the acquisition of Pharmacia Biochrom Ltd, there has been no change in the financial condition of the Borrower since the date(s) of the most recent financial statements, other than changes in the ordinary course of business, which changes have not been materially adverse, either singularly or in the aggregate.

(b) The Borrower does not have any contingent liabilities pursuant to the execution of guaranties or otherwise not noted in the Borrower's financial statements furnished to the Agent prior to the execution of the within Agreement except in connection with the acquisition of Pharmacia Biochrom, Ltd and will not hereafter incur any such contingent liabilities.

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(c) No document, instrument, agreement, or paper given the Agent by or on behalf of the Borrower or any guarantor of the Liabilities in connection with the Agent's and Lender's execution of the within Agreement contains any untrue statement of a material fact or omits to state a material fact necessary in order to make the statements therein not misleading.

6-28. YEAR 2000 COMPLIANCE.

(a) Based upon a diligent inquiry undertaken by the Borrower, it appears that the Borrower's operations are Year 2000 Compliant.

(b) The Borrower has developed a detailed plan and timetable with respect to the Borrower's operations becoming fully Year 2000 Compliant and has committed adequate resources to execute that plan and to meet such timetable.

(c) The Borrower will not suffer or permit its operations thereafter to cease to be Year 2000 Compliant in any manner which might have more than a DE MINIMUS effect on its operations.

6-29. OTHER COVENANTS. The Borrower shall not indirectly do or cause to be done any act which, if done directly by the Borrower, would breach any covenant contained in this Agreement.

6-30. CASH MANAGEMENT. The Agent may, at its option, require the Borrower to implement such cash management procedures as the Agent may require.

ARTICLE 7 - FINANCIAL AND OTHER REPORTING REQUIREMENTS /FINANCIAL COVENANTS

7-1. MAINTAIN RECORDS. The Borrower shall at all times

(a) keep proper books of account, in which full, true, and accurate entries shall be made of all of the Borrower's transactions, all in accordance with Generally Accepted Accounting Principles or generally accepted auditing principles (as applicable) applied consistently with prior periods to fairly reflect the financial condition of the Borrower at the close of, and its results of operations for, the periods in question;

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(b) keep accurate current records of the Collateral including, without limitation, accurate current stock, cost, and sales records of its

inventory, accurately and sufficiently itemizing and describing the kinds, types, and quantities of Inventory and the cost and selling prices thereof.

7-2. ACCESS TO RECORDS.

(a) The Borrower shall accord the Agent and the Agent's representatives with access from time to time as the Agent and such representatives may reasonably require to all properties owned by or over which the Borrower has control. The Agent, and the Agent's representatives, shall have the right, and the Borrower will permit the Agent and such representatives from time to time as the Agent and such representatives may reasonably request, to examine, inspect, copy, and make extracts from any and all of the Borrower's books, records, electronically stored data, papers, and files. The Borrower shall make available to the Agent any copying facilities which the Borrower has.

(b) The Borrower hereby authorizes the Agent and the Agent's representatives to inspect, copy, duplicate, review, cause to be reduced to hard copy, run off, draw off, and otherwise to use any and all computer or electronically stored information or data which relates to the Borrower, which information or data is in the possession of the Borrower or any service bureau, contractor, or other person", and directs any such service bureau, contractor, or other person fully to cooperate with the Agent and the Agent's representatives with respect thereto.

(c) The Borrower authorizes the Agent to verify at any time the Collateral or any portion thereof, including verification with Account Debtors, and/or with the Borrower's computer billing companies, collection agencies, and accountants and, upon the occurrence and during the continuance of an Event of Default, to sign the name of the Borrower on any notice to the Borrower's Account Debtors or verification of the Collateral.

(d) The Agent may use the information provided in Section 7-2 for all proper purposes relating to its role as lender to the Borrower.

7-3. IMMEDIATE NOTICE TO AGENT. The Borrower shall provide the Agent with written notice immediately upon the occurrence of any of the following events:

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(a) any change in the Borrower's officers, directors, or key employees;

(b) any material change in the business, operations, or financial affairs of the Borrower;

(c) the occurrence, or failure of occurrence, of an event, which occurrence or failure is, or with the passage of time or giving of notice (or both), would constitute, an Event of Default (as described herein); and

(d) any litigation which, if determined adversely to the Borrower, might have a material adverse effect on the financial condition of the Borrower.

7-4. MONTHLY REPORTS. Monthly, within twenty (20) days following the end of the previous month, the Borrower shall provide the Agent with:

(a) A summary of the aging of the Borrower's and Subsidiary's Accounts Receivable as of the end of the subject month for the Holliston, Massachusetts operations;

(b) An aging of the Borrower's and Subsidiary's Accounts Receivable as of the end of the subject month for the United Kingdom, Quebec, Canada and France operations;

(c) A Borrowing Base Certificate, in such form as the Agent may specify from time to time;

(d) A schedule, in such form as may be required by the Agent, of Availability as of the end of the subject month; and

(e) An internally prepared financial statement of the Borrower's financial condition on a consolidated basis and for each operating location at, and the results of its operations for, the period ending with the end of the subject month, and for the year to date period ending with the subject month, which financial statement shall include, at a minimum, a balance sheet and income statement.

7-5. ANNUAL REPORTS. Annually, within one hundred (100) days following the end of the Borrower's fiscal year, the Borrower shall furnish the Agent with an original signed counterpart of the Borrower's annual financial statement, which statement shall have been prepared by and bear the unqualified opinion of, the Borrower's independent certified public accountants (which accountants shall be acceptable to the Agent).

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7-6. ADDITIONAL FINANCIAL INFORMATION.

(a) In addition to the foregoing, the Borrower promptly shall provide the Agent and the Lenders with such other and additional information concerning the Borrower, the Collateral, the operation of the Borrower's business, and the Borrower's financial condition, including financial reports and statements, as the Agent may from time to time reasonably request from the Borrower.

(b) All financial information provided the Agent by the Borrower shall be prepared in accordance with Generally Accepted Accounting Principles or generally accepted auditing principles (as applicable) applied consistently in the preparation thereof and with prior periods, to fairly reflect the financial condition, of the Borrower at the close of, and its results of operations for, the periods in question. Where the Borrower is not required to provide audited financial statements, such statements will not have to include footnotes or year-end adjustments, unless otherwise reasonably required by the Agent.

7-7. APPRAISALS AND AUDITS. Upon the Agent's reasonable request from time to time, the Borrower shall obtain, or shall permit the Agent and Lenders to obtain (in all events, at the Borrower's expense) appraisals and audits of the Collateral in form and substance and by appraisers and auditors reasonably satisfactory to the Agent.

7-8. PROFITS. The Borrower's consolidated net income after taxes shall be no less than (a) \$1,000,000.00 in fiscal year 1999, (b) \$1,200,000.00 in fiscal year 2000, and (c) \$1,400,000.00 in fiscal year 2001, to be tested upon the earlier of W completion of the annual audited financial statements, or (ii) one hundred days following the end of the Borrower's fiscal year.

7-9. DEBT SERVICE COVERAGE. The ratio of the Borrower's total Funded Debt to EBITDA shall not at any time exceed 2.50 to 1.00, tested quarterly on a consolidated basis, commencing as of March 31, 1999. For the quarterly tests on March 31, 1999, June 30, 1999 and September 30, 1999, EBITDA will be annualized (i.e. March 31, 1999 - EBITDA x4, June 30, 1999 - EBITDA x2 and September 30, 1999 - EBITDA x1.33). From and after December 31, 1999, this covenant shall be calculated on a rolling four quarter basis.

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7-10. CASH FLOW COVERAGE. The ratio of the Borrower's Adjusted EDITDA to Debt Service shall not at any time be less than 1.50 to 1.00, tested quarterly on a consolidated basis commencing as of March 31, 1999. This covenant shall be calculated on a cumulative basis for the quarterly periods ending March 31, June 30, September 30 and December 31 and thereafter will be calculated on a rolling four quarter basis.

7-11. COMPLIANCE CERTIFICATES. The Borrower shall furnish the Agent with Compliance Certificates referencing Sections 7-8 through 7-10, above, in such form as the Agent may specify to be submitted within thirty (30) days of each test date.

ARTICLE 8 - DEFAULT

Upon the earlier to occur of: (i) January 29, 2002 or (ii) any one or more of the following events (herein, "Events of Default"), any and all Liabilities of the Borrower to the Lenders shall become upon written notice to the Borrower immediately due and payable, at the option of the Agent and without further notice or demand. Upon the occurrence of the Event of Default set forth in Section 8-7, any and all Liabilities shall become immediately due and payable without any further act on the part of the Agent or any Lender. The occurrence of any Event of Default shall also constitute, without notice or demand, a default under all other agreements between the Agent or any Lender and the

Borrower and instruments and papers given the Agent or any Lender by the Borrower, whether such agreements, instruments, or papers now exist or hereafter arise.

8-1. FAILURE TO PAY REVOLVING CREDIT OR TERM NOTES. The failure by the Borrower to pay any amount due under the Revolving Credit or the Term Notes within five (5) days of when due.

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8-2. FAILURE TO MAKE OTHER PAYMENTS. The failure by the Borrower to pay, when due, any other Liabilities, including without limitation, liabilities under a certain instruments of guaranty of even date pursuant to which the Borrower unconditionally guaranteed the payment and performance of all obligations and liabilities of Biochrom Limited to the Lenders, within five (5) days of when due.

8-3. FAILURE TO PERFORM LIABILITY. The failure by the Borrower to promptly, punctually and faithfully perform, discharge, or comply with any Liability or any other term of this Agreement, within twenty (20) days of written notice by the Agent to the Borrower of such failure, unless such failure is not capable of being cured, in which case no notice shall be required.

8-4. MISREPRESENTATION. The determination by the Agent that any representation or warranty heretofore, now, or hereafter made by the Borrower to the Agent, in any document, instrument, agreement, or paper was not true or accurate, in any material respect, when given.

8-5. ACCELERATION OF OTHER DEBT. The occurrence of any event such that any indebtedness of the Borrower to any creditor for borrowed money, other than the Lenders, has been accelerated.

8-6. DEFAULT UNDER OTHER AGREEMENTS. The occurrence of any event of default under any agreement between the Agent or the Lenders and the Borrower or instrument or paper given the Agent or the Lenders by the Borrower, whether such agreement, instrument, or paper now exists or hereafter arises (notwithstanding that the Agent or any Lender may not have exercised its rights upon default under any such other agreement, instrument or paper).

8-7. BUSINESS FAILURE. Any act by, against, or relating to the Borrower, or its property or assets, which act constitutes the application for, consent to, or sufferance of the appointment of a receiver, trustee, or other person, pursuant to court action or otherwise, over all, or any part of the Borrower's property; the granting of any trust mortgage or execution of an

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assignment for the benefit of the creditors of the Borrower, or the occurrence of any other voluntary or involuntary liquidation or extension of debt agreement for the Borrower; the failure by the Borrower to generally pay the debts of the Borrower as they mature; adjudication of bankruptcy or insolvency relative to the Borrower; the entry of an order for relief or similar order with respect to the Borrower in any proceeding pursuant to The Bankruptcy Code of 1978 as amended, Title 11 United States Code (commonly referred to as the Bankruptcy Code) or any other federal bankruptcy law; the filing of any complaint, application, or petition by or against the Borrower initiating any matter in which the Borrower is or may be granted any relief from the debts of the Borrower pursuant to the Bankruptcy Code or any other insolvency statute or procedure (however, it shall not be an Event of Default hereunder until the earlier of (x) the entry of an order for relief against the Borrower, or (y) the expiration of sixty (60) days without dismissal of such complaint, application, or petition if such complaint, application, or petition filed against the Borrower was not filed by or at the direction of the Borrower or any related entity, and is being diligently contested); the meeting by the Borrower with a formal or informal creditors, committee; the offering by or entering into by the Borrower of any composition, extension, or any other arrangement seeking relief from or extension of the debts of the Borrower, or the initiation of any other judicial or non-judicial proceeding or agreement by, against, or including the Borrower which seeks or intends to accomplish a reorganization or similar arrangement with creditors.

8-8. JUDGMENT. The entry of any judgment for the payment of money aggregating at least Fifty Thousand Dollars (\$50,000.00) against the Borrower, which judgment is not satisfied or appealed from (with execution or similar process stayed) within thirty (30) days of its entry.

8-9. RESTRAINT OF BUSINESS. The entry of any court order which enjoins, restrains or in any way prevents the Borrower from conducting all or any part of its business affairs in the ordinary course.

8-10. TRUSTEE PROCESS. The service of any process upon the Agent or any Lender seeking to attach by mesne or trustee process any funds of the Borrower on deposit with the Agent or such Lender.

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8-11. CHANGE IN MANAGEMENT/OWNERSHIP. Any material change in the authority or responsibilities of Chane Graziano or David Green and/or any direct or indirect decrease in the ownership by Chane Graziano or David Green of the capital stock of the Borrower from that existing at the execution of this Agreement other than arising by the exercise of stock options by employees.

8-12. CASUALTY LOSS. The occurrence of (i) any uninsured loss, theft, damage, or destruction in excess of \$100,000.00, or (ii) any sale (other than sales in the ordinary course of business) or encumbrance to or of any of the Collateral (except as provided in Section 6-6 hereof).

8-13. TERMINATION OF EXISTENCE. The termination of existence, dissolution, winding up, or liquidation of the Borrower.

8-14. ACQUISITION LOANS. The occurrence of an event of default under the Acquisition Loans.

8-15. SECURITYHOLDERS' AGREEMENT. The occurrence of any payment default under the Securityholders' Agreement or the giving of notice by any Creditor (as defined in the Subordination Agreement) to the Agent that an event of default has occurred under the Junior Debt (as defined in the Subordination Agreement).

ARTICLE 9 - AGENT AS BORROWER'S ATTORNEY-IN-FACT

9-1. APPOINTMENT AS ATTORNEY-IN-FACT. Effective only upon the occurrence and during the continuance of an Event of Default, the Borrower hereby irrevocably constitutes and appoints the Agent as the Borrower's true and lawful attorney, with full power of substitution, to convert the Collateral into cash at the sole risk, cost, and expense of the Borrower, but for the sole benefit of the Agent, for the benefit of the Lenders, subject to applicable law. The rights and powers granted the Agent by the within appointment include but are not limited to the right and power to:

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(a) prosecute, defend, compromise, or release any action relating to the Collateral;

(b) sign change of address forms to change the address to which the Borrower's mail is to be sent as the Agent shall designate; receive and open the Borrower's mail; remove any Collateral therefrom and turn over such mail (other than such proceeds) either to the Borrower, or to any trustee in bankruptcy, receiver, assignee for the benefit of creditors of the Borrower, or other legal representative of the Borrower whom the Agent determines to be the appropriate person to whom to so turn over such mail;

(c) endorse the name of the Borrower in favor of the Agent upon any and all checks, drafts, notes, acceptances, or other items or instruments; sign and endorse the name of the Borrower on, and receive as secured party, any of the Collateral, any invoices, schedules of Collateral, freight or express receipts, or bills of lading, storage receipts, warehouse receipts, or other documents of title of a same or different nature relating to the Collateral;

(d) sign the name of the Borrower on any notice to the Borrower's Account Debtors or verification of the Receivables Collateral; sign the Borrower's name on any Proof of Claim in Bankruptcy against Account Debtors, and

on notices of lien, claims of mechanics liens, or assignments or releases of mechanics liens securing the Accounts;

(e) take all such action as may be necessary to obtain the payment of any letter of credit of which the Borrower is a beneficiary;

(f) repair, manufacture, assemble, complete, package, deliver, alter or supply goods, if any, necessary to fulfill in whole or in part the purchase order of any customer of the Borrower;

(g) obtain, adjust, settle and cancel any insurance;

(h) use, license or transfer any or all General Intangibles of the Borrower; and

(i) and sign and file or record any financing or other statements in order to perfect or protect the Agent's security interest in the Collateral.

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9-2. FULL POWER TO ACT. In connection with all powers of attorney included in this Agreement, the Borrower hereby grants unto the Agent full power to do any and all things necessary or appropriate in connection with the exercise of such powers as fully and effectually as the Borrower might or could do, hereby ratifying all that said attorney shall do or cause to be done by virtue of this Agreement.

9-3. NO OBLIGATION TO ACT. The Agent shall not be obligated to do any of the acts or to exercise any of the powers authorized herein, but if the Agent elects to do any such act or to exercise any of such powers, it shall not be accountable for more than it actually receives as a result of such exercise of power, and shall not be responsible to the Borrower except for the Agent's actual willful misconduct, bad faith, or gross negligence.

9-4. SURVIVAL OF APPOINTMENT. All of the powers of attorney set forth in this Agreement shall not be affected by any disability or incapacity suffered by the Borrower and shall survive same. All powers conferred upon the Agent by this Agreement, being coupled with an interest, shall be irrevocable until this Agreement is terminated by a written instrument executed by a duly authorized officer of the Agent.

ARTICLE 10 - RIGHTS AND REMEDIES UPON DEFAULT

In addition to all of the rights, remedies, powers, privileges, and discretions which the Agent is provided prior to the occurrence of an Event of Default, the Agent shall have the following rights and remedies upon the occurrence of any Event of Default and at any time thereafter until such Event of Default has been cured to the satisfaction of the Agent.

10-1. RIGHTS OF ENFORCEMENT. The Agent shall have all of the rights and remedies of a secured party upon default under the UCC, in addition to which the Agent shall have all of the following rights and remedies:

(a) To collect the Receivables Collateral with or without the taking of possession of any of the Collateral; and/or

(b) To take possession of all or any portion of the Collateral; and/or

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(c) To sell, lease, or otherwise dispose of any or all of the Collateral, in its then condition or following such preparation or processing as the Agent deems advisable and with or without the taking of possession of any of the Collateral.

(d) To apply the Receivables Collateral or the proceeds of the Collateral towards (but not necessarily in complete satisfaction of) the Liabilities.

(e) To notify any of the Borrower's Account Debtors, either in the name of the Agent or the Borrower, to make payment directly to the Agent, and to advise any person of the Agent's security interest in and to the Collateral, and to collect all amounts due on account of the Collateral.

10-2. SALE OF COLLATERAL. Any sale or other disposition of the Collateral may be at public or private sale upon such terms and in such manner as the Agent deems advisable, having regard to compliance with any statute or regulation which might affect, limit, or apply to the Agent's disposition of the Collateral. The Agent may conduct any such sale or other disposition of the Collateral upon the Borrower's premises. Unless the Collateral is perishable or threatens to decline speedily in value, or is of a type customarily sold on a recognized market (in which event the Agent shall provide the Borrower with such notice as may be practicable under the circumstances), the Agent shall give the Borrower at least the greater of the minimum notice required by law or seven (7) days prior written notice of the date, time, and place of any proposed public sale, and of the date after which any private sale or other disposition of the Collateral may be made. The Agent or any Lender may purchase the Collateral, or any portion of it at any sale held under this Article.

10-3. OCCUPATION OF BUSINESS LOCATION. In connection with the Agent's exercise of the Agent's rights under this Article, the Agent may enter upon, occupy, and use any premises owned or occupied by the Borrower, and may exclude the Borrower from such premises or portion thereof as may have been so entered upon, occupied, or used by the Agent. The Agent shall not be required to remove any of the Collateral from any such premises upon the Agent's taking possession thereof, and may render any Collateral unusable to the Borrower. In no event shall the Agent be liable to the Borrower for use or occupancy by the Agent of any premises pursuant to this Article, nor for any charge (such as wages for the Borrower's employees and utilities) incurred in connection with the Agent's exercise of the Agent's Rights and Remedies.

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10-4. GRANT OF NONEXCLUSIVE LICENSE. The Borrower hereby grants to the Agent a nonexclusive irrevocable license to use, apply, and affix any trademark, tradename, logo, or the like in which the Borrower now or hereafter has rights, such license being with respect to the Agent's exercise of the rights hereunder including, without limitation, in connection with any completion of the manufacture of Inventory or sale or other disposition of inventory.

10-5. ASSEMBLY OF COLLATERAL. The Agent may require the Borrower to assemble the Collateral and make it available to the Agent at the Borrower's sole risk and expense at a place or places which are reasonably convenient to both the Agent and Borrower.

10-6. RIGHTS AND REMEDIES. The rights, remedies, powers, privileges, and discretions of the Agent in this Article 10 (herein, the "Agent's Rights and Remedies") shall be cumulative and not exclusive of any rights or remedies which it would otherwise have. No delay or omission by the Agent in exercising or enforcing any of the Agent's Rights and Remedies shall operate as, or constitute, a waiver thereof. No waiver by the Agent of any Event of Default or of any default under any other agreement shall operate as a waiver of any other default hereunder or under any other agreement. No single or partial exercise of any of the Agent's Rights or Remedies, and no agreement or transaction of whatever nature entered into between the Agent or any Lender and the Borrower, at any time, either express or implied, shall preclude the other or further exercise of the Agent's Rights and Remedies. No waiver by the Agent of any of the Agent's rights and remedies on any one occasion shall be deemed a waiver on any subsequent occasion, nor shall it be deemed a continuing waiver. All of the Agent's Rights and Remedies and all of the Agent's rights, remedies, powers, privileges, and discretions under any other agreement or transaction are cumulative, and not alternative or exclusive, and may be exercised by the Agent at such time or times and in such order of preference as the Agent in its sole discretion may determine. The Agent's rights and remedies may be exercised without resort or regard to any other source of satisfaction of the Liabilities.

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ARTICLE 11 - NOTICES

All notices, demands and other communications made in respect of this Agreement shall be made to the following addresses, each of which may be changed upon seven (7) days written notice to all others given by certified mail, return receipt requested or by telecopier as follows:

If to the Agent: Brown Brothers Harriman & Co.

40 Water Street
Boston, Massachusetts 02109
Attention: Timothy T. Telman
Fax: (617) 772-1138

With a copy to: BankBoston, N.A.
100 Federal Street
Boston, Massachusetts 02110
Attention: Jeffrey Westling
Fax: (617) 434-4426

With a copy to: Riemer & Braunstein, LLP
Three Center Plaza
Boston, Massachusetts 02108
Attention: Charles W. Stavros, Esquire
Fax: (617) 723-6831

If to the Borrower: Harvard Apparatus, Inc.
84 October Hill Road
Holliston, Massachusetts 01746
Attention: Mr. David Green
Fax: (508) 429-5732

With a copy to: Goodwin, Procter & Hoar, LLP
Exchange Place
Boston, Massachusetts 02109
Attention: H. David Henken, Esquire
Fax: (617) 523-1231

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All notices and other correspondence to the Borrower by the Agent in connection with this Agreement shall be deemed effective upon receipt to the Borrower's address found at the beginning of this Agreement, which address may be changed on seven (7) days written notice given the Agent by the Borrower. All notices and other correspondence to the Agent by the Borrower in connection with this Agreement shall be deemed effective upon receipt by the Agent at the Agent's principal office, or elsewhere as the Agent may specify from time to time, and shall be sent by certified mail, return receipt requested.

ARTICLE 12 - TERM OF REVOLVING CREDIT

12-1. TERM. The Revolving Credit shall remain in full force and effect until the earlier of (i) January 29, 2002 or (ii) the occurrence of an Event of Default hereunder. The Borrower may also terminate the Revolving Credit by written notice to the Agent.

12-2. EFFECT OF TERMINATION. Upon the termination of Revolving Credit, the Borrower shall pay the Agent on behalf of the Lenders all of the then principal balance of the Master Notes and all accrued and unpaid interest thereon (whether or not then due). Following such payment, all provisions of this Agreement, other than those contained in Section 1 through Section 1-10, above, shall remain in full force and effect until all of the Borrower's Liabilities to the Lenders shall have been paid in full.

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ARTICLE 13 - GENERAL

13-1. SET OFF. Any and all deposits or other sums at any time due to the Borrower from, or credited to the Borrower by, the Agent, Lenders or any of their affiliated banks or institutions and any cash, securities, instruments, or other property of the Borrower in the possession of the Agent, Lenders or any of their affiliates, whether for safekeeping, or otherwise, or in transit to or from the Agent, Lenders or any of their affiliates or in the possession of any third party acting on the Agent's or Lender's behalf (regardless of the reason the Agent or Lender had received same or whether the Agent or Lender has conditionally released the same) shall at all times constitute security for any and all Liabilities, and may be applied or set off by the Agent or any Lender against such Liabilities upon or after the occurrence of and during the continuance of an Event of Default, whether or not other collateral is available to the Agent or any Lender.

13-2. WAIVERS. The Borrower makes the following waivers knowingly, voluntarily, and intentionally, and understands that the Agent and the Lenders, in the establishment and maintenance of the Agent's and the Lenders, relationship with the Borrower, is relying thereon.

(a) Except as expressly provided herein, the Borrower WAIVES notice of non-payment, demand, presentment, protest and all forms of demand and notice, both with respect to the Liabilities and the Collateral.

(b) The Borrower, if entitled to it, WAIVES the right to notice and/or hearing prior to the Agent's exercising of the Agent's rights upon default.

(c) THE BORROWER, AND THE AGENT AND EACH LENDER RESPECTIVELY TO THE EXTENT ENTITLED THERETO, WAIVE ANY PRESENT OR FUTURE RIGHT OF THE BORROWER, THE AGENT, ANY LENDER OR OF ANY GUARANTOR OR ENDORSER OF THE BORROWER OR OF ANY OTHER PERSON LIABLE TO THE AGENT OR ANY LENDER ON ACCOUNT OF OR IN RESPECT TO THE LIABILITIES, TO A TRIAL BY JURY IN ANY CASE OR CONTROVERSY IN WHICH THE AGENT OR ANY LENDER IS OR BECOMES A PARTY (WHETHER SUCH CASE OR CONTROVERSY IS INITIATED BY OR AGAINST THE AGENT OR ANY LENDER OR IN WHICH THE AGENT OR ANY LENDER IS JOINED AS A PARTY LITIGANT), WHICH CASE OR CONTROVERSY ARISES OUT OF, OR IS IN RESPECT TO, ANY RELATIONSHIP AMONGST OR BETWEEN THE BORROWER, ANY SUCH PERSON, AND THE AGENT OR ANY LENDER IN CONNECTION WITH CONTROVERSIES ARISING OUT OF THIS AGREEMENT.

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13-3. SUCCESSORS AND ASSIGNS. This Agreement shall be binding upon the Borrower and the Borrower's executors, administrators, successors, and assigns and shall enure to the benefit of the Agent and the Lenders and the successors and assigns of each. In the event that the Agent or any Lender assigns or transfers its rights under this Agreement, the assignee shall thereupon succeed to and become vested with all rights, powers, privileges, and duties of such assignor hereunder and such assignor shall thereupon be discharged and relieved from its duties and obligations hereunder.

13-4. SEVERABILITY. Any determination that any provision of this Agreement or any application thereof is invalid, illegal, or unenforceable in any respect in any instance shall not affect the validity, legality, or enforceability of such provision in any other instance, or the validity, legality, or enforceability of any other provision of this Agreement.

13-5. AMENDMENTS; COURSE OF DEALING. This Agreement and all other documents, instruments, and agreements executed in connection herewith incorporate all discussions and negotiations between the Borrower and the Agent and each Lender, either express or implied, concerning the matters included herein and in such other instruments, any custom, usage, or course of dealings to the contrary notwithstanding. No such discussions, negotiations custom, usage, or course of dealings shall limit, modify, or otherwise affect the provisions hereof. No modification, amendment, or waiver of any provision of this Agreement or of any provision of any other agreement between the Borrower and the Agent or any Lender is effective unless executed in writing by the party to be charged with such modification, amendment and waiver, and if such party be the Agent or any Lender, then by a duly authorized officer thereof. No failure by the Agent or any Lender to give notice to the Borrower of the Borrower's having failed to observe and comply with any warranty or covenant included herein shall constitute a waiver of such warranty or covenant or the amendment of the within Agreement. No change made by the Agent in the manner by which Availability is determined (any of which changes may be made by the Agent in its discretion) shall obligate the Agent to continue to determine Availability in that manner.

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13-6. APPLICATION OF PROCEEDS. The proceeds of any collection, sale, or disposition of the Collateral, or of any other payments received hereunder, shall be applied toward the Liabilities in such order and manner as the Agent determines in its sole discretion, any statute, custom, or usage to the contrary notwithstanding. The Borrower shall remain liable for any deficiency remaining following such application.

13-7. COSTS AND EXPENSES OF AGENT AND LENDERS. The Borrower shall pay

on demand all Costs of Collection and all reasonable expenses of the Agent and Lenders in connection with the preparation, execution, and delivery of this Agreement and of any other documents and agreements between the Borrower and the Agent and the Lenders, whether now existing or hereafter arising, and all other reasonable expenses which may be incurred by the Agent in preparing or amending this Agreement and all other agreements, instruments, and documents related thereto. The Borrower specifically authorizes the Agent to pay all such fees and expenses and at the Agent's discretion, to add such fees and expenses to the Liabilities or to charge the same to any account of the Borrower with the Agent (with prompt notice by the Agent after the charging of any such account).

13-8. COPIES. This Agreement and all documents which relate thereto, which have been or may be hereinafter furnished the Agent may be reproduced by the Agent by any photographic, photostatic, microfilm, micro-card, miniature photographic, xerographic, or similar process, and the Agent may destroy any document so reproduced. Any such reproduction shall be admissible in evidence as the original itself in any judicial or administrative proceeding (whether or not the original is in existence and whether or not such reproduction was made in the regular course of business).

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13-9. MASSACHUSETTS LAW. This Agreement and all rights and obligations hereunder, including matters of construction, validity, and performance, shall be governed by the laws of The Commonwealth of Massachusetts. The Borrower submits itself to the jurisdiction of the Courts of said Commonwealth for all purposes with respect to this Agreement and the Borrower's relationship with the Agent and the Lenders.

13-10. INDEMNIFICATION. The Borrower shall indemnify, defend, and hold the Agent and each Lender harmless of and from any claim brought or threatened against the Agent and each Lender by the Borrower, any guarantor or endorser of the Liabilities, or any other person (as well as from attorneys, reasonable fees and expenses in connection therewith) on account of the Agent's and each Lender's relationship with the Borrower or any other guarantor or endorser of the Liabilities (each of which may be defended, compromised, settled, or pursued by the Lender with counsel of the Lender's selection, but at the expense of the Borrower), except if a court of competent jurisdiction, after all appeal periods have expired, finds that such claim arose from Agent's or Lender's bad faith, intentional misconduct, or gross negligence. The within indemnification shall survive payment of the Liabilities and/or any termination, release, or discharge executed by the Agent or Lenders in favor of the Borrower.

13-11. SPECIFIC PERFORMANCE. The failure by the Borrower to perform all and singular the Borrower's obligations hereunder will result in irreparable harm to the Agent and the Lenders for which the Agent and the Lenders will have no adequate remedy at law. Consequently, such obligations are specifically enforceable by the Agent and the Lenders.

13-12. TITLES. Underlined titles to sections have been included for convenience and are not part of the within Agreement.

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13-13. INTENT. It is intended that

- (a) this Agreement take effect as a sealed instrument;
- (b) the security interests created by this Agreement attach to all of the Borrower's assets described in Article 3, now owned or hereafter acquired and that the scope of the coverage thereof be broadly construed in favor of the Agent for the benefit of the Lenders;
- (c) the security interests created by this Agreement secure all Liabilities of the Borrower to the Lenders, whether now existing or hereafter arising; and
- (d) the Agent's consent to any action of the Borrower which is prohibited unless such consent is given may be given or refused by the Agent in its sole and absolute discretion.

13-15. RECEIPT OF AGREEMENT. The Borrower acknowledges receipt of a completed copy of this Agreement.

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ATTEST:

Harvard Apparatus, Inc.
(Borrower)

By /s/ David Green

Print Name: David Green

Title: President

Brown Brothers Harriman & Co.
(Agent)

By /s/ Timothy T. Telman

Print Name: Timothy T. Telman

Title: Deputy Manager

Brown Brothers Harriman & Co.
(Lender)

By /s/ Timothy T. Telman

Print Name: Timothy T. Telman

Title: Deputy Manager

BankBoston, N.A.
(Lender)

By /s/ Jeffrey R. Westling

Print Name: Jeffrey R. Westling

Title: Director

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EXHIBITS

The following Exhibits to this Loan and Security Agreement are respectively described in the section indicated.

EXHIBIT 1-7:	Master Note	Section 1-7
EXHIBIT 2-1:	Term Notes	Section 2-1
EXHIBIT 5-7:	Assignment of Intercompany Note and Security Documents	Section 5-7
EXHIBIT 5-10:	Tranche B Loan Agreement	Section 5-10
EXHIBIT 6-2:	Related Entity	Section 6-2(b)
EXHIBIT 6-4:	Trade Names; legal status; etc.	Section 6-4
EXHIBIT 6-5:	Locations	Section 6-5
EXHIBIT 6-6:	Security Interests	Section 6-6

EXHIBIT 6-7:	Indebtedness	Section 6-7
EXHIBIT 6-8:	Insurance Policies	Section 6-8
EXHIBIT 6-9:	Licenses, Distributor Franchise Agreements	Section 6-9
EXHIBIT 6-17:	Litigation	Section 6-17
EXHIBIT 6-20:	Government Contracts	Section 6-20
EXHIBIT 6-21:	Patents, Trademarks	Section 6-21
EXHIBIT 6-24:	Payments to Related Parties	Section 6-24

Exhibit 1-7

MASTER NOTE-\$1,875,000.00

BANKBOSTON, N.A.

Boston, Massachusetts

Date: March 2, 1999

FOR VALUE RECEIVED, the undersigned, Harvard Apparatus, Inc., a Massachusetts corporation with offices at 84 October Hill Road, Holliston, Massachusetts, promises to pay to the order of BankBoston, N.A. with its principal office at 100 Federal Street, Boston, Massachusetts (hereinafter, with any subsequent holder, the "Bank") at the office of Brown Brothers Harriman & Co. (the "Agent") located at 40 Water Street, Boston, Massachusetts, pursuant to the Loan Agreement (as defined below), the principal balance of loans and advances made by the Bank to the Borrower pursuant to the revolving credit facility in the maximum face amount of One Million Eight Hundred Seventy Five Thousand (\$1,875,000.00) Dollars established pursuant to the Amended and Restated Loan and Security Agreement of even date (as such may be further amended hereafter, the "Loan Agreement"), with interest at the rate and payable in the manner stated therein.

The revolving credit facility shall remain in full force and effect until the earlier of (i) termination of the revolving credit facility by the Agent in accordance with the terms and conditions of the Loan Agreement or (ii) January 29, 2002. Upon such termination, the Borrower shall pay to the Agent the entire principal balance of this Master Note and all accrued and unpaid interest thereon (whether or not then due).

The Agent's books and records concerning the Bank's loans and advances to the Borrower, the accrual of interest thereon, and the repayment of such loans and advances, shall be prima facie evidence of the Borrower's indebtedness to the Bank hereunder. The within Note shall not be necessary to establish the indebtedness of the Borrower to the Bank on account of such loans and advances.

Any and all deposits or other sums at any time credited by or due to the Borrower from the Bank or any of its banking or lending affiliates and any cash, securities, instruments, or other property of the Borrower in the possession of the Bank, or any of its banking or lending affiliates, whether for safekeeping, or otherwise, or in transit to or from the Bank or any of its banking or lending affiliates or in the possession of any third party acting on the Bank's behalf (regardless of the reason the Bank had received same or whether the Bank has conditionally released the same) shall at all times constitute security for any and all Liabilities, and may be applied or set off against such Liabilities upon or after the occurrence of an Event of Default under the Loan Agreement, whether or not other collateral is available to the Bank.

No delay or omission by the Agent in exercising or enforcing any of the Agent's powers, rights, privileges, remedies, or discretions hereunder shall operate as a waiver thereof on that occasion nor on any other

occasion. No waiver of any default hereunder shall operate as a waiver of any other default hereunder, nor as a continuing waiver.

The Borrower, and each endorser and guarantor of this Note, shall indemnify, defend, and hold the Bank harmless against any claim brought or threatened against the Bank by the Borrower (other than a claim which is finally judicially determined against the Bank), by any endorser or guarantor, or by any other person (as well as from attorneys reasonable fees and expenses in connection therewith) on account of the Bank's relationship with the Borrower or any endorser or guarantor hereof (each of which may be defended, compromised, settled or pursued by the Bank with counsel of the Bank's selection, but at the expense of the Borrower and any endorser and/or guarantor).

The Borrower will pay on demand all attorneys' reasonable fees and out-of-pocket expenses incurred by the Bank in the administration of all Liabilities (as defined in the Loan Agreement) and obligations of the Borrower to the Bank, including, without limitation, costs and expenses associated with travel on behalf of the Bank. The Borrower will also pay on demand, without limitation, all attorneys' reasonable fees, out-of-pocket expenses incurred by the Bank's attorneys and all costs incurred by the Bank, including, without limitation, costs and expenses associated with travel on behalf of the Bank, which costs and expenses are directly or indirectly related to the protection or enforcement of any of the Bank's rights against the Borrower or any such endorser or guarantor and against any collateral given the Bank to secure this Note or any other Liabilities of the Borrower or such endorser and guarantor to the Bank (whether or not suit is instituted by or against the Bank).

The Borrower, and each endorser and guarantor of this Note, respectively waives presentment, demand, notice, and protest, and also waives any delay on the part of the holder hereof. Each assents to any extension or other indulgence (including, without limitation, the release or substitution of collateral) permitted the Borrower or any endorser or guarantor by the Bank with respect to this Note and/or any collateral given to secure this Note or any extension or other indulgence, as described above, with respect to any other liability or any collateral given to secure any other liability of the Borrower or any endorser or guarantor to the Bank.

This Note shall be binding upon the Borrower and each endorser and guarantor hereof and upon their respective heirs, successors, and assigns and shall inure to the benefit of the Bank and its successors, endorsees, and assigns.

The liabilities of the Borrower and any endorser or guarantor of this Note are joint and several; provided, however, the release by the Bank of the Borrower or any one or more endorser or guarantor shall not release any other person obligated on account of this Note. Each reference in this Note to the Borrower, any endorser, and any guarantor, is to such person individually and also to all such persons jointly. No person obligated on account of this Note may seek contribution from any other person also obligated unless and until all liabilities, obligations

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and indebtedness to the Bank of the person from whom contribution is sought have been satisfied in full.

This Note is delivered to the Agent for the benefit of the Bank at one of its offices in Massachusetts, shall be governed by the laws of The Commonwealth of Massachusetts, and shall take effect as a sealed instrument. The Borrower and each endorser and guarantor of this Note each submits to the jurisdiction of the courts of The Commonwealth of Massachusetts for all purposes with respect to this Note, any collateral given to secure their respective liabilities, obligations and indebtedness to the Bank, and their respective relationships with the Bank.

The undersigned makes the following waiver knowingly, voluntarily, and intentionally, and understands that the Bank, in the establishment and maintenance of the Bank's relationship with the Borrower contemplated by the within Note, is relying thereon. THE UNDERSIGNED, TO THE EXTENT ENTITLED THERETO, WAIVES ANY PRESENT OR FUTURE RIGHT OF THE UNDERSIGNED, OR OF ANY GUARANTOR OR ENDORSER OF THE UNDERSIGNED OR OF ANY OTHER PERSON LIABLE TO THE BANK ON ACCOUNT OF OR IN RESPECT TO THE LIABILITIES, TO A TRIAL BY JURY IN ANY

CASE OR CONTROVERSY IN WHICH THE BANK IS OR BECOMES A PARTY (WHETHER SUCH CASE OR CONTROVERSY IS INITIATED BY OR AGAINST THE BANK OR IN WHICH THE BANK IS JOINED AS A PARTY LITIGANT), WHICH CASE OR CONTROVERSY ARISES OUT OF, OR IS IN RESPECT TO, ANY RELATIONSHIP AMONGST OR BETWEEN THE UNDERSIGNED, ANY SUCH PERSON, AND THE BANK IN CONNECTION WITH CONTROVERSIES ARISING OUT OF THE LOAN ARRANGEMENT CONTEMPLATED BY THE LOAN AGREEMENT.

The Borrower has read all of the terms and conditions of this Note and acknowledges receipt of an exact copy of it.

WITNESS Harvard Apparatus, Inc.

Signed in my Presence

By: /s/ David Green

Name:

Print Name:

Title: President

Exhibit 2-1

COMMERCIAL PROMISSORY NOTE

\$1,050,000.00

Boston, Massachusetts
March 2, 1999

FOR VALUE RECEIVED, the undersigned promises to pay to the order of BROWN BROTHERS HARRIMAN & CO. (together with any successors or assigns, the "Bank") at the office of the Bank located at 40 Water Street, Boston, Massachusetts ONE MILLION FIFTY THOUSAND and 00/100 Dollars (\$1,050,000.00) as provided below:

In quarterly principal installments of (a) \$23,875.00 each payable on May 1, 1999, August 1, 1999, November 1, 1999 and February 1, 2000, (b) \$35,813.00 each payable on May 1, 2000, August 1, 2000, November 1, 2000, and February 1, 2001, (c) \$47,750.00 each payable on May 1, 2001, August 1, 2001, November 1, 2001, and a final principal installment of the entire remaining principal balance on January 29, 2002;

with interest thereon calculated at a floating rate equal to 1% above the Base Rate per annum.

Interest shall be payable quarterly in arrears commencing on May 1, 1999 and on each August 1, November 1, and February 1 thereafter and on the date the final principal installment under this Note becomes due or the entire amount of this Note becomes due and payable in full (whether by acceleration or otherwise). If this Note bears interest at a floating rate, the applicable floating rate shall change as and when the Base Rate changes. Interest shall be calculated on the basis of a 360-day year for the actual number of days elapsed including holidays and days on which the Bank is not open for the conduct of banking business.

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SECTION 1. PAYMENT TERMS.

1.1 PAYMENTS; PREPAYMENTS. All payments hereunder shall be made by the undersigned to the Bank in United States currency at the Bank's address specified above (or at such other address as the Bank may specify), in immediately available funds, on or before 2:00 p.m. (Boston, Massachusetts time) on the due date thereof. Payments received by the Bank prior to the occurrence of an Event of Default will be applied FIRST to fees, expenses and other amounts due hereunder (excluding principal and interest); SECOND, to accrued interest; and THIRD to outstanding principal. After the occurrence of an Event of Default payments will be applied to the Obligations under this Note as the Bank

determines in its sole discretion. The undersigned may pay all or a portion of the amount owed earlier than it is due without penalty. If this Note is payable in installments, prepayments shall be applied to installments of principal in the inverse order of the date on which they become due. Amounts prepaid may not be reborrowed.

1.2 (Intentionally omitted.)

1.3 DEFAULT RATE. To the extent permitted by applicable law, upon and after the occurrence of an Event of Default (whether or not the Bank has accelerated payment of this Note), interest on principal and overdue interest shall, at the option of the Bank, be payable on demand at a rate per annum (the "Default Rate") equal to 2% per annum above the rate of interest otherwise payable hereunder.

SECTION 2. DEFAULTS AND REMEDIES.

2.1 DEFAULT. The occurrence of any Event of Default as defined in a certain Amended and Restated Loan and Security Agreement of even date entered into by and between, among others, the undersigned and the Agent (as may be further amended, the "Loan Agreement").

2.2 REMEDIES. Upon an Event of Default, or at any time thereafter, at the option of the Bank, all Obligations of the undersigned shall become immediately due and payable without notice or demand and, if the Obligations are secured, the Bank shall then have in any jurisdiction where enforcement hereof is sought, in addition to all other rights and remedies provided by agreement or at law or in equity, the rights and remedies of a secured party under the Uniform Commercial Code of Massachusetts. All rights and remedies of the Bank are cumulative and are exclusive of any rights or remedies provided by law or any other agreement, and may be exercised separately or concurrently.

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SECTION 3. DEFINITIONS.

For purposes of this Note, the following definitions shall apply:

"Agent" shall mean Brown Brothers Harriman & Co., a New York limited partnership;

"Base Rate" shall have the meaning set forth in the Loan Agreement;

"Obligation" means any obligation hereunder or otherwise of any Obligor to the Bank or to any of its affiliates, whether direct or indirect, absolute or contingent, due or to become due, now existing or hereafter arising including, without limitation, any Liabilities as defined in the Loan Agreement; and

"Obligor" means the undersigned, any guarantor or any other person primarily or secondarily liable hereunder or in respect hereof, including any person or entity who has pledged or granted to the Bank a security interest or other lien in property on behalf of the undersigned to constitute collateral for the Obligations.

SECTION 4. MISCELLANEOUS.

4.1 WAIVER, AMENDMENT. No delay or omission on the part of the Bank in exercising any right hereunder shall operate as a waiver of such right or of any other right under this Note. No waiver of any right or amendment hereto shall be effective unless in writing and signed by the Bank nor shall a waiver on one occasion be construed as a bar to or waiver of any such right on any future occasion. Each Obligor waives presentment, demand, notice, protest, and all other demands and notices in connection with the delivery, acceptance, performance, default or enforcement of this Note or of any collateral for the Obligations, and assents to any extensions or postponements of the time of payment or any and all other indulgences under this Note or with respect to any such collateral, to any and all substitutions, exchanges or releases of any such collateral, or to any and all additions or releases of any other parties or persons primarily or secondarily liable hereunder, which from time to time be granted by the Bank in connection herewith regardless of the number or period of any extensions.

4.2 SECURITY; SET-OFF. The undersigned grants to the Bank, as security

for the full and punctual payment and performance of the Obligations, a continuing lien on and security interest in all securities or other property belonging to the undersigned now or hereafter held by the Bank and in all deposits (general or special, time or demand, provisional or final) and other sums credited by or due from the Bank to the undersigned or subject to withdrawal by the undersigned; and regardless of the adequacy of

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any collateral or other means of obtaining repayment of the Obligations, the Bank is hereby authorized at any time and from time to time, after the occurrence and during the continuation of an Event of Default without notice to the undersigned (any such notice being expressly waived by the undersigned) and to the fullest extent permitted by law, to set off and apply such deposits and other sums against the Obligations of the undersigned, whether or not the Bank shall have made any demand under this Note and although such Obligations may be contingent or unmatured.

4.3 TAXES. The undersigned agrees to indemnify the Bank from and hold it harmless from and against any transfer taxes, documentary taxes, assessments or charges made by any governmental authority by reason of the execution, delivery, and performance of this Note and any collateral for the Obligations.

4.4 EXPENSES. The undersigned will pay on demand all expenses of the Bank in connection with the preparation, default, collection or enforcement of this Note or any collateral for the Obligations, or any waiver or amendment of any provision of any of the foregoing, including, without limitation, reasonable attorneys fees of outside legal counsel, and including without limitation any reasonable fees or expenses associated with any travel or other costs relating to any appraisals, examinations, administration of the Obligations or any collateral therefor, and the amount of all such expenses shall be an Obligation secured by any such collateral.

4.5 BANK RECORDS. The entries on the records of the Bank (including any appearing on this Note) shall be prima facie evidence of the aggregate principal amount outstanding under this Note and interest accrued thereon.

4.6 FINANCIAL INFORMATION. The undersigned shall furnish the Bank from time to time with such financial statements and other information relating to any Obligor or any collateral securing this Note as and to the extent provided in the Loan Agreement.

4.7 GOVERNING LAW, CONSENT TO JURISDICTION. This Note is intended to take effect as a sealed instrument and shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts, without regard to its conflicts of laws rules. The undersigned agrees that any suit for the enforcement of this Note may be brought in the courts of The Commonwealth of Massachusetts or any Federal Court sitting in such Commonwealth and consents to the non-exclusive jurisdiction of each such court and to service of process in any such suit being made upon the undersigned by mail at the address specified below. The undersigned hereby waives any objection that it may now or hereafter have to the venue of any such suit or any such court or that such suit was brought in an inconvenient court.

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4.8 SEVERABILITY; AUTHORIZATION TO COMPLETE; PARAGRAPH HEADINGS. If any provision of this Note shall be invalid, illegal or unenforceable, such provisions shall be severable from the remainder of this Note and the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby. The Bank is hereby authorized, without further notice, to fill in any blank spaces on this Note, and to date this Note as of the date funds are first advanced hereunder. Paragraph headings are for the convenience of reference only and are not a part of this Note and shall not affect its interpretation.

4.9 JURY WAIVER. THE BANK (BY ITS ACCEPTANCE OF THIS NOTE) AND THE UNDERSIGNED AGREE THAT NEITHER OF THEM, INCLUDING ANY ASSIGNEE OR SUCCESSOR SHALL SEEK A JURY TRIAL IN ANY LAWSUIT, PROCEEDING, COUNTERCLAIM, OR ANY OTHER LITIGATION PROCEDURE BASED UPON, OR ARISING OUT OF, THIS NOTE, ANY RELATED INSTRUMENTS, ANY COLLATERAL OR THE DEALINGS OR THE RELATIONSHIP BETWEEN OR AMONG

ANY OF THEM. NEITHER THE BANK NOR THE UNDERSIGNED SHALL SEEK TO CONSOLIDATE ANY SUCH ACTION WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED. THE PROVISIONS OF THIS PARAGRAPH HAVE BEEN FULLY DISCUSSED BY THE BANK AND THE UNDERSIGNED, AND THESE PROVISIONS SHALL BE SUBJECT TO NO EXCEPTIONS. NEITHER THE BANK NOR THE UNDERSIGNED HAS AGREED WITH OR REPRESENTED TO THE OTHER THAT THE PROVISIONS OF THIS PARAGRAPH WILL NOT BE FULLY ENFORCED IN ALL INSTANCES.

HARVARD APPARATUS, INC.

Witness:

By: /s/ David Green

Title: President

Address:

84 October Hill Rd.
Holliston, MA

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Exhibit 2-1

COMMERCIAL PROMISSORY NOTE

\$1,050,000.00

Boston, Massachusetts
March 2, 1999

FOR VALUE RECEIVED, the undersigned promises to pay to the order of BANKBOSTON, N.A. (together with any successors or assigns, the "Bank") at the office of Brown Brothers Harriman & Co. (the "Agent") located at 40 Water Street, Boston, Massachusetts pursuant to the Loan Agreement (defined below) ONE MILLION FIFTY THOUSAND and 00/100 Dollars (\$1,050,000.00) as provided below:

In quarterly principal installments of (a) \$23,875.00 each payable on May 1, 1999, August 1, 1999, November 1, 1999 and February 1, 2000, (b) \$35,813.00 each payable on May 1, 2000, August 1, 2000, November 1, 2000, and February 1, 2001, (c) \$47,750.00 each payable on May 1, 2001, August 1, 2001, November 1, 2001, and a final principal installment of the entire remaining principal balance on January 29, 2002;

with interest thereon calculated at a floating rate equal to 1% above the Base Rate per annum.

Interest shall be payable quarterly in arrears commencing on May 1, 1999 and on each August 1, November 1, and February 1 thereafter and on the date the final principal installment under this Note becomes due or the entire amount of this Note becomes due and payable in full (whether by acceleration or otherwise). If this Note bears interest at a floating rate, the applicable floating rate shall change as and when the Base Rate changes. Interest shall be calculated on the basis of a 360-day year for the actual number of days elapsed including holidays and days on which the Bank is not open for the conduct of banking business.

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SECTION 1. PAYMENT TERMS.

1.1 PAYMENTS; PREPAYMENTS. All payments hereunder shall be made by the undersigned to the Agent in United States currency at the Agent's address specified above (or at such other address as the Agent may specify), in immediately available funds, on or before 2:00 p.m. (Boston, Massachusetts time) on the due date thereof. Payments received by the Agent prior to the occurrence of an Event of Default will be applied FIRST to fees, expenses and other amounts due hereunder (excluding principal and interest); SECOND, to accrued interest;

and THIRD to outstanding principal. After the occurrence of an Event of Default payments will be applied to the Obligations under this Note as the Agent determines in its sole discretion. The undersigned may pay all or a portion of the amount owed earlier than it is due without penalty. If this Note is payable in installments, prepayments shall be applied to installments of principal in the inverse order of the date on which they become due. Amounts prepaid may not be reborrowed.

1.2 (Intentionally omitted.)

1.3 DEFAULT RATE. To the extent permitted by applicable law, upon and after the occurrence of an Event of Default (whether or not the Bank has accelerated payment of this Note), interest on principal and overdue interest shall, at the option of the Agent, be payable on demand at a rate per annum (the "Default Rate") equal to 2% per annum above the rate of interest otherwise payable hereunder.

SECTION 2. DEFAULTS AND REMEDIES.

2.1 DEFAULT. The occurrence of any Event of Default as defined in a certain Amended and Restated Loan and Security Agreement of even date entered into by and between, among others, the undersigned and the Agent (as may be further amended, the "Loan Agreement").

2.2 REMEDIES. Upon an Event of Default, or at any time thereafter, at the option of the Agent, all Obligations of the undersigned shall become immediately due and payable without notice or demand and, if the Obligations are secured, the Agent shall then have in any jurisdiction where enforcement hereof is sought, in addition to all other rights and remedies provided by agreement or at law or in equity, the rights and remedies of a secured party under the Uniform Commercial Code of Massachusetts. All rights and remedies of the Agent are cumulative and are exclusive of any rights or remedies provided by law or any other agreement, and may be exercised separately or concurrently.

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SECTION 3. DEFINITIONS.

For purposes of this Note, the following definitions shall apply:

"Agent" shall mean Brown Brothers Harriman & Co., a New York limited partnership;

"Base Rate" shall have the meaning set forth in the Loan Agreement;

"Obligation" means any obligation hereunder or otherwise of any Obligor to the Bank or to any of its affiliates, whether direct or indirect, absolute or contingent, due or to become due, now existing or hereafter arising including, without limitation, any Liabilities as defined in the Loan Agreement; and

"Obligor" means the undersigned, any guarantor or any other person primarily or secondarily liable hereunder or in respect hereof, including any person or entity who has pledged or granted to the Agent a security interest or other lien in property on behalf of the undersigned to constitute collateral for the Obligations.

SECTION 4. MISCELLANEOUS.

4.1 WAIVER, AMENDMENT. No delay or omission on the part of the Agent in exercising any right hereunder shall operate as a waiver of such right or of any other right under this Note. No waiver of any right or amendment hereto shall be effective unless in writing and signed by the Agent nor shall a waiver on one occasion be construed as a bar to or waiver of any such right on any future occasion. Each Obligor waives presentment, demand, notice, protest, and all other demands and notices in connection with the delivery, acceptance, performance, default or enforcement of this Note or of any collateral for the Obligations, and assents to any extensions or postponements of the time of payment or any and all other indulgences under this Note or with respect to any such collateral, to any and all substitutions, exchanges or releases of any such collateral, or to any and all additions or releases of any other parties or persons primarily or secondarily liable hereunder, which from time to time be granted by the Agent in connection herewith regardless of the number or period of any extensions.

4.2 SECURITY; SET-OFF. The undersigned grants to the Bank, as security for the full and punctual payment and performance of the Obligations, a continuing lien on and security interest in all securities or other property belonging to the undersigned now or hereafter held by the Bank and in all deposits (general or special, time or demand, provisional or final) and other sums credited by or due from the Bank to the undersigned or subject to withdrawal by the undersigned; and regardless of the adequacy of

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any collateral or other means of obtaining repayment of the Obligations, the Bank is hereby authorized at any time and from time to time, after the occurrence and during the continuation of an Event of Default without notice to the undersigned (any such notice being expressly waived by the undersigned) and to the fullest extent permitted by law, to set off and apply such deposits and other sums against the Obligations of the undersigned, whether or not the Agent shall have made any demand under this Note and although such Obligations may be contingent or unmatured.

4.3 TAXES. The undersigned agrees to indemnify the Bank from and hold it harmless from and against any transfer taxes, documentary taxes, assessments or charges made by any governmental authority by reason of the execution, delivery, and performance of this Note and any collateral for the Obligations.

4.4 EXPENSES. The undersigned will pay on demand all expenses of the Bank in connection with the preparation, default, collection or enforcement of this Note or any collateral for the Obligations, or any waiver or amendment of any provision of any of the foregoing, including, without limitation, reasonable attorneys fees of outside legal counsel, and including without limitation any reasonable fees or expenses associated with any travel or other costs relating to any appraisals, examinations, administration of the Obligations or any collateral therefor, and the amount of all such expenses shall be an Obligation secured by any such collateral.

4.5 AGENT RECORDS. The entries on the records of the Agent (including any appearing on this Note) shall be prima facie evidence of the aggregate principal amount outstanding under this Note and interest accrued thereon.

4.6 FINANCIAL INFORMATION. The undersigned shall furnish the Agent from time to time with such financial statements and other information relating to any Obligor or any collateral securing this Note as and to the extent provided in the Loan Agreement.

4.7 GOVERNING LAW, CONSENT TO JURISDICTION. This Note is intended to take effect as a sealed instrument and shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts, without regard to its conflicts of laws rules. The undersigned agrees that any suit for the enforcement of this Note may be brought in the courts of The Commonwealth of Massachusetts or any Federal Court sitting in such Commonwealth and consents to the non-exclusive jurisdiction of each such court and to service of process in any such suit being made upon the undersigned by mail at the address specified below. The undersigned hereby waives any objection that it may now or hereafter have to the venue of any such suit or any such court or that such suit was brought in an inconvenient court.

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4.8 SEVERABILITY; AUTHORIZATION TO COMPLETE; PARAGRAPH HEADINGS. If any provision of this Note shall be invalid, illegal or unenforceable, such provisions shall be severable from the remainder of this Note and the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby. The Bank is hereby authorized, without further notice, to fill in any blank spaces on this Note, and to date this Note as of the date funds are first advanced hereunder. Paragraph headings are for the convenience of reference only and are not a part of this Note and shall not affect its interpretation.

4.9 JURY WAIVER. THE BANK (BY ITS ACCEPTANCE OF THIS NOTE) AND THE UNDERSIGNED AGREE THAT NEITHER OF THEM, INCLUDING ANY ASSIGNEE OR SUCCESSOR SHALL SEEK A JURY TRIAL IN ANY LAWSUIT, PROCEEDING, COUNTERCLAIM, OR ANY OTHER LITIGATION PROCEDURE BASED UPON, OR ARISING OUT OF, THIS NOTE, ANY RELATED

INSTRUMENTS, ANY COLLATERAL OR THE DEALINGS OR THE RELATIONSHIP BETWEEN OR AMONG ANY OF THEM. NEITHER THE BANK NOR THE UNDERSIGNED SHALL SEEK TO CONSOLIDATE ANY SUCH ACTION WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED. THE PROVISIONS OF THIS PARAGRAPH HAVE BEEN FULLY DISCUSSED BY THE BANK AND THE UNDERSIGNED, AND THESE PROVISIONS SHALL BE SUBJECT TO NO EXCEPTIONS. NEITHER THE BANK NOR THE UNDERSIGNED HAS AGREED WITH OR REPRESENTED TO THE OTHER THAT THE PROVISIONS OF THIS PARAGRAPH WILL NOT BE FULLY ENFORCED IN ALL INSTANCES.

HARVARD APPARATUS, INC.

Witness:

By: /s/ David Green

Title: President

Address:

84 October Hill Rd.
Holliston, MA

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Exhibit 5-7(a) and (b)

ASSIGNMENT OF CONTRACTS
AND ASSUMPTION OF LIABILITIES AGREEMENT

This Agreement is made March 2, 1999 by and between Pharmacia Biotech (Biochrom) Limited, a limited liability company incorporated in England with registered number 974213, whose registered office is at Unit 22 Phase I Cambridge Science Park, Milton Road, Cambridge England CB4 4FJ ("Seller") and Biochrom Limited, a limited liability company incorporated in England with registered number 3526954, whose registered office is at Unit 22 Phase I Cambridge Science Park, Milton Road, Cambridge England CB4 4FJ ("Buyer").

WITNESSETH:

WHEREAS, the Seller now carries on and has for some years past been carrying on as the legal and beneficial owner of the business of manufacturing, designing, developing and selling products, including without limitation, spectrophotometers and amino acid analyzers and related accessories, chemicals, service, software and spare parts (the "Business");

WHEREAS, pursuant to the terms of an Asset Purchase Agreement dated March 2, 1999 (the "Purchase Agreement"), by and between Seller, Pharmacia & Upjohn, Inc., a Delaware corporation, Buyer and Harvard Apparatus, Inc., a Massachusetts corporation, Buyer has agreed to purchase from Seller, and Seller has agreed to sell to Buyer, the Business and Subject Assets (all terms used herein and not defined shall have the meaning set forth in the Purchase Agreement); and

WHEREAS, Seller is a party to those contracts and agreements described in Section 3.11 of the Asset Purchase Agreement (the "Assumed Contracts") and desires to transfer and assign to Buyer all of Seller's rights under and interest in and to the Assumed Contracts.

NOW, THEREFORE, in consideration of the execution and delivery of the Purchase Agreement, and of the mutual covenants contained therein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

1. Seller hereby transfers, assigns and sets over to Buyer free from all claims, charges, liens, encumbrances, equities and adverse rights of any description together with all rights now or hereafter attaching to them:

- 1.1 all the Goodwill of the Seller in connection with the Business and the exclusive right of the Buyer and its successors and assigns to represent itself as carrying on the Business in succession to the Seller; and

1.2 the full benefit of all of Seller's rights under and interest in and to the Assumed Contracts (so far in each case as the Seller can assign the same) subject to terms, covenants and other conditions thereof

to hold the same unto the Buyer absolutely.

2. Buyer hereby assumes from and after the Closing the Assumed Liabilities and all obligations arising or coming due under the Assumed Contracts in accordance with and pursuant to the terms of the Purchase Agreement. Except for the Assumed Liabilities and the obligations under the Assumed Contracts, as provided in the Asset Purchase Agreement, Buyer shall not assume or be bound by any obligations or liabilities of Seller or any affiliate of Seller of any kind or nature, known, unknown, accrued, absolute, contingent or otherwise, whether now existing or hereafter arising.

3. This Agreement, the representations, warranties and covenants hereunder and any sum which may become due by either Buyer or Seller hereunder are subject to all the terms, representations, warranties, covenants, indemnities and conditions contained in the Purchase Agreement.

4. The Seller hereby covenants with the Buyer that the Seller shall, at all times after the date of this Agreement, do all acts and execute all documents as may be reasonably necessary or desirable to secure to the Buyer the full benefit of the interest, connection and custom of the Seller in the Business hitherto carried on by it free from all claims, charges, liens, encumbrances, equities and any adverse rights of any description.

5. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same document.

6. This Agreement shall be construed under and governed by the internal laws of the State of New York without regard to its conflict of laws provisions. The preceding notwithstanding, the parties acknowledge that Seller's Business is situated in England and Wales and that, accordingly, the laws of England and Wales of a mandatory nature may apply to certain matters. To the extent necessary to give effect to the transfers and assignments hereunder under English law, the parties agree that this Agreement is also executed as a deed and that it is delivered upon dating it.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

PHARMACIA BIOTECH (BIOCHROM) LIMITED

By: /s/ J.G. Lee
[second signatory not legible]

Name: J.G. Lee
Title: Director

BIOCHROM LIMITED

By: /s/ David Green

Name: David Green
Title: Director

Signed as a deed by)
PHARMACIA BIOTECH)
(BIOCHROM) LIMITED)
acting by:)

[signature not legible]

Director

Director/Secretary

Signed as a deed by)
BIOCHROM LIMITED)

/s/ David Green

acting by:

)

Director
/s/ Chane Graziano

Director/Secretary

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SCHEDULE 6.2

RELATED ENTITIES

Ealing Scientific LTD.
D/B/A Harvard Apparatus Canada
6010 Vanden Abeele
Saint-Laurent Quebec H4S-1R9
Canada

Harvard Apparatus S.A.R.L.
6 avenue des Andes
Minipare Bat 8
91952 LES ULIS CEDEX
France

Harvard Apparatus LTD.
Fircroft Way
Edenbridge Kent TN8 68E
England

Biochrom Limited
Cambridge Science Park
Milton Road
Cambridge CB4 4FJ
England

SCHEDULE 6.4

TRADE NAMES

i. Trade Names & Styles

Harvard Apparatus Inc.
HAI Acquisition Corp.
Guell LTD.
Harvard Apparatus LTD.
Ealing Scientific LTD.
Harvard Apparatus Canada
Harvard Apparatus S.A.R.L.
Harvard Biosciences

ii. Legal Names & Statuses

Harvard Apparatus Inc.
HAI Acquisition Corp.
Guell LTD.
Harvard Apparatus LTD.
Ealing Scientific LTD.
Harvard Apparatus S.A.R.L.

iii. Entities/Parties From Whom Borrower Acquired Assets

Welsh & Bailey Inc.
formerly Harvard Apparatus Inc.
Medical Systems Corporation of Greenvale New York

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SCHEDULE 6.5

LOCATIONS OF COLLATERAL

The following collateral are kept at other than the offices of the Borrower:

A. Original Stock Certificates:

Ealing Scientific LTD 17,500 shares
Harvard Apparatus LTD 35 shares
Biochrom Limited [___] shares

B. Key Man Life Insurance Policies:

\$1m On Chane Graziano #00634149
\$1m On David Green #00634151

Located in safe deposit box at: Middlesex Bank
830 Washington Street.
Holliston, MA 01746

C. Tooling, Molds, Dies and Artwork:

Various items of above nature kept at vendors' location

3

SCHEDULE 6.6

TITLE TO ASSETS

Leasetec Systems Credit has made precautionary UCC filings with respect to certain leased equipment.

4

SCHEDULE 6.7

INDEBTEDNESS

Indebtedness under Subordinated Debentures of the Borrower dated as of March 15, 1996 in an aggregate principal amount outstanding as of February 8, 1999 of \$787,500.

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SCHEDULE 6.8

INSURANCE POLICIES

The Borrower has the following insurance policies in place:

Key Man Life Insurance	Lincoln Benefits Life Co.	Chane Graziano #00634151
Key Man Life Insurance	Lincoln Benefits Life Co.	David Green #00634149
Automobile Insurance	Arbella Mutual Ins. Co.	#Q2N070654-00
Flood Insurance	National Flood Ins. Co.	#FL 1-6405-8902-2
Package Policy	Chubb Ins. Group	binder
Foreign Liability	Chubb Ins. Group	binder
Worker's Compensation	Chubb Ins. Group	# 7163-99-07
Commercial Umbrella	Westchester Specialty Group	#CUA 102801-01
Crime/Fiduciary/Executive	Chubb Ins. Group	#8091-63-09-L
Business Travel Accident Ins.	AIG Life Ins. Co.	# GT0804628
Customs Bond	Roanoke Brokerage Serv. Co.	#0049601646/ser#1632552

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SCHEDULES 6.9

LICENSES

The Borrower holds the following licenses for:

The manufacture and sale of CPK products

The manufacture and sale of Microdialysis Probes

The sale of pumps under US patent "Infusion Pump for at least one syringe" #8394481

The manufacture and sale of oxygen imaging products under US Patent #4,947,850

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SCHEDULE 6.17

LITIGATION

15 Smith St.	Plaintiff alleges environmental contamination close to a site once occupied by The Harvard Apparatus Company. Harvard Apparatus, Inc. has no relation to The Harvard Apparatus Company.
Marie-Francois Lazzari (Pending)	Plaintiff is a former employee of Harvard Apparatus S.A.R.L. and is suing the company for wrongful termination.
Barry Cohen and Kent Scientific	The Borrower is suing for infringement of tradedress and unauthorized use of proprietary information.

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SCHEDULE 6.20

GOVERNMENT CONTRACTS

The Borrower holds no Government Contracts other than those received in the ordinary course of business in the form of purchase orders. At the present time there are no such orders of a material amount.

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SCHEDULE 6.21

PATENTS TRADEMARKS & TRADE NAMES

A. The Borrower has the rights to the following Trademarks, trade names and patents:

CPK	-	US Trademark
STRONGHOLD	-	US Trademark
Whole Rat	-	named owned
Infusion Pump for at least 1 syringe	-	Patent Application #8-394441
Oxymap	-	US Tradename
Oxyspot	-	US Tradename

B. Biochrom Limited has the rights to the following trademarks, tradenames and patents:

Registered trademarks:

Biochrom* (Austria, Benelux, former Czechoslovakia, France, Germany, Hungary, Italy, Switzerland, former Yugoslavia)

GeneQuant (Great Britain)

Novaspec (Great Britain)

Ultrospec (Denmark, France, Great Britain, India**, Japan)

Ultropac (France)

* registered owner is Pharmacia Biosystems GmbH. There are two agreements with a German company regarding use of the "Biochrom" name.

** registered owner is Pharmacia AB.

Common law trademarks:

UniSpec
UViMaster
UViMaster Plus
UViMaster PC

Copyrights:

Common law copyrights in connection with legally protectable drawings, circuit diagrams, printed circuitboard layouts, photographs for printed circuitboard production, manuals, promotional materials and software developed by Seller.

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SCHEDULE 6.24

PAYMENTS TO RELATED PARTIES

1. Interest and principle to Chane Graziano under sub debt and Series A Preferred Stock.
2. Intercompany Loans:
 - a. Loan from Ealing Scientific LTD to Harvard Apparatus S.A.R.L. in the principal amount of \$168,000.
 - b. Loan from Harvard Apparatus LTD to Harvard Apparatus S.A.R.L. in the principal amount of \$78,00.
 - c. Loan from Harvard Apparatus, Inc. to Harvard Apparatus LTD in the principal amount of \$80,000.

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Exhibit 5-10

DATED ----- 1999

- (1) BIOCHROM LIMITED
- (2) BROWN BROTHERS HARRIMAN & CO (AS AGENT)
- (3) BANKBOSTON N.A. (AS LENDER)
- (4) BROWN BROTHERS HARRIMAN & CO (AS LENDER)

TRANCHE B LOAN AGREEMENT

- relating to-

a US Dollar term loan facility of US\$3,400,000

OLS WANG
90 Long Acre
London WC2E 9TT

Tel: 0171-208 8888
Fax: 0171-208 8800
email: olsmail@olswang.co.uk

Ref: MPL/GDL/6866-1

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auditors' report;

"Acquisition Agreement" the sale and purchase agreement dated on or before the date of this Agreement relating to the sale and purchase of the Target Assets and made between the Vendors and the Borrower;

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"Acquisition Costs" those fees, commissions, costs and expenses properly incurred by the Borrower in relation to its acquisition of the Target Assets;

"Acquisition Documents" the Acquisition Agreement together with all Schedules 2.2(a), 2.10, 3.10, 3.12 and 3.22 and Exhibits 7.1(g), 7.1(h), 7.1(i) and 7.1(m);

"Act" the Companies Act 1985;

"Advance" the advance made or to be made to the Borrower under the Term Loan Facility;

"Affiliate" in relation to a body corporate, any company in which that body corporate or any subsidiary or holding company or any subsidiary of any holding company of that body corporate holds 25% or more of the issued share capital giving the right to attend and vote at general meetings of Chat company;

"Agent Security":

- (i) a Guarantee executed or to be executed by each Charging Group Company in favour of the Agent;
- (ii) a Debenture executed or to be executed by each Charging Group Company in favour of the Agent;
- (iii) any guarantee and any document creating security executed and delivered after the date of this Agreement as security for any of the obligations and liabilities of the Borrower and any other Group Company under any Financing Document;

"Auditors" in relation to each Group Company, KPMG or any other firm of chartered accountants of internationally recognised standing that has been appointed as auditors of such Group Company;

"Base Rate" the US\$ base rate of the Agent from time to time;

"Business Day" a day (other than a Saturday or Sunday) on which banks and foreign exchange markets are open for business in London and Boston, Massachusetts;

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"Business Plan" the business plan for the Group prepared by or on behalf of the Borrower comprising a document entitled "Executive Summary" dated 27 October 1997 and an undated document

entitled "Biochrom Growth Plan" describing the nature of, and prospects for, the Borrower's businesses and operations;

"Certified Copy"

in relation to a document, a copy of that document bearing the endorsement "Certified a true, complete and accurate copy of the original, which has not been amended otherwise than by a document, a Certified Copy of which is attached hereto", which has been signed and dated by a duly authorised officer of the relevant company or by its solicitor on its behalf and which complies with that endorsement;

"Change"

in relation to the Agent any Lender (or any body corporate of which the Agent or any Lender is a Subsidiary), the introduction, implementation, repeal, withdrawal or change in, or in the interpretation or application (in each case occurring after the date of this Agreement) of:

- (i) any law, regulation, practice or concession; or
- (ii) any directive, requirement, request or guidance (whether or not having the force of law but if not having the force of law, one which applies generally to a class or category of financial institutions of which the Agent or such Lender (or that body corporate) forms part and compliance with which is in accordance with the general practice of those financial institutions) of the European Community, any central bank including the European Central Bank, the Board of Governors of the Federal Reserve System of the United States or any other United States authority or any other fiscal, monetary, regulatory or other authority in accordance with whose instructions the Agent and the Lenders and similar financial institutions customarily act;

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"Change of Control"

means a change of control of the Borrower and/or a Charging Group Company as defined in Section 840 of the Income and Corporation Taxes Act 1988;

"Charging Group Companies"

the Borrower and each of its Subsidiaries which has granted, or is by the terms of this Agreement obliged to grant, a Guarantee and Debenture and "Charging Group Company" shall be construed accordingly;

"Commitment"

subject to Clause 2.3 as follows:

Lender	Dollar Commitment	Commitment Percentage
Brown Brothers Harriman & Co.	1.7m	50%
BankBoston N.A.,	1.7m	50%

"Commitment Percentage" as provided in the definition of Commitment above;

"Completion" the completion of the sale and purchase of the Target Assets pursuant to the Acquisition Agreement;

"Dangerous Materials" any element or substance, whether consisting of gas, liquid, solid or vapour, identified by any Environmental Law to be, to have been, or to be capable of being or becoming, harmful to mankind or any living organism or damaging to the Environment;

"Debenture" a debenture in the agreed form executed or to be executed in favour of the Agent (as security agent and trustee for the Lenders);

"Deed of Assignment" a deed of assignment of even date herewith made between the Parent and the Agent;

"Default" any event specified as such in Clause 13.1;

"Default Notice" has the meaning given to that term in sub-clause 13.2.1;

"Disclosure Letter" has the meaning given to that term in the Acquisition Agreement;

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"Disposal" a sale, transfer or other disposal (including without limitation by way of lease or loan) by a person of all or part of its assets, whether by one transaction or a series of transactions and whether at the same time or over a period of time;

"Distribution Agreement" the distribution agreement entered into on or about the date hereof between the Borrower and Amersham Pharmacia AD;

"Dollar Commitment" as provided in the definition of Commitment above;

"Drawdown Date" the date on which the Advance is made, or is proposed to be made;

"Drawdown Notice" a notice substantially in the form set out in the Second Schedule hereto;

"Encumbrance" any mortgage, charge, assignment by way of security, pledge, hypothecation, lien, right of set-off, retention of title provision, trust or flawed asset arrangement (for the purpose of, or which has the effect of, granting security) or any other similar security interest, or any agreement, whether conditional or otherwise, to create any of the same, or any agreement to sell or otherwise dispose of any asset on terms whereby such asset is or is intended to be leased to or reacquired or acquired by any Group Company;

"Environment" all or any of the following media: air (including air within buildings or other structures and whether above or below ground); land (including buildings and any other structures or erections in, on or under it and any soil and anything below the

surface of land); land covered with water; and water (including sea, ground and surface water);

"Environmental Law"

any statutory or common law, treaty, convention, directive or regulation having legal or judicial effect whether of a criminal or civil nature, concerning:

(i) pollution or contamination of the Environment;

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(ii) harm, whether actual or potential, to mankind and human senses, living organisms and ecological systems;

(iii) the generation, manufacture, processing, distribution, use (including abuse), treatment, storage, disposal, transport or handling of Dangerous Materials; or

(iv) the emission, leak, release or discharge into the Environment of noise, vibration, dust, fumes, gas, odours, smoke, steam, effluvia, heat, light, radiation (of any kind), infection, electricity or any Dangerous Material and any matter or thing capable of constituting a nuisance or an actionable tort of any kind in respect of such matters;

"Final Repayment Date"

31 January 2002;

"Finance Lease"

any lease which should be capitalised in accordance with GAAP;

"Financial Year"

in relation to a company, has the meaning given to that expression in Section 223 of the Act;

"Financing Documents"

each of this Agreement, the Tranche A Loan Agreement, the Interest Rate Protection Agreements and the Security Documents (and each of such agreements and documents being a Financing Document);

"FRS"

together with a number means the financial reporting standard issued by the Accounting Standards Board for application in England and Wales and identified by reference to that number;

"GAAP"

in relation to a company, accounting principles, concepts, bases and policies generally adopted and accepted in the jurisdiction of its incorporation;

"Group"

the Borrower, and each of its Subsidiaries both now and in the future and "Group Company" means any one of them;

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"Guarantee"

a guarantee in the Agent's standard form executed or to be executed in favour of the Agent;

"holding company" has the meaning given in sections 736 and 736(a) of the Act;

"Indebtedness" in relation to a person, its obligation (whether present or future, actual or contingent, as principal or surety) for the payment or repayment of money (whether in respect of interest, principal or otherwise) incurred in respect of:

- (i) monies borrowed or raised;
- (ii) any bond, note, loan stock, debenture or similar instrument;
- (iii) any acceptance credit, bill discounting, note purchase, factoring or documentary credit facility;
- (iv) the supply of any goods or services which is more than 45 days past the expiry of the period customarily allowed by the relative supplier after the due date except where the liability to pay the relevant supplier is being contested in good faith;
- (v) any guarantee, bond, stand-by letter of credit or other similar instrument issued in connection with the performance of contracts;
- (vi) any interest rate or currency swap agreement or any other hedging or derivatives instrument or agreement making allowance for any permitted netting of obligations;
- (vii) any arrangement pursuant to which any asset sold or otherwise disposed of by that person is or is intended to be leased to or reacquired by a Group Company (whether following the exercise of an option or otherwise); or

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- (viii) (without double counting) any guarantee, indemnity or similar insurance against financial loss given in respect of the obligation of any person of a type arising under any of heads (i) to (vii) above;

"Information Package": the Business Plan;

"Intellectual Property" all patents, certificates of addition, supplementary certificates of addition, supplementary protection certificates, petty patents, utility models, plant variety rights (including applications for any of the foregoing and any improvement and any rewards or, extensions and rights to apply therefor in any part of the world), designs (whether registered or unregistered), copyrights (whether registered or unregistered, trade names, business names and brand names, knowhow, formulae,

confidential information, trade secrets, computer software programs and systems, semiconductor chips, databases and any similar rights existing in any country (including the benefit of any licences or consents relating to any of the above) and all fees, royalties or other rights derived therefrom or incidental thereto in any part of the world;

"Interest Date" the date on which interest is payable in accordance with Clause 6 below;

"Interest Rate Protection Agreements" each agreement entered into or to be entered into between the Borrower and the Agent for the purpose of hedging the Borrower's interest rate liabilities in relation to all or any part of the Term Loan;

"Interest Period" each period determined in accordance with Clause 6 for the purpose of calculating interest on Advances or overdue amounts;

"Lenders" BankBoston, N.A. and Brown Brothers Harriman & Co and each of its respective successors and assigns permitted in accordance with the terms of this Agreement and "Lender" shall be construed accordingly;

"Lending Office" the office set out under the Agent's and/or the Lender's name in Clause 20 or such other office

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in the United States through which the Agent maintains the Facility under this Agreement;

"Loan" the aggregate outstanding amount of the Advance at any one time;

"Loan Instalment" has the meaning given to that term in Clause 7.1;

"Loan Instalment Repayment Date" has the meaning given to that term in Clause 7.1;

"Majority Lenders" at any time Lenders to which more than 66 2/3 per cent. of the Loan are owing at such time or, if the Loan is not outstanding, Lenders whose Commitments then aggregate more than 66 2/3 per cent. of the aggregate of all Commitments (or, if all Commitments have been reduced to zero, aggregated more than 66 2/3 per cent. of the aggregate of all Commitments immediately before such reduction to zero), save that where there shall only be two Lenders the Majority Lenders shall mean both of them together;

"Margin" 1 per cent. per annum;

"Material Adverse Effect" an event or series of events which have a material adverse effect on:

(i) the ability of any Charging Group Company to comply with its material obligations (which include for the avoidance of doubt any of its payment obligations) under any Financing Document; or

- (ii) the financial condition of the Parent and its Subsidiaries taken as a whole;

"Operating Budget"

in relation to the Group and the period starting not later than the date of this Agreement and ending on 31 December 1999, the Business Plan, and in relation to each successive 12 month period thereafter during the Security Period:

- (i) a projected balance sheet; and
- (ii) a projected profit and loss account;

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relative to each such period and on a month by month basis and with commentary prepared and approved by the board of directors of the Borrower drawing on the previous period's performance and forecast market conditions;

"Operating Lease"

a hire agreement, conditional sale agreement or instalment sale and purchase agreement (other than a lease of real property) which is not a Finance Lease;

"Parent"

Harvard Apparatus, Inc. a Massachusetts corporation with its principal offices at 84 October Hill Road, Holliston, Massachusetts;

"Party"

a party to this Agreement;

"Permitted Encumbrance":

- (i) any Encumbrance created under the Financing Documents;
- (ii) any right of set-off or lien, in each case arising by operation of law or by contract in the ordinary course of its trading activities;
- (iii) any retention of title to goods supplied to a Charging Group Company in the ordinary course of its trading activities;
- (iv) any right of set-off over credit balances on bank accounts of Charging Group Companies arising in the ordinary course of the banking arrangements of the Borrower;
- (v) any agreement entered into by a Charging Group Company in the ordinary course of its trading activities to sell or otherwise dispose of any asset on terms whereby that asset is or is intended to be leased to or reacquired or acquired by a Charging Group Company;
- (vi) any Encumbrance over an asset of a company which becomes a Subsidiary of the Borrower (other than by reason of its incorporation) after the date of this Agreement, being an Encumbrance which is in existence at the time at which

that company becomes such a
Subsidiary but only if:

- (a) that Encumbrance was not created in contemplation of that company becoming such a Subsidiary;
- (b) the principal amount secured by that Encumbrance has not been and shall not be increased; and
- (c) that Encumbrance is discharged within six months of the date on which that company became such a Subsidiary;

(vii) any Encumbrance over an asset acquired by a Charging Group Company after the date of this Agreement and subject to which that asset is acquired but only if:

- (a) that Encumbrance was not created in contemplation of its acquisition by that company;
- (b) the amount secured by that Encumbrance has not been increased in contemplation of, or since the date of, its acquisition by that company; and
- (c) that Encumbrance is discharged within six months of the date of its acquisition by that company;

(viii) the Subordinated Security;

(ix) any Encumbrance not otherwise permitted pursuant to sub-paragraphs (i) to (viii) above (inclusive) in respect of any assets not exceeding, in aggregate, (pound)10,000 in value;

"Permitted Indebtedness"

- (i) Indebtedness under any Financing Document;
- (ii) Indebtedness under any Finance Lease;

(iii) Indebtedness under any Operating Lease permitted by Clause 12.3.11;

(iv) Indebtedness of any Charging Group Company to the Parent or another Charging Group Company;

(v) Indebtedness of any Group Company to the extent it is the subject of a Guarantee and a Debenture;

- (vi) Indebtedness referred to in subparagraph (iv) of the definition of Indebtedness where the liability to pay the relevant supplier is being contested in good faith;
 - (vii) the Subordinated Loan; and
 - (viii) Indebtedness not otherwise referred to in sub-paragraphs (i) to (vii) above (inclusive) in an aggregate principal amount not exceeding (pound)25,000 for the Group taken as a whole;
- "Potential Default" [ILLEGIBLE] of materiality or the satisfaction of any other condition under Clause 13.1, would be a Default;
- "Properties" all freehold and leasehold properties listed in the Fourth Schedule hereto;
- "Quarter Date" each of 1 February, 1 May, 1 August and 1 November (save that in respect of the first Quarter Date hereunder it shall be 1 June 1999);
- "Recognised Bank" at any time:
- (a) a person [ILLEGIBLE] defined in section 840A of the Income and Corporation Taxes Act 1988) and which is within the charge to UK corporation tax as regards any interest [ILLEGIBLE] it (as the case may be) under or in connection with this Agreement and any other Financing Documents; or
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- (b) if at any time section 349 and/or section 840A of the Income and Corporation Taxes Act 1938 (or a statutory reenactment or modification thereof, in substantially the same form and context as at the date hereof) shall not at any time continue in full force and effect a bank carrying on a bona fide banking business in the United Kingdom which is within the charge to UK corporation tax as regards any interest received or receivable by it under or in connection with this Agreement and any other Financing Documents; or
 - (c) a person who is resident (as such term is defined in the relevant double tax treaty) in a country which has a double tax treaty with the United Kingdom giving residents of that country an exemption from United Kingdom taxation on interest and does not carry on a trade or business in the United Kingdom through a permanent establishment with which the Term Loan Facility is effectively connected; or

(d) any other institution (not falling within paragraphs (a), (b) or (c) above) which has produced prior to the date on which interest is receivable by it hereunder a valid notice issued by the Inland Revenue directing that interest be paid by the Borrower without deduction of income tax;

"Reservations"

the principle that equitable remedies are remedies which may be granted or refused at the discretion of the court, the limitation of enforcement by laws relating to bankruptcy, insolvency, liquidation, reorganisation, court schemes, moratoria, administration and other laws generally affecting the rights of creditors, the time barring of claims under the Limitation Act 1980, the possibility that an undertaking to assume liability for or to indemnify against nonpayment of United Kingdom stamp duty may be voided defences of set-off or counterclaim and

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similar principles or the defence that a contractual provision amounts to a penalty;

"Sale"

the sale of the whole or substantially the whole of the assets and/or business and/or goodwill of the Borrower to a single purchaser or to one or more purchasers as part of a single or series of transactions;

"Security Documents":

- (i) each and every Guarantee executed by a Charging Group Company;
- (ii) each and every Debenture executed by a Charging Group Company;
- (iii) the Subordination Agreement; and
- (iv) any guarantee and any document creating security executed and delivered after the date of this Agreement as [ILLEGIBLE] liabilities of the Borrower and the other Group Companies under any Financing Document;

"Security Period"

the period starting on the date of this Agreement and ending on the date on which all of the obligations and liabilities of the Group Companies under each Financing Document and discharged in full and none of the Lenders has any continuing obligation in relation to the Facility;

"SSAP"

together with a number means the statement of standard accounting practice issued by the Institute of Chartered Accountants for application in England and Wales and identified by reference to that number;

"Subordinated Lender"

the Parent;

"Subordinated Loan"

all amounts outstanding under a loan in the principal amount of US\$1,500,000 made by the Subordinated Lender to the Borrower on or about the date of this Agreement;

"Subordinated Security" the debenture granted by the Borrower to the Subordinated Lender dated on or about the date of this Agreement;

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"Subordination Agreement" the deed of priority made or to be made between (1) the Borrower, (2) the Lenders and (3) the Subordinated Lender;

"Subsidiary" a subsidiary within the meaning of Section 736 of the Act;

"Target Assets" all of the assets to be acquired by the Borrower pursuant to the Acquisition Agreement;

"Taxes" includes all present and future taxes, charges, imposts, duties, levies, deductions, withholdings or fees of any kind whatsoever, or any amount payable on account of or as security for any of the foregoing, by whomsoever on whomsoever and wherever imposed, levied, collected, withheld or assessed, together with any penalties, additions, fines, surcharges or interest relating thereto and "Tax" and "Taxation" shall be construed accordingly;

"Term Loan Facility" the US Dollar term loan facility referred to in sub-clause 2.1.1;

"Term Loan Facility Limit" subject to Clause 7, US\$3,400,000;

"Tranche A Loan Agreement" the revolving credit facility agreement setting out the terms and conditions of a revolving credit facility in the amount of US\$5,875,000 of even date herewith made available by the Agent to the Parent;

"Transaction Documents" in relation to the Parent and to a Group Company, each of the following documents to which it is a party: the Financing Documents, the Acquisition Documents and the Subordination Agreement;

"Transfer Certificate" a certificate in the forms or in the form substantially set out in the Third Schedule hereto;

"VAT" value added tax as provided for in the Value Added Tax Act 1994 and legislation (or purported legislation and whether delegated or otherwise) supplemental to that Act or in any primary or secondary legislation promulgated by the European Community or any official body or agency of the European Community, and any tax similar or equivalent to value added tax imposed

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by any country other than the United Kingdom and any similar or turnover Tax replacing or introduced in addition to any of the same; and

"Vendor" Pharmacia Biotech (Biochrom) Limited, a company incorporated in England under number 974213.

- 1.2 Words importing the singular shall include the plural and vice versa.
- 1.3 References to Clauses and Schedules are to be construed as references to the Clauses of, and Schedules to, this Agreement.
- 1.4 References to any document shall be construed as references to that document, as from time to time amended, varied, novated or supplemented, as the case may be.
- 1.5 References to any statute or statutory provision include any statute or statutory provision which amends, extends, consolidates or replaces the same, or which has been amended, extended, consolidated or replaced by the same, and shall include any orders, regulations, instruments or other subordinate legislation from time to time made under the relevant statute.
- 1.6 References to a document being "in the agreed form" means that document the form and content of which has been approved by the Agent or which has been agreed and entered into by the Agent and the relevant parties.
- 1.7 References to "assets" shall include revenues and property and the right to revenues and property and rights of every kind, present, future and contingent and whether tangible or intangible (including uncalled share capital).
- 1.8 The words "including" and "in particular" shall be construed as being by way of illustration or emphasis only and shall not be construed as, nor shall they take effect as, limiting the generality of any foregoing words.
- 1.9 The words "other" and "otherwise" shall not be construed ejusdem generis with any foregoing words where a wider construction is possible.
- 1.10 References to a "person" shall be construed so as to include that person's assigns, transferees or successors in title and shall be construed as including references to an individual, firm, partnership, joint venture, company, corporation, body corporate, unincorporated body of persons or any state or any agency of a state.
- 1.11 Where there is a reference in this Agreement to any amount, limit or threshold specified in US Dollars, in ascertaining whether or not that amount, limit or threshold has been attained, broken or achieved, as the case may be, a non-US Dollars amount shall be counted on the basis of the equivalent in US Dollars of that amount using the Agent's relevant spot rate of exchange on the day on which such calculation is to be made.
- 1.12 Accounting terms shall be construed so as to be consistent with GAAP.

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- 1.13 References to time are to Boston, Massachusetts time.
- 1.14 The headings in this Agreement are for convenience only and shall be ignored in construing this Agreement.

2. FACILITY

2.1 Facility

Subject to the terms of this Agreement the Lenders agree to make available to the Borrower a US Dollar Term Loan Facility in the maximum principal amount of US\$3,400,000.

2.2 Commitments

Subject to the terms and conditions of this Agreement:

- 2.2.1 the Lenders agree to make available to the Borrower the Term Loan Facility up to the Term Loan Facility Limit; and
- 2.2.2 each of the Lenders agree to participate in the Advance (in the same proportion to the amount of the Advance as its Commitment bears to the aggregate Commitments of all the Lenders) up to an aggregate maximum principal amount not exceeding its Commitment.

2.3 Obligations several

The obligations of each Lender under this Agreement are several. Any failure of a Lender to perform any of its obligations under this Agreement shall not relieve any other Party hereto of any of its obligations hereunder. No Lender shall be responsible for the obligations of any other Lender under this Agreement.

2.4 Rights several

The rights of the Agent and each of the Lenders against the Borrower under this Agreement are separate and independent rights. Subject to the terms and conditions of this Agreement, each Lender may separately protect and enforce its rights hereunder; and it shall not be necessary for any other Lender or the Agent to be joined as an additional party in any proceedings for such purpose.

3. PURPOSE

3.1 Purpose of the Term Loan Facility

The proceeds of the Term Loan Facility shall be used to pay:

3.1.1 the consideration payable to the Vendor by the Borrower for the Target Assets purchased by it pursuant to the Acquisition Agreement; and

3.1.2 the Acquisition Costs;

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and for no other purpose.

3.2 Undertaking by the Borrower

The Borrower undertakes that it will only utilise the Term Loan Facility as permitted by this Clause 3.

3.3 No Liability

The Agent shall not be concerned as to the use or application of the proceeds of the Advances or the use or applications of amounts made available under the Facility.

4. CONDITIONS PRECEDENT

4.1 Confirmation Precedent

Notwithstanding any other term of this Agreement, the Agent shall not be under any obligation to make the Facility available unless it has notified the Borrower that all three conditions set out in the First Schedule hereto have been satisfied or waived on or prior to Friday, 12 February 1999 or such later date as the Agent may agree.

4.2 Confirmation of Satisfaction

The Agent shall, at the request of the Borrower, certify whether or not any one or more of the conditions set out the First Schedule hereto have been satisfied or, as the case may be, waived.

5. TERM LOAN FACILITY

5.1 Drawdown

Subject to the other terms of this Agreement, the Term Loan Facility shall be drawdown in one Advance of US\$3,400,000 at Completion when requested by the Borrower by means of a Drawdown Notice in accordance with Clause 5.3. Drawdown of the Term Loan Facility shall take place on or before Friday, 12 February 1999 or such later date as the Agent may agree. If the Term Loan Facility is not drawdown by that date it shall be cancelled and shall cease to be available for utilisation.

5.2 Conditions to the Advance

The obligation of the Agent to make available the Advance is subject to the conditions that on the date on which the relevant Drawdown Notice is given and on the relevant Drawdown Date:

- 5.2.1 the representations and warranties in Clause 11 to be repeated on those dates are correct and will be correct immediately after the Advance is made;
- 5.2.2 no Default or Potential Default has occurred and is continuing or would occur on the making of the Advance; and

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- 5.2.3 the Advance shall not, at any time, exceed the Term Loan Facility Limit.

5.3 Drawdown Notice

- 5.3.1 When the Borrower wishes to draw down the Advance, it shall give a duly completed Drawdown Notice to the Agent to be received not later than 11.00 a.m. on the day prior to Drawdown Date.
- 5.3.2 A Drawdown Notice shall be irrevocable and the Borrower shall be obliged to borrow in accordance with its terms.

5.4 Advance

Subject to the terms of this Agreement, the Agent acting through its Lending Office shall make available to the Borrower on the Drawdown Date an amount equal to the Advance.

5.5 Cash Management

The Agent may, at its option, require the Borrower to implement such cash management procedures as the Agent may require.

6. INTEREST

6.1 Interest Rate

Interest shall accrue on the Advance from and including the Drawdown Date up to and including the date the Loan is repaid in full at the rate determined by the Agent to be the aggregate of:

- 6.1.1 the Margin; and
- 6.1.2 Base Rate.

6.2 Interest Periods

Interest will be payable on the Loan in arrears on each Quarter Date in each year any amount is outstanding. For the avoidance of doubt, the first Interest Date is 1 June 1999.

6.3 Default Interest

- 6.3.1 If the Borrower fails to pay any amount payable under any Financing Document to which it is a party on the due date, it shall pay default interest on the overdue amount from the due date to the date of actual payment calculated by reference to successive Interest Periods at the rate per annum being the aggregate of:
 - 6.3.1.1 Base Rate plus 2 percent per annum; and
 - 6.3.1.2 the Margin.

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- 6.3.2 So long as the overdue amount remains unpaid, the default

interest rate shall be recalculated in accordance with the provisions of this Clause 6,3 on the last day of each such Interest Period and any unpaid interest shall be compounded at the end of each Interest Period.

6.4 Calculation and Payment of Interest

6.4.1 At the end of each Interest Period, the Agent shall notify the Borrower of the rate and amount of interest payable for the Interest Period (but in the case of any default interest calculated under Clause 6.3. any such notification need not be made more frequently than weekly). Each notification shall set out in reasonable detail the basis of computation of the amount of interest payable.

6.4.2 Interest due from the Borrower under this Agreement shall:

6.4.2.1 accrue from day-to-day at the rate calculated under this Clause 6:

6.4.2.2 be calculated on the basis of the actual number of days elapsed and a 360 day year; and

6.4.2.3 be payable both before and after judgment.

6.5 Agent's Determination

The determination by the Agent of any interest payable under this Clause 6 shall be conclusive and binding on the Borrower except for any manifest error. If the Borrower reasonably believes that such determination is incorrect, the Agent shall as soon as reasonably practicable, provide in reasonable detail the basis of computation of such interest.

7. REPAYMENT AND PREPAYMENT

7.1 Repayment of Loan

The Borrower shall repay the Loan by payment to the Agent on each date set out in Column 1 below ("Loan Instalment Repayment Date") of the amount ("Loan Instalment") set out in Column 2 below opposite the relevant Instalment Repayment Date (so that the Loan is repaid in full on or before the Final Repayment Date):

Column 1	Column 2
Instalment Repayment Date	Instalment (\$)
1 June 1999	77,250
1 August 1999	77,250
1 November 1999	77,250
1 February 2000	77,250
1 May 2000	115,872
1 August 2000	115,576
1 November 2001	115,876
1 February 2001	115,876

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1 May 2001	154,500
1 August 2001	154,500
1 November 2001	154,500
31 January 2002	2,164,000

7.2 Mandatory Prepayment on Sale

7.2.1 Notwithstanding Clause 7.1 and this Clause 7.2. if so required by the Agent, on any date on which a Sale occurs ("Prepayment Date") the Loan shall be repaid in full and the Agent's obligations under this Agreement shall be [Illegible]

7.2.2 The Borrower shall give the Agent at least 30 days' prior notice of the date upon which a Sale is proposed to occur.

7.3 Voluntary Prepayment of Loan

- 7.3.1 The Borrower may, by giving the Agent not less than five days' prior notice, prepay the whole or part (but, if in part, in a minimum amount of US\$100,000 and an integral multiple of US\$25,000) of the Advance on an [Illegible].
- 7.3.2 Any prepayment shall be made together with accrued interest on the amount prepaid and any amounts payable under Clause 22.1.
- 7.3.3 Each prepayment of the relevant Loan under this Clause 7.3 shall be applied against the unpaid instalments in inverse order of maturity.

7.4 No Reborrowing of Loan

Any amount repaid or prepaid in relation to the Loan may not be reborrowed and shall reduce the Term Loan Facility Limit by the amount so repaid or prepaid.

7.5 Change of Control

Upon a Change of Control the Advance shall be repaid in full and the Agent's obligations shall be terminated and the Term Loan Facility Limit shall be reduced to zero.

8. CHANGES IN CIRCUMSTANCES

8.1 Illegality

If, after the date of this Agreement, it becomes illegal for the Agent or any Lender to maintain all or part of the Term Loan Facility or to continue to make available or fund the Loan, then:

- 8.1.1 the relevant Lender shall notify the Borrower; and

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- 8.1.2 8.1.2.1 the affected part of the Term Loan Facility shall be cancelled immediately and the affected part of the Term Loan Facility Limit shall be reduced accordingly; and

- 8.1.2.2 the Borrower shall prepay to the Agent (on behalf of the Lenders) the affected part of the Loan (together with accrued interest on the amount prepaid and all other amounts owing to the Agent or the Lenders under this Agreement) not later than the latest date permitted by the relevant law.

Any such prepayment under sub-clause 8.1.2.2 above shall be subject to Clause 22.1.

8.2 Increased Costs

- 8.2.1 If, after the date of this Agreement, a Change occurs which causes an Increased Cost (as defined in sub-clause 8.2.3) to the Agent (or any Lender or any company of which the Agent or any Lender is a Subsidiary) then the Borrower shall pay (as additional interest) to the Agent or the relevant Lender within five Business Days of demand all amounts which the Agent certifies to be necessary to compensate the Agent or the relevant Lender (or any company of which the Agent or the Lender, as the case may be, is a Subsidiary) for the Increased Cost.

- 8.2.2 Any demand made under sub-clause 8.2.1 shall set out in reasonable detail so far as is practicable the basis of computation of the Increased Cost.

- 8.2.3 In this Clause 8.2 the following expressions shall have the following meanings:

"Increased Cost" any cost to, or reduction in the amount payable to, or reduction in the return on capital or regulatory capital achieved by, the

Agent or any Lender (or any company of which the Agent or any Lender, as the case may be, is a Subsidiary) to the extent that it arises, directly or indirectly, as a result of the Change and is attributable to all or part of the Facility or the Advance or the funding of the Advance including:

- (i) any Tax Liability (other than Tax on Overall Net Income) incurred by the Agent or any Lender;
- (ii) any changes in the basis or timing of Taxation of the Agent in relation to all or part of the Facility or the Advance or the funding of the Advance;

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- (iii) the cost to the Agent or any Lender (or any company of which the Agent is a Subsidiary) of complying with, or the reduction in the amount payable to or reduction in the return on capital or regulatory capital achieved by the Agent (or any company of which the Agent or such Lender, as the case may be, is a Subsidiary) as a result of complying with any capital adequacy or similar requirements howsoever arising, including as a result of an increase in the amount of capital to be allocated to any Facility or of a change to the weighting of the commitment under any Facility or the Advance (but not, for the avoidance of doubt, penalties arising as a result of the Agent or any Lender failing so to comply); and
- (iv) the cost to the Agent or any Lender of complying with any reserve, cash ratio, special deposit or liquidity requirements (or any other similar requirements).

"Tax Liability" in respect of any person:

- (i) any liability or any increase in the liability of that person to make any payment of or in respect of Tax;
- (ii) the loss of any relief, allowance, deduction or credit in respect of Tax which would otherwise have been available to that person;
- (iii) the setting off against income, profits or gains or against any Tax liability of any relief, allowance, deduction or credit in respect of Tax which would otherwise have been available to that person; and
- (iv) the loss or setting off against any Tax liability of a right to repayment of Tax which would otherwise have been available to that person.

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For the purposes of this definition of "Tax Liability", any question of whether

or not any relief, allowance, deduction, credit or right to repayment of Tax has been lost or set-off, and if so, the date on which that loss or set off took place, shall be conclusively determined by the relevant person's Auditors.

"Tax on Overall Net Income"

in relation to the Agent or any Lender, Tax (other than Tax deducted or withheld from any payment) imposed on profits of the Agent or such Lender by the jurisdiction in which its Lending Office or its head office is situated.

8.2.4 If the Borrower is required to pay any amount to the Agent or any Lender under this Clause 8.2, then, without prejudice to that obligation and so long as the circumstances giving rise to the relevant Increased Cost are continuing and subject to the Borrower giving the Agent not less than five Business Days' prior notice (which shall be irrevocable), the Borrower may prepay the Advance together with accrued interest on the amount prepaid. Any such prepayment shall be subject to Clause 22.1. On any such prepayment the Facility shall be automatically cancelled and the Term Loan Facility Limit shall each be reduced to zero.

8.3 Mitigation

8.3.1 If any circumstances arise in respect of the Agent or any Lender which would, or upon the giving of notice would, result in the operation of Clauses 8.1, 8.2 or 9.8 to the detriment of the Borrower, then the Agent shall:

8.3.1.1 promptly upon becoming aware of those circumstances and their results, notify the Borrower; and

8.3.1.2 in consultation with the Borrower, take all such steps as it determines are reasonably open to it to mitigate the effects of those circumstances (including changing its Lending Office in the United States or consulting with the Borrower with a view to transferring some or all of its rights and obligations under this Agreement to another Agent or other financial institution acceptable to the Borrower) in a manner which will avoid the circumstances in question and on terms acceptable to the Borrower and the Agent or such Lender

Provided That the Agent or such Lender shall not be obliged to take any steps which in its opinion would or might have an adverse effect on its business or financial condition or the management of its Tax affairs or cause it to incur any material costs or expenses.

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8.3.2 Nothing in this Clause 8.4 shall limit, reduce, affect or otherwise qualify the rights of the Agent or the Lenders or the obligations of the Borrower under Clauses 8.1, 8.2 and 9.8.

8.4 Certificates

The certificate or notification of the Agent as to any of the matters referred to in this Clause 8 shall be in reasonable detail and shall be conclusive and binding on the Borrower except for any manifest error.

9. PAYMENTS

9.1 Funds

All payments under this Agreement shall be made for value on the due date in freely transferable and readily available funds.

9.2 Payments

9.2.1 Each payment to the Borrower shall be made to the account of the Borrower specified in the Drawdown Notice.

9.2.2 Each payment to the Agent shall be made as directed by the Agent from time to time.

9.3 Business Days

If a payment under this Agreement is due on a day which is not a Business Day, the due date for that payment shall instead be the next Business Day in the same calendar month (if there is one) or the preceding Business Day (if there is not).

9.4 Currency

All payments relating to costs, losses, expenses or Taxes shall be made in the currency in which the relative costs, losses, expenses or Taxes were incurred. Any other amount payable under this Agreement shall, except as otherwise provided, be made in US Dollars.

9.5 Accounts as Evidence

The Agent shall maintain in accordance with its usual practice an account which shall, as between the Borrower and the Agent, be prima facie evidence of the amounts from time to time advanced by, owing to, paid and repaid to the Agent under this Agreement.

9.6 Partial Payments

9.6.1 If the Agent receives a payment insufficient to discharge all the amounts then due and payable by the Borrower under this Agreement, the Agent shall apply that payment towards the obligations of the Borrower in the following order:

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9.6.1.1 First, in or towards payment of any unpaid costs and expenses of the Agent under this Agreement.

9.6.1.2 Second, in or towards payment of any accrued interest due by the Borrower but unpaid under this Agreement.

9.6.1.3 Third, in or towards payment of any principal due by the Borrower but unpaid under this Agreement.

9.6.1.4. Fourth, in or towards payment of any other sum due by the Borrower but unpaid under the Financing Documents.

9.6.2 The Agent may vary the order set out in sub-clauses 9.6.1.1 to 9.6.1.4 and shall give notice of any such variation to the Borrower.

9.6.3 Sub-clauses 9.6.1 and 9.6.2 shall override any appropriation made by the Borrower.

9.7 Set-off and Counterclaim

All payments by the Borrower under this Agreement shall be made without set-off or counterclaim.

9.8 Grossing-up

9.8.1 Subject to sub-clause 9.8.2, all sums payable to the Agent and the Lenders pursuant to or in connection with any Financing Document shall be paid in full, free and clear of all deductions or withholdings whatsoever except only as may be required by law for and on account of any Taxes.

9.8.2 If any deduction or withholding for an on account of any Taxes is required [Illegible] borrower shall:

9.8.2.1 ensure or procure that the deduction or withholding is made and that it does not exceed the maximum legal

requirement therefor,

- 9.8.2.2 pay, or procure the payment of, the full amount deducted or withheld to the relevant Taxation or other authority in accordance with the applicable law:
 - 9.8.2.3 increase the payment in respect of which the deduction or withholding is required so that the net amount received by the Agent or any Lender, as the case may be, after the deduction or withholding (and after taking account of any further deduction or withholding which is required to be made as a consequence of the increase) shall be equal to the amount which the Agent or such Lender would have been entitled to receive in the absence of any requirement to make any deduction or withholding; and
 - 9.8.2.4 promptly deliver or procure the delivery to the Agent of receipts evidencing each deduction or withholding which has been made.
- 9.8.3 The Borrower shall not be required to pay an additional amount under this Clause 9.8 if the payment in respect of which the deduction or withholding is required is a payment of interest on the Advance and:
- 9.8.3.1 at the time the Advance was made, the Agent or the relevant Lender was not a Recognised Bank otherwise than as a consequence of a Change occurring after the date of this Agreement (and the obligation to deduct or withhold would not have arisen if that Advance had been made by a Recognised Bank); or
 - 9.8.3.2 at the time when the interest is paid, the Agent or the relevant Lender is not beneficially entitled to the interest or, being beneficially entitled to the interest, the Agent or the relevant Lender is neither within the charge to United Kingdom corporation tax as respects interest otherwise than as a consequence of a Change occurring after the date of this Agreement (and the obligation to deduct or withhold would not have arisen if the Agent or the relevant Lender had been a Recognised Bank) nor a person within paragraph (c) or (d) of the definition of "Recognised Bank" otherwise than as a consequence of a Change occurring after the date of this Agreement (and the obligation to deduct or withhold would not have arisen if the Agent or the relevant Lender had been such a person);

and each Lender falling within paragraph (c) or (d) of the definition of "Recognised Bank" undertakes that:

- (i) it shall promptly initiate an application pursuant to the Double Taxation Relief (Taxes on Income) (General) Regulations 1970 (SI 1970/488) for a direction to the Borrower from the Inland Revenue not to deduct income tax from interest payable on the Advance by completing a form FD 13 (or such other or additional form as is from time to time applicable) and lodging it with the relevant tax authority in the jurisdiction in which it is resident for the purposes of the relevant double tax treaty ("the overseas tax authority") and (unless the form is sent directly by the overseas tax authority to the Inland Revenue) upon its return from the overseas tax authority procure that the form is expeditiously delivered to the Borrower for transmission to the appropriate branch of the Financial Intermediaries and Claims Office of the Inland Revenue ("FICO") or other appropriate branch of the Inland Revenue;

- (ii) it shall keep the Borrower informed as to the progress of the application referred to in paragraph (i) above; and
- (iii) it shall deal in a timely manner with any request for information relating to the application made by the overseas tax authority, the Inland Revenue and any such reasonable request by or on behalf of the Borrower and shall do all reasonable things and take all reasonable steps to expedite the progress of the application;

and the Borrower agrees that it shall upon receipt of the application form pursuant to paragraph (i) above properly complete it and transmit it to FICO, keep the Agent and the Lenders fully informed as to the progress of the application and deal in a timely manner with any request for information relating to the application made by FICO or the overseas tax authority and any such reasonable request made by or on behalf of the Agent or the Lenders and shall do all reasonable things and take all reasonable steps to expedite the progress of the application.

9.8.4 If the Agent or the relevant Lender determines, in its absolute discretion, that it has received, realised, utilised and retained a Tax benefit by reason of any deduction or withholding in respect of which the Borrower has made an increased payment under this Clause 9.8, the Agent or the relevant Lender shall, provided that it has received all amounts which are then due and payable by the obligors under any Financing Document, pay to the Borrower (to the extent that the Agent or the relevant Lender can do so without prejudicing the amount of the benefit or repayment and the right of the Agent or the relevant Lender to obtain any other benefit, relief or allowance which may be available to it) such amount, if any, as the Agent or the relevant Lender, in its absolute discretion shall determine, will leave the Agent or the relevant Lender in no worse position than it would have been in if the deduction or withholding had not been required, provided that:

- 9.8.4.1 the Agent or the relevant Lender shall have an absolute discretion as to the time at which and the order and manner in which it realises or utilises any Tax benefit and shall not be obliged to arrange its business or its Tax affairs in any particular way in order to be eligible for any credit or refund or similar benefit;
- 9.8.4.2 the Agent or the relevant Lender shall not be obliged to disclose any information regarding its business, Tax affairs or Tax computations; and
- 9.8.4.3 if the Agent or the relevant Lender has made a payment to the Borrower pursuant to this sub-clause 9.8.4 on account of any Tax benefit and it subsequently transpires that the Agent or the relevant Lender did not receive that Tax benefit, or received a lesser Tax benefit, the Borrower shall, on demand, pay to the Agent or the relevant Lender such sum as the Agent or the relevant Lender may determine as being necessary to restore its

after-tax position to that which it would have been had no adjustment under this sub-clause 9.8.4 been made. Any sums payable by the Borrower to the Agent or the relevant Lender under this sub-clause 9.8.4 shall be subject to Clause 22.1.

9.8.5 The Agent or the relevant Lender shall not be obliged to make any payment under sub-clause 9.8.4 if, by doing so, it would contravene the terms of any applicable law or any notice, direction or requirement of any governmental or regulatory authority (whether or not having the force of law).

9.8.6 If the Borrower is required to make an increased payment for the account of the Agent or the relevant Lender under sub-clause 9.8.2, then, without prejudice to that obligation and so long as such requirement exists and subject to the Borrower giving the Agent not less than 10 days' prior notice (which shall be irrevocable), the Borrower may prepay all the Advances together with accrued interest on the amount prepaid. Any such prepayment shall be subject to Clause 22.1. On any such prepayment the Facility shall be automatically cancelled, and the Term Loan Facility Limit shall be reduced to zero.

10. SECURITY

10.1 Security Documents

The obligations and liabilities of the Borrower to the Agent under the Financing Documents shall be secured by the interests and rights granted in favour of the Agent as security agent and trustee for the Lenders under the Security Documents.

10.2 Interest Rate Protection Agreements

All obligations and liabilities of the Borrower to the Agent under or in connection with any Interest Rate Protection Agreement shall be treated, for all purposes (other than Clauses 9.6 and 15.1), as obligations and liabilities incurred under this Agreement and, for the avoidance of doubt, the Borrower's obligations and liabilities under any Interest Rate Protection Agreement shall be secured obligations and liabilities under the Security Documents and for such purposes any reference in any Security Document to the Agent shall be deemed to include the Agent as a party to the relevant Interest Rate Protection Agreements.

10.3 Release of Security on Disposals

In respect of any Disposal made by a Charging Group Company which falls within sub-clause 12.3.2, the Agent shall on the completion of that Disposal release, at the cost and expense of the relevant Charging Group Company, from the Security Documents, the assets which are the subject of that Disposal but, in relation to a Disposal which falls within sub-clause 12.3.2.2), only if the Agent is reasonably satisfied that it will receive security over the asset purchased with the Disposal proceeds of the released asset equivalent to that which attached to the released asset immediately prior to its release from the Security Documents.

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11. REPRESENTATIONS AND WARRANTIES

11.1 Representations and Warranties

The Borrower represents and warrants to the Agent and to each Lender that:

11.1.1 Status

The Company was incorporated on 13th March 1998 and as of the date immediately prior to the completion of the Acquisition Agreement had no assets or liabilities and had not traded (except as contemplated by, or otherwise in connection with this Agreement and the other Transaction Documents and the transactions contemplated by this Agreement and the other Transaction Documents). Each Charging Group Company is a limited company duly incorporated under the laws of its own jurisdiction and possesses the capacity to sue and be sued in its own name and has the power to carry on its business and to own its property and other assets.

11.1.2 Powers and Authority

Each Charging Group Company has power to execute, deliver and perform [Illegible] transactions contemplated by those documents and all necessary corporate, shareholder and other action has been or will be taken to authorise the execution, delivery and performance of the same.

11.1.3 Binding Obligations

Subject to the Reservations, the obligations of each Charging Group Company under the Transaction Documents constitute its legal, valid, binding and enforceable obligations.

11.1.4 Contraventions

The execution, delivery and performance by each Charging Group Company of the Transaction Documents does not:

11.1.4.1 contravene any applicable law or regulation or any order of any governmental or other official authority, body or agency or any judgment, order or decree of any court having jurisdiction over it;

11.1.4.2 conflict with or result in any breach of any of the terms of, or constitute a default under, any agreement or other instrument to which it is a party or any licence or other authorisation to which it is subject or by which it or any of its property is bound; or

11.1.4.3 contravene or conflict with the provisions of its memorandum and articles of association.

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11.1.5 Insolvency

No Group Company has taken any action nor have any steps been taken or legal proceedings been started or threatened against it for winding-up, dissolution or reorganisation (other than a solvent winding-up for the purposes of reconstruction or amalgamation to which the Agent consents), other than a winding-up petition which is proved to the satisfaction of the Agent to be frivolous or vexatious and which is, in any event, discharged within 14 days of the presentation and before it is advertised, the enforcement of any Encumbrance over its assets or for the appointment of a receiver, administrative receiver, or administrator, trustee or similar officer of it or of any of its assets.

11.1.6 No Default

No Group Company is (nor would be with any of the giving of notice, the lapse of time, the determination of materiality, or the satisfaction of any other condition) in breach of or in default under any agreement to which it is a party or which is binding on it or any of its assets in a manner or to an extent which would be reasonably likely to have a Material Adverse Effect.

11.1.7 Litigation

No action, litigation, arbitration or administrative proceeding has been commenced other than that which is proved to the satisfaction of the Agent to be frivolous or vexatious and which is, in any event, discharged within 14 days, or, to the best of the Borrower's information, knowledge and belief, is pending or threatened, against any Group Company which is reasonably likely to be determined against the relevant Group Company and which, if decided adversely, would exceed (pounds)25,000 nor is there subsisting any unsatisfied final judgment or award given against any of them by any court, arbitrator or other body (which is not the subject of appeal).

11.1.8 Accounts

Each of the latest Accounts of each Charging Group Company required to be delivered under sub-clause 12.1.1 is prepared in accordance with GAAP and gives a true and fair view of the financial position of the relevant company as at the date to which they were prepared and for the Financial Year of that company then ended.

11.1.9 Encumbrances

No Encumbrance other than a Permitted Encumbrance exists over all or any part of the assets of any Group Company.

11.1.10 No Encumbrances Created

The execution of the Financing Documents by the Charging Group Companies and the exercise of each of their respective rights and the

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performance of each of their respective obligations under the Financing Documents will not result in the creation of, or any obligation to create, any Encumbrance (other than a Permitted Encumbrance) over or in respect of any of their assets.

11.1.11 Authorisations

Other than the registration of particulars of the Security Documents at the Companies Registration Office pursuant to Section 395 of the Act, registrations at the Land Registry and the Trade Marks Registry, the giving of notice in respect of any contracts being assigned, the stamping of the Acquisition Documents, all authorisations, approvals, licenses, consents, filings, registrations, payment of duties or taxes and notarisations:

11.1.11.1 required and material for the conduct of the business, trade and ordinary activities of each Group Company;

11.1.11.2 required for the performance and discharge of the obligations of each Group company under the Financing Documents to which it is a party; and

11.1.11.3 required in connection with the execution, delivery, validity, enforceability or admissibility in evidence of the Financing Documents to which each Group Company is a party

are in full force and effect.

11.1.12 Taxes

Each Group Company has complied in all material respects with all Taxation laws in all jurisdictions in which it is subject to Taxation and has paid all Taxes due and payable by it and no claims are being asserted against it in respect of Taxes except for assessments in relation to the ordinary course of its business or claims contested in good faith and in respect of which adequate provision has been made and disclosed in the latest Accounts or other information delivered to the Agent under this Agreement.

11.1.13 Information Package

To the best of the Borrower's information, knowledge and belief:

11.1.13.1 the factual information contained in the Information Package was, at the date of the relevant report or document, true and accurate in all material respects and not misleading in any material respect, there are no other facts the omission of which would make any

fact or statement in the Information Package misleading in any material respect and nothing has occurred which would render any material fact or statement in the Information Package untrue or misleading in any material respect; and

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11.1.13.2 all estimates, forecasts and projections contained or referred to in the Information Package, and all assumptions and presumptions upon the basis of which the same were made, were fair and reasonable at the time they were made, and nothing has occurred since the date the same were made which would necessitate a material revision to any of those estimates, forecasts or projections in order for them to be fair and reasonable.

11.1.14 Accounting Reference Date

Save in relation to companies becoming Group Companies after the date hereof where such companies have different accounting reference periods but which shall be changed to 31 December by the relevant Group Company as soon as is practicable and tax efficient the accounting reference date of each Group Company is 31 December.

11.1.15 Corporate Structure

Immediately prior to Completion, the Borrower has and has had no Subsidiaries.

11.1.16 Disclosures

There is no disclosure made in the Disclosure Letter or any other disclosure to the Acquisition Documents or the Investment Agreement which has or may have a material and adverse effect on any of the material information, prospects, estimates, forecasts and projections contained or referred to in the Information Package.

11.1.17 Environmental

Each Group Company has and has at all times complied with all applicable Environmental Law, non-compliance with which would be reasonably likely to have a Material Adverse Effect, every consent, authorisation, licence or approval required under or pursuant to any Environmental Law by each Group Company in connection with the conduct of its business and the ownership, use, exploitation or occupation of its assets the absence or lack of which would be reasonably likely to have a Material Adverse Effect, has been obtained and is in full force and effect, there has been no default in the observance of the conditions and restrictions (if any) imposed in, or in connection with, any of the same which default would be reasonably likely to have a Material Adverse Effect, and, to the best of the Borrower's information, knowledge and belief, no circumstances have arisen:

11.1.17.1 which would entitle any person to revoke, suspend, amend, vary, withdraw or refuse to amend any of the same; or

11.1.17.2 which might give rise to a claim against any Group Company which would be reasonably likely to have a Material Adverse

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Effect having regard to the cost to that Group Company of meeting such a claim.

11.1.18 Year 2000 Compliance

The computer systems of each Group Company are, or can be made to be within 12 months of the date of this Agreement year 2000 compliant.

11.2 Repetition

The representations and warranties set out in Clause 11.1 shall survive the execution of this Agreement and shall be deemed to be repeated as follows:

11.2.1 Each of the said representations and warranties shall be deemed to be repeated on the first Drawdown Date.

11.2.2 Each of the representations and warranties in sub-clauses 11.1.1, 11.1.2, 11.1.3, 11.1.4 and 11.1.8 shall be repeated on each Quarter Date in each year in which any amounts remain outstanding under this Agreement

in each case, as if made with reference to the facts existing at the time of repetition.

12. UNDERTAKINGS

12.1 Information Undertakings

The Borrower undertakes that during the Security Period it shall, unless the Agent otherwise agrees:

12.1.1 Accounts

As soon as the same become available (and in any event within 120 days after the end of each of its Financial Years), deliver to the Agent the Accounts for each such Financial Year of each Charging Group Company together with:

12.1.1.1 to the extent not delivered pursuant to this Clause 12.1.1 the unconsolidated profit and loss account for the Borrower for each such Financial Year and

12.1.1.2 a copy of the management letter (if any) addressed by the Auditors to the directors of each such company in connection with its auditing of the relevant Accounts as soon as reasonably practicable after receipt of the letter by such company.

12.1.2 Information on Request

Promptly following the Agent's request, provide from time to time to the Agent such other information, estimates, forecasts or projections in relation to any Group Company and any of their respective businesses, assets,

financial condition, ownership or prospects as the Agent may from time to time reasonably require.

12.1.3 Operating Budgets

12.1.3.1 Provide to the Agent (in a format acceptable to the Agent) an Operating Budget for each of its Financial Years during the Security Period, not less than 30 days prior to the start of each such Financial Year, together with a comparison of the information, estimates, forecasts and projections contained in such budget with the actual out-turn in the previous Financial Year (and to the extent relevant figures are not available to the forecast for such Financial Year).

12.1.3.2 If any Group Company shall determine that any of the

estimates, forecasts or projections made in relation to any of its Financial Years should be different in any material and adverse respect from those set out in the then current Operating Budget (or any substitution therefore subsequently made and agreed by the Agent), provide to the Agent revised estimates, forecasts or projections in respect of any part of each such Financial Year and such revised estimates, forecasts or projections shall apply immediately following their approval by the boards of directors of the relevant company and the Borrower.

12.1.4 GAAP

Ensure that all Accounts submitted to the Agent in respect of any Charging Group Company have been prepared in accordance with GAAP.

12.1.5 Default, Litigation, etc.

Promptly, upon becoming aware of the same, notify the Agent of:

12.1.5.1 any Default or Potential Default;

12.1.5.2 any litigation, arbitration or administrative proceeding commenced against any Group Company involving a potential liability of any Group Company exceeding (pound)25,000;

12.1.5.3 any Encumbrance (other than a Permitted Encumbrance) attaching to any of the assets of any Group Company;

12.1.5.4 any notice, order, direction, requisition, permission or other like matter whatsoever issued by any landlord or any competent local or government authority or department to any Group Company relating to the Properties the effect of which would be reasonably likely to have a Material Adverse Effect; and

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12.1.5.5 any other occurrence relating to a Group Company (including any third party claim or liability) which would be reasonably likely to have a Material Adverse Effect.

12.2 Positive Undertakings

The Borrower undertakes that during the Security Period it shall, and it shall procure that each Group Company shall, unless the Agent otherwise agrees in writing:

12.2.1 Pay Taxes

Pay and discharge all Taxes and governmental charges payable by or assessed upon it prior to the date on which the same become overdue unless, and only to the extent that, such Taxes and charges shall be contested in good faith by appropriate proceedings, pending determination of which payment may lawfully be withheld, and there shall (if the Auditors so advise) be set aside adequate reserves with respect to any such Taxes or charges so contested in accordance with GAAP.

12.2.2 Insurance

12.2.2.1 Cause all buildings, trade and other fixtures and all plant, machinery, vehicles, computers and office and other equipment and all stock-in-trade forming part of its assets to be insured and to be kept insured and cause the Group Companies to take out and maintain product liability and recall insurance at all times in such insurance office of repute, as shall have been selected by the Borrower or with Lloyd's underwriters,

in each case, in such amounts and against such risks on the equivalent basis as insurances are maintained by prudent companies carrying on businesses comparable with that of the Group and on a comparable scale as regards the property and assets insured, the insured risks and the classes of risk to be covered and the amount of the insurance cover.

- 12.2.2.2 Cause the interest of the Agent in all such assets that are for the time being insured otherwise than in the joint names of the Agent and the Borrower to be noted by endorsement on the policy or policies of insurance relating thereto.
- 12.2.2.3 Duly and punctually pay all premiums and other monies due and payable under all such insurances as aforesaid and promptly upon request by the Agent produce to the Agent the premium receipts or other evidence of the payment thereof.
- 12.2.2.4 As soon as practicable after receiving a written request from the Agent deposit all policies and other contracts of insurance relating to its assets or any part thereof with the Agent or produce the same to the Agent for inspection.

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- 12.2.2.5 If default shall be made by the Borrower in complying with this sub-clause 12.2.2 the Agent may, but shall not be obliged, to effect or renew any such insurance as is mentioned in this sub-clause either in its own name or in its name and that of the Borrower jointly or in the name of the Borrower with an endorsement of the Agent's interest and all the monies expended by the Agent on so effecting or renewing any such insurance shall be reimbursed by the Borrower to the Agent on demand by the Agent.

12.2.3 Authorisations

Obtain, maintain and comply with the terms of any authorisation, approval, licence, consent, exemption, clearance, filing or registration:

- 12.2.3.1 which is required and is material for the conduct of its business, trade and ordinary activities and the failure of which to obtain would have a Material Adverse Effect; and
- 12.2.3.2 required to enable it to perform its obligations under, or for the validity, enforceability or admissibility in evidence of, any Financing Document to which it is a party.

12.2.4 Access

Upon reasonable notice being given to the Borrower by the Agent, permit the Agent and any person (being an accountant, auditor, solicitor, valuer or other professional adviser of the Agent) authorised by the Agent to have, at all reasonable times during normal business hours, access to the property, premises and accounting books and records of any Group Company and to the officers of any Group Company.

12.2.5 Delivery of Declarations, etc.

Within any relevant period laid down in any applicable statute, law or regulation make all necessary declarations and deliver all necessary forms and documents required to be delivered to, filed with or registered with any United Kingdom governmental, statutory or other body or agency by it in connection with the Transaction Documents to which it is a party and any of the

transactions contemplated under such Transaction Documents.

12.2.6 Compliance with Environmental Law

Comply in all material respects with Environmental Law where failure to do so would have a Material Adverse Effect.

12.2.7 Dangerous Materials

Ensure that all Dangerous Materials treated, kept and stored, produced, manufactured, generated, refined or used from, in, upon, or under any of the

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real property owned by a Group Company are held and kept upon such real property in such a manner and up to such standards as they would be kept by a prudent company carrying on the same trade as that Group Company.

12.2.8 Protection of Rights Under the Acquisition Documents

Take all reasonable and practical steps to preserve and enforce its rights arising under any Acquisition Document.

12.2.9 Year 2000 Compliance

Use all reasonable endeavours to procure that any potential adverse affect of the occurrence of the year 2000 on its computer and other systems will be remedied within 12 months of the date of Completion.

12.2.10 Change of Ownership

Immediately notify the Agent of any change in the ownership of any shares in the issued share capital of the Borrower.

12.2.11 Intellectual Property

Use all reasonable endeavours to protect and preserve its Intellectual Property where failure to do so would have a Material Adverse Effect,

12.3 Negative Undertakings

The Borrower undertakes that during the Security Period it shall not, and it shall procure that none of the Group Companies shall, unless the Agent otherwise agrees:

12.3.1 Negative Pledge

Create or permit to subsist any Encumbrance over any of its assets other than Permitted Encumbrances.

12.3.2 Disposal of Assets

Make a Disposal other than:

- 12.3.2.1 in the ordinary course of its trading activities;
- 12.3.2.2 where the proceeds of the Disposal are used within three months of that Disposal for the purchase of an asset which is to be used for the same purposes as the asset the subject of that Disposal;
- 12.3.2.3 a Disposal of an asset which is obsolete for the purpose for which such asset is normally utilised;
- 12.3.2.4 a Disposal to a Charging Group Company or to the Parent;

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- 12.3.2.5 a Disposal of cash on terms not otherwise prohibited by this Agreement; or
- 12.3.2.6 a Disposal (other than of any shares in any Subsidiary) on arms length terms where the aggregate value of the assets the subject of a Disposal by Group Companies other than in accordance with sub-clauses 12.3.2.1 to 12.3.2.5 above in any Financial Year of the Borrower does not exceed (pound)25,000 (for the purposes of this sub-clause, the value of any asset shall be the greater of its book value and the consideration received for it).
- 12.3.3 Change of Business
- Other than expansion of the business as contemplated in the Business Plan make any substantial change to the general nature of the business of the Group as a whole from that carried on at the date of this Agreement.
- 12.3.4 Mergers
- Enter into any amalgamation, demerger, merger or reconstruction in any circumstances or enter into any joint venture (where the aggregate investment in respect of all such joint ventures exceeds (pound)50,000) or partnership agreement without the consent of the Agent, such consent not to be unreasonably withheld or delayed.
- 12.3.5 Fees
- Pay any fees or commissions to any person other than:
- 12.3.5.1 on arms length terms and for the purpose of and in the ordinary course of its trade; or
- 12.3.5.2 fees incurred in connection with the Acquisition of the Target Assets.
- 12.3.6 Loans
- Make any loans or grant any credit to or for the benefit of any person, other than:
- 12.3.6.1 amounts of credit allowed by the relevant company in the normal course of its trading activities;
- 12.3.6.2 loans made by one Charging Group Company to the Parent or to other Charging Group Companies; or
- 12.3.6.3 loans made by a Charging Group Company to its employees where such loans do not, when aggregated with all such loans made by all Group Companies, exceed (pound)25,000 at any time.
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- 12.3.7 Indebtedness
- Incur or permit to subsist any Indebtedness other than Permitted Indebtedness.
- 12.3.8 Incorporation of Subsidiaries
- Incorporate any company as its Subsidiary, except where such company upon its incorporation executes, subject to, and to the extent permitted under, all applicable laws, a Guarantee and Debenture (or Security Documents having equivalent effect (in form and substance approved by the Agent)) under the laws of the jurisdiction of that company's incorporation and delivers the same to the Agent together with, in the latter case, a legal opinion (in a form and content satisfactory to the Agent)

confirming such Security Documents are valid and effective in guaranteeing and securing the relevant liabilities from lawyers appointed or approved by the Agent.

12.3.9 Acquisitions

Acquire any business of, or shares or securities of, any company (other than a Charging Group Company) without the consent of the Agent such consent not to be unreasonably withheld or delayed other than where:

12.3.9.1 the aggregate of the consideration payable for, and Indebtedness assumed by Group Companies in connection with, all such acquisitions made by Group Companies in any Financial Year of the Borrower does not exceed (pound)25,000; and

12.3.9.2 promptly on such acquisition:

12.3.9.2.1 if the acquisition is of a business, the business and assets of the business become subject to an existing Guarantee and Debenture; or

12.3.9.2.2 if the acquisition is of shares comprising more than 50 per cent of the issued share capital of a company, subject to any legal prohibition or limitation on the giving of any such Guarantee and Debenture (or its equivalent under relevant law), that company executes a Guarantee and Debenture or Security Documents having equivalent effect (in form and substance approved by the Agent) under the laws of the jurisdiction of that company's incorporation and delivers the same to the Agent together with, in the latter case, a legal opinion (in a form and content satisfactory to the Agent) from lawyers appointed by the Agent.

12.3.10 Variation of Transaction Documents

Permit or effect any variations, novations or amendments (other than variations of a minor or non-material nature) without the consent of the Agent, to:

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12.3.10.1 the Acquisition Documents;

12.3.10.2 the Subordinated Loan;

12.3.10.3 the Distribution Agreement;

or terminate. suspend. cancel, rescind or make or agree to any claim that the Acquisition Agreement is frustrated or consent or agree to any waiver or release of any obligation of any party (other than of itself) under any of the above documents.

12.3.11 Operating Lease Payments

Other than under leases of real property, make a payment under any hire agreement, credit sale agreement, hire purchase agreement, conditional sale agreement or installment sale and purchase agreement which is not a Finance Lease if the aggregate of all such payments made by the Group Companies will exceed, in any Financial Year of the Borrower. (pound)75,000.

12.3.12 [ILLEGIBLE]

The Borrower shall not make any payment, nor give any value to any Affiliate of the Borrower except for goods and services

actually purchased by the Borrower from, or sold by the Borrower to, such Affiliate of the Borrower for a price and on terms which shall:

12.3.12.1 before market value; and

12.3.12.2 be no less favourable from those which would have been charged in an arm's length transaction.

13. DEFAULT

13.1 Default

Each of the following shall be a Default, namely, if:

13.1.1 Non-Payment

the Borrower or the Parent does not pay within five days of the due date any amount payable by it under this Agreement or the Tranche A Loan Agreement, as the case may be, at the place at and in the currency and funds in which it is expressed to be payable;

13.1.2 Other Defaults

any Charging Group Company or the Parent breaches any of its obligations under any Financing Document (other than the obligations referred to in sub-clause 13.1.1) and, if that breach is capable of remedy, it is not remedied within 15 Business Days after notice of that breach has been given by the Agent to the Borrower,

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13.1.3 Breach of Representation or Warranty

any representation, warranty or statement made or deemed to be repeated by any Charging Group Company under any Financing Document or in any document delivered by or on behalf of any Borrower under or in connection with any Financing Document is incorrect when made or deemed to have been repeated (save to the extent any such inaccuracy is immaterial) and if the circumstances resulting in such representation and warranty being incorrect are capable of being altered so that such representation and warranty so altered would be correct, such circumstances are not altered within 15 Business Days after notice of such representation and warranty being incorrect has been given by the Agent to the Borrower;

13.1.4 Unlawfulness or Repudiation

it is unlawful for any Charging Group Company or the Parent to perform or comply with, or any Charging Group Company or the Parent claims it is not bound by any of its obligations under any Financing Document;

13.1.5 Cross-default

any Indebtedness other than in respect of the Subordinated Loan of all or any of the Group Companies in excess of, in aggregate, (Pounds)25,000:

13.1.5.1 is not paid when due or within any applicable grace period; or

13.1.5.2 (by reason of the occurrence of a default, howsoever described) is declared to be or otherwise becomes due and payable prior to its specified maturity;

13.1.6 Attachment or Distress

a creditor or encumbrancer attaches or takes possession of, or a distress, execution, sequestration or other process is levied or enforced upon or sued out against, any of the assets of any Group

Company (having a value of at least (Pounds)25,000) and such process is not discharged within 10 Business Days;

13.1.7 Enforcement of Security

any Encumbrance over any of the assets of any Charging Group Company is enforced;

13.1.8 Inability to Pay Debts

any Charging Group Company:

13.1.8.1 other than in respect of the Subordinated Loan suspends payment of its debts or is unable or admits its inability to pay its debts as they fall due;

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13.1.8.2 other than in respect of the Subordinated Loan by reason of financial or trading difficulties begins negotiations with any creditor with a view to the general readjustment or rescheduling of any of its Indebtedness; or

13.1.8.3 other than in respect of the Subordinated Loan proposes or enters into any composition or outlet arrangement for the benefit of its creditors generally or any class of creditors;

13.1.9 Insolvency Proceedings

any legal proceedings are started or other similar and formal steps are taken (including the presentation of a petition) for:

13.1.9.1 any Charging Group Company to be adjudicated or found insolvent; or

13.1.9.2 the winding-up or dissolution of any Charging Group Company other than:

13.1.9.2.1 in connection with a solvent reconstruction, the terms of which have been previously approved in writing by the Agent; or

13.1.9.2.2 [ILLEGIBLE] Agent to be frivolous or vexatious and which is, in any event, discharged within 21 days of its presentation and before it is advertised provided always that no Advance shall be made at any time during which any winding-up petition has been presented and has not been discharged; or

13.1.9.3 the appointment of a trustee, receiver, administrative receiver or similar officer in respect of any Charging Group Company or any of its assets;

13.1.10 Adjudication or Appointment

any adjudication, order or appointment is made under or in relation to any of the proceedings referred to in sub-clause 13.1.9 with respect to any Charging Group Company;

13.1.11 Administrative Order

an application is made to the court for an administration order under the Insolvency Act 1986 with respect to any Charging Group Company;

13.1.12 Analogous Proceedings

any event occurs or proceeding is taken with respect to any Charging Group Company in any jurisdiction to which it is subject which has an effect equivalent or similar to any of the events mentioned in sub-clauses 13.1.6, 13.1.8, 13.1.9, 13.1.10 or

13.1.11;

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13.1.13 Cessation of Business

any Charging Group Company suspends, ceases or threatens to suspend or cease to carry on all or a substantial part of its business other than if such business is transferred to the Parent or another Charging Group Company;

13.1.14 Material Adverse Change

any event or series of events occur which has or will have a Material Adverse Effect;

13.1.15 Amendment of Articles of the Borrower

the Borrower, without the prior written consent of the Agent, amends its articles of association;

13.1.16 Redemption of Shares by the Borrower

the Borrower, without the prior written consent of the Agent, such consent not to be unreasonably withheld or delayed, makes any redemption of any of its shares, purchases any of its shares or otherwise reduces its issued share capital;

13.1.17 Default or termination of the Distribution Agreement

the Borrower is in breach (which breach remains unremedied or waived in accordance with the Distribution Agreement or which is waived by the Agent) of the Distribution Agreement or the Distribution Agreement is terminated or comes to an end by operation of law.

13.2 Acceleration, etc.

13.2.1 If a Default occurs and remains unremedied the Agent may by notice ("Default Notice") to the Borrower cancel the Facility and require the Borrower immediately to repay the Loan together with accrued interest and all other sums payable under this Agreement, whereupon they shall become immediately due and payable. Upon the service of any Default Notice the Agent's obligations under this Agreement shall be terminated, the Facility shall be cancelled and the Term Loan Facility Limit shall be reduced to zero;

For the avoidance of doubt, if any other Default has occurred, the Agent may exercise all its rights under this Clause 13 and the Agent may enforce the Security Documents, including in respect of the amount so demanded by the Agent.

14. SET-OFF

The Agent may set off any obligation due and owing by the Group Company under any Financing Document against any obligation due and owing by the Agent to such Group Company, regardless of the place of payment, booking branch or currency of either obligation. If the obligations are in different currencies, the Agent may convert

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either obligation at the relevant spot rate of exchange of the Agent for the purpose of the set-off.

15. FEES AND EXPENSES

15.1 Expenses

The Borrower shall on demand pay all expenses incurred (including legal, valuation and accounting fees but, only to the extent the same are

reasonable in amount), and any VAT on those expenses:

- 15.1.1 by the Agent and the Lenders in connection with the negotiation, preparation and execution of the Financing Documents to which it is a party;
- 15.1.2 by the Agent and the Lenders in connection with the granting of any release, waiver or consent or in connection with any amendment or variation of any Financing Documents to which it is a party; and
- 15.1.3 by the Agent and the Lenders in enforcing, perfecting, protecting or preserving (or attempting so to do) any of its rights, or in suing for or recovering any sum due from the Borrower or any other person under any Financing Document, or in investigating any possible Default or Potential Default which the Agent has reasonable grounds for believing may have occurred.

15.2 Documentary Taxes Indemnity

All stamp, documentary, registration or other like duties or Taxes, including any penalties, additions, fines, surcharges or interest relating to those duties and Taxes, which are imposed or chargeable on or in connection with any Financing Document to which it is a party shall be paid by the Borrower. The Agent shall be entitled but not obliged to pay any such duties or Taxes (whether or not they are its primary responsibility). If the Agent does so the Borrower shall on demand indemnify the Agent against those duties and Taxes and against any costs and expenses incurred by the Agent in discharging them.

15.3 VAT

- 15.3.1 All payments made by a Group Company under the Financing Documents to which it is a party are calculated without regard to VAT. If any such payment constitutes the whole or any part of the consideration for a taxable or deemed taxable supply (whether that supply is taxable pursuant to the exercise of an option or otherwise) by the Agent, the amount of that payment shall be increased by an amount equal to the amount of VAT which is chargeable in respect of the taxable supply in question.
- 15.3.2 No payment or other consideration to be made or furnished to a Group Company by the Agent pursuant to or in connection with any Financing Document or any transaction or document contemplated in any Financing Document may be increased or added to by reference to (or as a result of any

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increase in the rate of) any VAT which shall be or may become chargeable in respect of any taxable supply.

15.4 Indemnity Payments

Where in any Financing Document a Group Company has an obligation to indemnify or reimburse the Agent in respect of any loss or payment, the calculation of the amount payable by way of indemnity or reimbursement shall take account of the likely Tax treatment in the hands of the Agent (as determined by the Agent's auditors acting reasonably) of the amount payable by way of indemnity or reimbursement and of the loss or payment in respect of which that amount is payable.

16. WAIVERS; REMEDIES CUMULATIVE

The rights of the Agent under the Financing Documents:

- 16.1 may be exercised as often as necessary;
- 16.2 are cumulative and not exclusive of its rights under the general law; and
- 16.3 may be waived only in writing and specifically.

Delay in exercising or non-exercise of any such right is not a waiver of

that right.

17. MISCELLANEOUS

17.1 Severance

If any provision of this Agreement is or becomes illegal, invalid or unenforceable in any jurisdiction, that shall not affect:

17.1.1 the legality, validity or enforceability in that jurisdiction of any other provision of this Agreement; or

17.1.2 the legality, validity or enforceability in any other jurisdiction of that or any other provision of this Agreement.

17.2 Counterparts

This Agreement may be executed in any number of counterparts and this shall have the same effect as if the signatures on the counterparts were on a single copy of this Agreement.

17.3 Euro

If sterling is, or is to be, replaced by the euro, the Agent may notify the Borrower after negotiating in good faith with the Borrower of any amendments to this Agreement it considers necessary to reflect that replacement and to put the Agent and the Lenders and the Borrower in the same position, so far as possible, that they would have been in if no such replacement had occurred. Upon such notification this Agreement shall be deemed to be amended in accordance with such notification.

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17.4 Sharing payments

17.4.1 If any Lender (the "Sharing Lender") receives or recovers any payment or satisfaction in respect of any sums due under this Agreement (whether by voluntary or involuntary payment or the exercise of any right of setoff or combination of accounts or otherwise) in an amount which, in proportion to their respective participations, is greater than the payment or satisfaction received or recovered by any other Lender (such greater amount being in this Clause called the "Excess") then, subject as provided in paragraphs (17.4.2) and (17.4.3) below:

17.4.1.1 the Sharing Lender shall forthwith notify the Agent of its receipt or recovery of the Excess;

17.4.1.2 the Agent shall promptly calculate the pro rata share of the Excess due to each Lender on the basis of the aggregate sums received or recovered by each Lender (which calculation shall be conclusive in the absence of manifest error) and notify the Lenders accordingly;

17.4.1.3 the Sharing Lender shall, within five Business Days after demand by the Agent, pay to the Agent an amount equal to the Excess (in this Clause called an "Excess Payment");

17.4.1.4 the amount of the Excess shall, as between the Borrower and the Sharing Lender, be treated as not having been paid; and

17.4.1.5 the Agent shall, as soon as practicable and in accordance with its calculation referred to above, distribute the amount of the Excess Payment to the Lenders entitled to it and such distribution shall be treated as if it had been paid by the Borrower.

17.4.2 If and to the extent that, as a matter of law, the indebtedness of the Borrower to the Sharing Lender is finally extinguished discharged or satisfied by any receipt or recovery first referred to in paragraph (17.4.1) above and paragraph (17.4.1.4) is (or

would be) ineffective, the Sharing Lender will not be obliged to make an Excess Payment.

- 17.4.3 If and to the extent that a Sharing Lender is or becomes obliged to repay to any person the amount of any receipt or recovery first referred to in paragraph (17.4.1) above having made any Excess Payment in respect of it, each Lender will on demand reimburse that Sharing Lender through the Agent its proportion of the Excess Payment together with its proportion of the cost to the Sharing Lender of funding the Excess Payment to the date of actual reimbursement, upon which the liability of the Borrower to each of the Lenders shall be readjusted accordingly (as to which any calculation or certificate of the Agent shall be conclusive in the absence of manifest error).
- 17.4.4 Notwithstanding the above provisions of this Clause 17.4, a Lender which shall have commenced an action or proceedings in any court to recover any

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sum owing to it under this Agreement and as a result shall have received an Excess shall not be required to share any portion of such Excess with any other Lender which has been notified in advance of such action or proceedings and has had an opportunity to, but does not, join such action or proceedings or commence and diligently prosecute a separate action or proceedings to enforce its rights in the same or another court.

18. THE AGENT AND THE LENDERS

18.1 Appointment of the Agent

- 18.1.1 Each Lender (other than the Agent, if it is also a Lender) irrevocably appoints the Agent to act as its agent for the purpose of this Agreement and irrevocably authorises the Agent on its behalf to exercise the rights powers and discretions that are specifically delegated to it under or in connection with this Agreement and any other incidental rights powers and discretions. The Agent may act through its directors officers employees attorneys and agents.
- 18.1.2 The relationship between the Agent and the Lenders is that of agent and principal only, The Agent shall not be trustee or fiduciary for any other person and need not hold in trust any monies paid to it for any other party, save as expressly contemplated pursuant to the Subordination Agreement.

18.2 Instructions of Majority Lenders

- 18.2.1 The Agent shall (subject as otherwise provided in this Agreement) act or refrain from acting in accordance with any instructions of the Majority Lenders in connection with any matter, whether or not expressly provided for in this Agreement, and shall be fully protected if it so acts or refrains from acting in accordance with any such instructions. However, the Agent shall not be obliged to seek instructions as to the exercise of any right power or discretion or as to any such matter and, in the absence of instructions, the Agent may act as it sees fit. Any instructions given by the Majority Lenders shall be binding on all the Lenders.
- 18.2.2 Before it commences any proceedings or takes any action under or in respect of this Agreement, the Agent may require an indemnity and/or security satisfactory to it, whether by way of payment in advance or otherwise, against all liabilities losses costs and expenses which it would or may incur in doing so.

18.3 Responsibility of the Agent

- 18.3.1 The Agent shall have only those duties obligations and responsibilities which are expressly specified in this Agreement.

18.3.2 The Agent shall not be responsible to any other Party for:

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- 18.3.2.1 the execution, authenticity, validity, enforceability or adequacy of this Agreement or any other document;
- 18.3.2.2 the sufficiency or accuracy of any representations warranties or statements made in or in connection with this Agreement or any other document;
- 18.3.2.3 whether or not amounts payable under this Agreement are actually paid (when due or without limitation otherwise); or
- 18.3.2.4 any other failure of any other person to perform its respective obligations under this Agreement or any other document.

18.3.3 The Agent may:

- 18.3.3.1 rely on any original or copy of any notice document or signature believed by it to be authentic;
- 18.3.3.2 rely on any statement made by any person regarding any matters which may reasonably be assumed to be within his knowledge; and select, engage, pay for and (whether or not engaged by it) rely on lawyers accountants surveyors or other professional advisers;

and shall not be liable to any other Party to this Agreement for any consequences of such reliance.

18.4 Assessment of the Borrower

Without affecting the responsibility of the Borrower for information supplied by it and any representation warranty or statement made by it in connection with this Agreement, each Lender confirms that it has made and will in future continue to make its own independent investigation assessment and appraisal of the business, financial condition, creditworthiness, status and affairs of the Borrower in connection with the participation of such Lender in the Facility and has not relied and will not rely on the Agent therefor.

18.5 Default

The Agent shall not at any time be obliged to monitor or enquire as to whether or not a Default or a Potential Default has occurred or is continuing. The Agent shall not at any time be deemed to have knowledge of the occurrence of a Default or a Potential Default unless it has received written notice from a Party referring to this Agreement, describing the relevant event or circumstances and stating that the event is a Default or a Potential Default (as the case may be). If the Agent receives such a notice, it shall promptly notify the Lenders.

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18.6 Information

The Agent shall promptly forward any document or copy of any document which it receives from a Party for another Party and shall not be obliged to review or check the same. The Agent shall otherwise not be obliged now or in the future to provide any Lender with any information concerning the business, financial condition, credit-worthiness, status or affairs of the Borrower or, unless requested to do so by a Lender in accordance with this Agreement, to request any certificate or other document from the Borrower or any other person.

18.7 The position of the Agent

The Agent may:

- 18.7.1 carry on any banking or other business with the Borrower and/or any other member of the Group or the Parent;
- 18.7.2 act as agent or trustee for or in relation to any financing involving the Borrower and/or any other member of the Group or the Parent;
- 18.7.3 retain for its own account any fees profits or other remuneration payable to it as Agent under this Agreement or in relation to any of the above matters;
- 18.7.4 if it is also a Lender, exercise all its rights and powers in such capacity under this Agreement as if it were not also the Agent.

18.8 Liability

Neither the Agent nor any director, officer, employee, attorney or agent of the Agent shall be liable to any other person for any action taken or not taken by it or them under or in connection with this Agreement, unless caused by its or their gross negligence or wilful misconduct.

18.9 Indemnities

- 18.9.1 Each Lender shall forthwith on demand indemnify the Agent for its proportion (rateably according to the Lender's respective participation in Advances or, if none, their respective Commitments or, if all Commitments have been cancelled, their most recent respective Commitments, each at the date of demand) of any liability, loss, cost or expense incurred by or imposed on or claimed from the Agent in any way relating to or arising out of its acting as the Agent except to the extent that the liability loss or expense arises from the Agent's gross negligence or wilful misconduct or is part of its normal administrative costs and expenses.
- 18.9.2 The Borrower shall forthwith on demand reimburse each Lender (including the Agent, in its capacity as a Lender) for any payment made by it under paragraph (18.9.1) above. The liability of the Borrower shall not be limited or affected by paragraph (18.9.1) above.

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18.10 Compliance

The Agent shall not be obliged to do anything which would or might, in its opinion, be contrary to any law regulation or official directive or request of any jurisdiction or render it liable to any person and may do anything which, in its opinion, is necessary or desirable to comply with any such law regulation directive or request. Without limitation, the Agent need not disclose any information relating to the Borrower or any other member of the Group if disclosure would or might, in the opinion of the Agent, be contrary to any duty of secrecy or confidentiality or otherwise render it liable to any person.

18.11 Changes of Agent

- 18.11.1 The Agent may resign (without stating any reason) by giving notice to the Lenders and the Borrower in which case the Agent may forthwith appoint as successor Agent any affiliate of the Agent. Failing such appointment, the Majority Lenders may appoint a successor Agent.
- 18.11.2 If the appointment of a successor Agent is to be made by the Majority Lenders but they have not, within 30 days after the Agent's notice of resignation, appointed a successor Agent which accepts the appointment, the Agent may appoint a successor Agent.
- 18.11.3 Any successor Agent appointed under any provision in this Clause shall only be appointed with the prior written consent of the Borrower, such consent not to be unreasonably withheld or delayed

and provided that it is a reputable and experienced Recognised Bank.

18.11.4 The resignation of the Agent and the appointment of any successor Agent will both become effective when and only when the successor Agent notifies all the parties that it accepts the appointment, upon which:

18.11.4.1 the successor Agent shall succeed to and be vested with all the rights powers and duties of the retiring Agent as if a Party to this Agreement in the capacity of the Agent;

18.11.4.2 the retiring Agent shall continue to have the benefit and protection of this Clause 18 in respect of the period while it was the Agent; and

18.11.4.3 subject to paragraph (18.11.5) below, the retiring Agent shall have no further obligation as Agent under this Agreement.

18.11.5 The retiring Agent shall, at its own cost, make available to the successor Agent such documents and records and provide such assistance as the successor Agent may reasonably request for the purposes of performing its functions as the Agent under this Assignment.

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18.12 Amendment with Majority Lenders' consent

Any amendment or waiver of any provision of this Agreement and any waiver of any Default under this Agreement shall only be effective if made in writing and signed by or on behalf of the party against whom the amendment or waiver is asserted. For this purpose, any amendment or waiver which is made in writing by the Agent at the direction of the Majority Lenders shall be binding on all Lenders, except that the written approval of all Lenders shall be required where that amendment or waiver relates to:

18.12.1 the amount of the Facility or of any Lender's Commitment or the length of the Term Loan Facility or the amount or currency of or the due date for any payment of principal of or interest on the Loan;

18.12.2 any change in the manner of calculation of the rate or rates of interest or other amounts payable to the Lenders hereunder;

18.12.3 any voluntary or mandatory prepayment;

18.12.4 any amendment of the definition of "Majority Leaders" or of the provisions of this Clause; or

18.12.5 the release of the Borrower from any security created hereby.

Any amendment affecting the rights of the Agent shall also require the consent of the Agent.

19. TRANSFERS OF PARTICIPATIONS

19.1 Novation by Transfer Certificate

Subject to clause 21.6, if any Lender (the "Existing Lender") wishes to novate or transfer all or any part of its rights benefits and/or obligations under this Agreement to another Recognised Bank approved by the Agent and the Borrower (provided that such approval shall duly be required from the Borrower if no Default has occurred and is continuing if capable of remedy), which approval will not be unreasonably withheld or delayed (the "New Lender") then the Existing Lender may after consultation with the Agent and, through the Agent, the Borrower effect a substitution in respect thereof involving the New Lender by the delivery to the Agent and acceptance by it of a duly completed Transfer Certificate, executed by the Existing Lender and the New Lender.

19.2 Effect of Transfer Certificate

Upon delivery to the Agent of any Transfer Certificate pursuant to Clause 19.1 and acceptance thereof by the Agent (which delivery and acceptance shall be evidenced exclusively and conclusively by the Agent's countersignature on such Transfer Certificate pursuant to Clause 19.4, without which such Transfer Certificate shall be ineffective):

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- 19.2.1 save as provided in Clause 19.3, the respective rights of the Existing Lender and the Borrower against each other under this Agreement with respect to all or the relevant part of the Existing Lender's Commitment and/or participation in Advances (all as specified in the schedule to such Transfer Certificate) shall be terminated and each shall be released from all further obligations to the other(s) under this Agreement with respect thereto (all such rights and obligations to be so terminated or released being referred to in this Clause as "Discharged Rights and Obligations");
- 19.2.2 the Borrower and the New Lender shall each acquire rights against each other and assume obligations towards each other which (except as regards the identity of the parties thereto) are identical to the Discharged Rights and Obligations; and
- 19.2.3 the Agent, the New Lender and the other Lenders shall acquire the same rights and assume the same obligations between themselves as they would have acquired and assumed had such New Lender been an original party to this Agreement as a Lender with the Discharged Rights and Obligations acquired or assumed by it in consequence of such Transfer Certificate.

19.3 Obligations prior to Transfer Certificate

Discharged Rights and Obligations shall not include, and there shall be no termination or release pursuant to this Clause 8 (Illegality, Increased Costs and Market Disruption) and Clause 9.8 (Grossing-up) of, any rights or obligations arising pursuant to Clause 15 or 16 in respect of the period, or in respect of payments made under this Agreement during the period, prior to the effective date of the relevant Transfer Certificate.

19.4 Signing of Transfer Certificate

The Borrower and the Lenders hereby appoint the Agent to receive and countersign each Transfer Certificate as agent on its behalf as required by this Clause and, to the extent relevant, the provisions of Clause 18 shall apply mutatis mutandis with respect to such appointments. The Agent shall be entitled but not obliged) to decline to accept and/or countersign any proposed Transfer Certificate which is not in the form set out in the Third schedule hereto.

19.5 Administration Fee

The administration fee will be charged out of the fees collected by the Agent pursuant to section 1.11 of the Tranche A Loan Agreement.

19.6 Protection of Agent

The Agent shall be entitled to rely on any Transfer Certificate delivered to it pursuant to this Clause which appears on its face to be complete and regular and appears to be signed on behalf of the Existing Lender and the New Lender named as party to it. The Agent shall have no liability or responsibility to any party as a consequence of placing

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reliance on and acting in accordance with and countersigning any such Transfer Certificate.

19.7 Notification

The Agent shall notify the Borrower promptly of the receipt and execution on its behalf by the Agent of any Transfer Certificate and shall deliver a copy of it to the Borrower.

19.8 No liability of Existing Lender

Nothing in this Agreement or any Transfer Certificate shall oblige an Existing Lender to:

19.8.1 accept a retransfer from a New Lender of any of the rights, benefits and/or obligations transferred or novated under this Clause and/or a Transfer Certificate; or

19.8.2 be liable for or contribute to any losses incurred by the New Lender by reason of the non-performance by the Borrower of its obligations under this Agreement or otherwise.

19.9 Information

Provided that the Borrower has received a confidentiality undertaking in form and substance satisfactory to it, a Lender or the Agent may disclose on a confidential basis to any actual or potential New Lender or potential Agent or other assignee or transferee of any rights, benefits or obligations under this Agreement in each case as previously approved in writing by the Lender, such consent not to be unreasonably withheld or delayed, such information about the Borrower and any Subsidiary of the Borrower (and so that the Borrower shall procure any further requisite consent from each Subsidiary) and their respective business and financial condition as such Lender shall reasonably consider appropriate.

20. NOTICES

20.1 Method

Each notice or other communication to be given under this Agreement shall be given in writing in English and, unless otherwise provided, shall be made by fax or letter.

20.2 Delivery

Any notice or other communication to be given by one Party to another under this Agreement shall (unless one Party has by 15 days' notice to the other Party specified another address) be given to that other Party at the respective addresses given in Clause 20.3.

20.3 Addresses

The address and fax number of the Borrower and the Agent are:

AMENDMENT AND WAIVER TO AMENDED AND RESTATED LOAN AND SECURITY
AGREEMENT DATED MARCH 2, 1999 BETWEEN
BROWN BROTHERS HARRIMAN & CO., AS AGENT FOR ITSELF
AND FLEET NATIONAL BANK F/K/A BANKBOSTON, N.A.
AND
HARVARD APPARATUS, INC.

This Amendment and Waiver to Amended and Restated Loan and Security Agreement (hereinafter, the "Amendment") is made as of the 31st day of December, 1999 by and between HARVARD APPARATUS, INC., a Massachusetts corporation with its principal executive office at 84 October Hill Road, Holliston, Massachusetts (hereinafter, the Borrower") and BROWN BROTHERS HARRIMAN & CO. (the "Agent"), as agent for itself and FLEET NATIONAL BANK f/k/a BankBoston, N.A., (hereinafter, the "Lenders"), in consideration of the mutual covenants contained herein and the benefits to be derived herefrom. Unless otherwise specified herein, all capitalized terms shall have the same meaning as set forth in the Loan Agreement (as defined hereinbelow).

W I T N E S S E T H:

WHEREAS, the Borrower executed and delivered to the Agent a certain Amended and Restated Loan and Security Agreement dated March 2, 1999 (hereinbefore and hereinafter, the "Loan Agreement") pursuant to which, among other things, the Lenders extended in favor of the Borrower a Revolving Credit in the original maximum principal amount of \$3,750,000.00 and Term Notes in the aggregate original principal amount of \$2,100,000.00; and

WHEREAS, the Borrower has requested that the Lenders (i) amend Section 7-8 of the Loan Agreement, and (ii) provide a one-time waiver of the prepayment required pursuant to Section 2-2 of the Loan Agreement solely as it relates to the Borrower's 1999 year end consolidated, audited financial statement; and

WHEREAS, the Lenders have indicated their willingness to do so, BUT ONLY on the terms and conditions contained in this Amendment; and

WHEREAS, the Borrower has determined that this Amendment is in the Borrower's best interest.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. The Borrower hereby certifies to the Lenders that, to the best of the Borrower's knowledge and belief after due inquiry, the representations and warranties contained in the Loan Agreement, as modified by this Amendment, are true as of the date hereof and that

no Event of Default under the Loan Agreement or any document executed in connection therewith has occurred and is continuing.

2. The Borrower acknowledges and agrees that the Borrower has no offsets, defenses, claims or counterclaims against the Lenders with respect to the Loan Agreement, this Amendment or any other document, instrument or agreement executed and delivered by Borrower to any of the Lenders in connection therewith and, to the extent that the Borrower has any such offsets, defenses, claims or counterclaims, the Borrower hereby affirmatively WAIVES any such offsets, defenses, claims or counterclaims and specifically RELEASES the Lenders for any such liability on account thereof.

3. Section 7-8 of the Loan Agreement is hereby amended by deleting same in its entirety and substituting the following therefor:

"7-8. PROFITS. The Borrower's consolidated net income (exclusive of imputed interest on warrants) after taxes shall be no less than (a) \$1,000,000.00 in fiscal year 1999, (b) \$1,200,000.00 in fiscal year 2000, and (c) \$1,400,000.00 in fiscal year 2001, to be tested upon the earlier of (i) completion of the annual audited financial statements, or (ii) one hundred (100)

days following the end of the Borrower's fiscal year."

4. The Lenders hereby waive the requirement set forth in Section 2-2 of the Loan Agreement obligating the Borrower to make an additional payment to the Agent, for the benefit of the Lenders, in an amount equal to 50% of the Borrower's Excess Cash Flow for the year ending December 31, 1999, as reported in the Borrower's consolidated, audited financial statement delivered to the Agent. The waiver set forth herein is a one-time waiver relating SOLELY to the payment due in connection with the Borrower's year ending December 31, 1999 and shall not be deemed to constitute a waiver by the Agent or Lenders of their right to collect, or a limitation on the Borrower's obligation to make, any future amounts due pursuant to Section 2-2, or otherwise.

5. This Amendment and all other documents, instruments or agreements executed in connection herewith incorporate all discussions and negotiations between the Borrower and the Lenders, either expressed or implied, concerning the matters included herein, any statute, custom, or usage to the contrary notwithstanding. No such discussions or negotiations shall limit, modify or otherwise affect the provisions hereof. No modification, amendment, or waiver of any provision of this Amendment or the Loan Agreement or any provision under any other agreement, document or instrument between the Borrower and the Lenders shall be effective unless executed in writing by the party to be charged with such modification, amendment or waiver, and if such party be a Lender, then by a duly authorized officer thereof.

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6. Except as specifically modified herein, the Loan Agreement shall remain in full force and effect as originally written and the Borrower hereby ratifies and confirms all terms and conditions contained therein and further ratifies and reaffirms all representations and warranties made therein as of the date hereof.

7. This Amendment shall be construed in accordance with and governed by the laws of the Commonwealth of Massachusetts and shall take effect as a sealed instrument.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals as of the date first written above.

HARVARD APPARATUS, INC.

By: /s/ David Green

Title: President

ACKNOWLEDGED AND AGREED:

BROWN BROTHERS HARRIMAN & CO.,
as Agent and as a Lender

By: /s/ Timothy T. Telman

Name: Timothy T. Telman

Title: Vice President

FLEET NATIONAL BANK f/k/a
BankBoston, N.A.,
as a Lender

By: /s/ Michael Brochetti

Name: Michael Brochetti

Title: Vice President

SECOND AMENDMENT TO AMENDED AND RESTATED LOAN AND SECURITY
AGREEMENT DATED MARCH 2, 1999 BETWEEN
BROWN BROTHERS HARRIMAN & CO., AS AGENT FOR ITSELF
AND FLEET NATIONAL BANK F/K/A BANKBOSTON, N.A.
AND
HARVARD APPARATUS, INC.

This Second Amendment to Amended and Restated Loan and Security Agreement (hereinafter, the "Amendment") is made as of this 14th day of July, 2000 by and between HARVARD APPARATUS, INC., a Massachusetts corporation with its principal executive office at 84 October Hill Road, Holliston, Massachusetts (hereinafter, the "Borrower") and BROWN BROTHERS HARRIMAN & CO. (the "Agent"), as agent for itself and FLEET NATIONAL BANK f/k/a BankBoston, N.A., (hereinafter, the "Lenders"), in consideration of the mutual covenants contained herein and the benefits to be derived herefrom. Unless otherwise specified herein, all capitalized terms shall have the same meaning as set forth in the Loan Agreement (as defined hereinbelow).

W I T N E S S E T H:

WHEREAS, the Borrower executed and delivered to the Agent a certain Amended and Restated Loan and Security Agreement dated March 2, 1999, as amended by Amendment dated as of December 31, 1999 (hereinbefore and hereinafter, as amended, the "Loan Agreement") pursuant to which, among other things, the Lenders extended in favor of the Borrower a Revolving Credit in the original maximum principal amount of \$3,750,000.00 and Term Notes in the aggregate original principal amount of \$2,100,000.00; and

WHEREAS, the Borrower has requested that the Lenders (i) amend the Loan Agreement to provide for a supplemental term loan in the original principal amount of \$2,000,000.00, and (ii) otherwise amend the Loan Agreement as provided for herein; and

WHEREAS, the Lenders have indicated their willingness to do so, BUT ONLY on the terms and conditions contained in this Amendment; and

WHEREAS, the Borrower has determined that this Amendment is in the Borrower's best interest.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. The Borrower hereby certifies to the Lenders that, to the best of the Borrower's knowledge and belief after due inquiry, the representations and warranties contained in the Loan Agreement, as modified by this Amendment, are true as of the date hereof and that no Event of

Default under the Loan Agreement or any document executed in connection therewith has occurred and is continuing.

2. The Borrower acknowledges and agrees that the Borrower has no offsets, defenses, claims or counterclaims against the Lenders with respect to the Loan Agreement, this Amendment or any other document, instrument or agreement executed and delivered by Borrower to any of the Lenders in connection therewith and, to the extent that the Borrower has any such offsets, defenses, claims or counterclaims, the Borrower hereby affirmatively WAIVES any such offsets, defenses, claims or counterclaims and specifically RELEASES the Lenders for any such liability on account thereof.

3. Section 2-1 of the Loan Agreement is hereby amended by deleting same in its entirety and substituting the following therefor:

112-1 TERM NOTES. Upon satisfaction by the Borrower of all conditions precedent to the effectiveness of this Agreement,

the Lender shall make loans to the Borrower (i) in the aggregate amount of \$2,100,000.00 to be repaid in accordance with the terms and conditions of certain Commercial Promissory Notes of even date in the form of EXHIBIT 2-1, and (ii) in the aggregate amount of \$2,000,000.00 to be repaid in accordance with the terms and conditions of certain Supplemental Commercial Promissory Notes dated on or about July __, 2000 in the form of EXHIBIT 2-1A (the Commercial Promissory Notes and the Supplemental Commercial Promissory Notes shall be referred to herein individually and collectively as the "Term Notes").

4. The definition of "Commitment" set forth in Article 4 is hereby deleted in its entirety and replaced with the following:

"Commitment": \$7,850,000 plus Acquisition Loans."

5. The definition of "Funded Debt" set forth in Article 4 is hereby deleted in its entirety and replaced with the following;

"Funded Debt": any and all interest bearing indebtedness of the Borrower or any subsidiary including any and all subordinated indebtedness."

6. The definition of "Subsidiary" set forth in Article 4 is hereby deleted in its entirety and replaced with the following:

"Subsidiary": shall mean, individually and collectively, each entity constituting a subsidiary of the Borrower, including, without

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limitation, the following: (a) Ealing Scientific Limited, (b) Harvard Apparatus Limited, (c) Harvard Apparatus S.A.R.L., f/k/a Ealing S.A.R.L., (d) Biochrom Limited and (e) Hugo Sachs Elektronik Harvard Apparatus GmbH."

7. The Loan Agreement is hereby amended by deleting Exhibits 6-2, 6-4, 6-5, 6-7, 6-21 and 6-24 in their entirety and replacing them with Exhibits 6-2, 6-4, 6-5, 6-7, 6-21 and 6-24 attached hereto and specifically incorporated by reference herein.

8. The Loan Agreement is hereby amended by adding the following Section after Section 13-15:

"SECTION 13-16. PLEDGE/PARTICIPATIONS. Each Lender, may at any time pledge all or any portion of its rights under the loan documents including any portion of any promissory note executed in connection with this Agreement to any one of the twelve (12) Federal Reserve Banks organized under Section 4 of the Federal Reserve Act, 12 U.S.C. Section 341. No such pledge or enforcement thereof shall release such Lender from its obligation under any of the loan documents. In addition, each Lender shall have the unrestricted right at any time and from time to time, and without the consent of or notice to the Borrower, to grant to one or more banks or other financial institutions (each a "Participant") participating interests in such Lender's obligation to lend hereunder and/or any or all of the loans held by the Lender hereunder. In the event of any such grant by a Lender of a participating interest to a Participant, whether or not upon notice to the Borrower, such Lender shall remain responsible for the performance of its obligations hereunder. Each Lender may furnish information concerning the Borrower in its possession from time to time to prospective assignees and Participants provided that the Lender shall require any such prospective assignee or Participant to agree in writing to maintain the confidentiality of such information."

9. This Amendment shall become effective as of the date hereof upon the

satisfaction of the following conditions:

- (a) LOAN DOCUMENTS. The Agent shall have received this Amendment executed and delivered by a duly authorized officer of the Borrower, with a counterpart for each Lender.
- (b) CORPORATE PROCEEDINGS OF BORROWER. The Agent shall have received, with a counterpart for each Lender, resolutions of the Borrower authorizing the execution, delivery and

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performance of this Amendment and all transactions contemplated hereby.

- (c) OFFICER'S CERTIFICATE. The Borrower shall have delivered to the Agent an Officer's Certificate in the form of Exhibit A hereto.
- (d) OPINION OF COUNSEL. The Borrower shall have delivered to the Agent an opinion of Goodwin, Procter & Hoar, LLP, counsel to the Borrower, in form and substance satisfactory to the Agent. The Agent may, in its discretion, waive the terms of this subsection as a precondition to the effectiveness of this Amendment.
- (e) SUPPLEMENTAL TERM NOTES. The Borrower shall have delivered to the Agent Supplemental Commercial Promissory Notes in the aggregate amount of \$2,000,000.00 in the form of EXHIBIT 2-1A.
- (f) CONSENT OF SUBORDINATED DEBT HOLDERS. The Borrower shall have delivered to the Agent a ratification and consent of the Subordination Agreement executed by all parties thereto in form and substance satisfactory to the Agent.
- (g) PLEDGE AGREEMENT. The Borrower shall have delivered to the Agent a Ratification and Amendment to Pledge Agreement ratifying the existing documents and pledging to the Agent for the benefit of the Lenders, the Borrower's stock ownership interest in Hugo Sachs Elektronik - Harvard Apparatus, GmbH, with stock certificates and stock powers pertaining thereto, each in form and substance satisfactory to the Agent. The Agent may, in its discretion, waive the terms of this subsection as a precondition to the effectiveness of this Amendment.
- (h) INTELLECTUAL PROPERTY SECURITY AGREEMENTS. The Borrower shall have delivered to the Agent such intellectual property security documents as the Agent may require, in form and substance satisfactory to the Agent confirming that the Borrower has granted to the Agent a security interest in all intellectual property of the Borrower.
- (i) ACQUISITION DOCUMENTS. The Borrower shall have delivered to the Agent evidence that the acquisition of certain assets of

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AmiKa Corp. free and clear of all liens and encumbrances has been completed, which evidence shall be in form and substance satisfactory to the Agent.

- (j) ADDITIONAL ASSURANCES. The Borrower shall have delivered to the Agent such additional documents, instruments or agreements as the Agent may reasonably require in order to more fully confirm, vest and/or perfect the Agent's first perfected security interest in and to all collateral now or previously granted to the Agent more securely in the Agent and the Lenders and to otherwise give effect to the terms of this Amendment.
- (k) FEES. The Borrower shall have paid to the Agent all fees and expenses due by the Borrower to the Agent and each Lender (including without limitation, the commitment fee related to this Amendment in the aggregate amount of \$20,000.00) as well as all fees and expenses of the Agent's and/or any Lender's attorneys.

10. This Amendment and all other documents, instruments or agreements executed in connection herewith incorporate all discussions and negotiations between the Borrower and the Lenders, either expressed or implied, concerning the matters included herein, any statute, custom, or usage to the contrary notwithstanding. No such discussions or negotiations shall limit, modify or otherwise affect the provisions hereof. No modification, amendment, or waiver of any provision of this Amendment or the Loan Agreement or any provision under any other agreement, document or instrument between the Borrower and the Lenders shall be effective unless executed in writing by the party to be charged with such modification, amendment or waiver, and if such party be a Lender, then by a duly authorized officer thereof.

11. Except as specifically modified herein, the Loan Agreement shall remain in full force and effect as originally written and the Borrower hereby ratifies and confirms all terms and conditions contained therein and further ratifies and reaffirms all representations and warranties made therein as of the date hereof.

12. This Amendment shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts and shall take effect as a sealed instrument.

13. This Amendment may be executed in one or more counterparts, each of which shall be deemed to be an original and all of which, when taken together, shall be deemed to be one and the same instrument.

[Remainder of page intentionally left blank]

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IN WITNESS WHEREOF, the parties have hereunto set their hands and seals as of the date first written above.

HARVARD APPARATUS, INC.

By: /s/ DAVID GREEN

Title: PRESIDENT

ACKNOWLEDGED AND AGREED:

per pro BROWN BROTHERS HARRIMAN & CO.,
as Agent and as a Lender

By: /s/ TIMOTHY T. TELMAN
Name: TIMOTHY T. TELMAN
Title: VICE PRESIDENT

FLEET NATIONAL BANK f/k/a
BankBoston, N.A.,
as a Lender

By: /s/ MICHAEL BROCHETTI
Name: MICHAEL BROCHETTI
Title: VICE PRESIDENT

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Exhibit 2-1A

SUPPLEMENTAL COMMERCIAL PROMISSORY NOTE

\$1,000,000.00

Boston, Massachusetts
July 14, 2000

FOR VALUE RECEIVED, the undersigned promises to pay to the order of BROWN BROTHERS HARRIMAN & CO. (together with any successors or assigns, the "Bank") at the office of the Bank located at 40 Water Street, Boston, Massachusetts ONE MILLION 00/100 Dollars (\$1,000,000.00) as provided below:

In quarterly principal installments of (a) \$62,500.00 each payable on each September 30, December 30, March 30 and June 30 during the term of this Note, and (b) a final principal installment of the entire remaining principal balance on June 30, 2004;

with interest thereon calculated at a floating rate equal to 1% above the Base Rate per annum.

Interest shall be payable quarterly in arrears commencing on September 30, 2000 and on each December 30, March 30, June 30, and September 30 thereafter during the term of this Note and on the date the final principal installment under this Note becomes due or the entire amount of this Note becomes due and payable in full (whether by acceleration or otherwise). If this Note bears interest at a floating rate, the applicable floating rate shall change as and when the Base Rate changes. Interest shall be calculated on the basis of a 360-day year for the actual number of days elapsed including holidays and days on which the Bank is not open for the conduct of banking business.

SECTION 1. PAYMENT TERMS.

1.1 PAYMENTS; PREPAYMENTS. All payments hereunder shall be made by the undersigned to the Bank in United States currency at the Bank's address specified above (or at such other address as the Bank may specify), in immediately available funds, on or before 2:00 p.m. (Boston, Massachusetts time) on the due date thereof. Payments received by the Bank prior to the occurrence of an Event of Default will be applied FIRST to fees, expenses and other amounts due hereunder (excluding principal and interest); SECOND, to accrued interest; and third to outstanding principal. After the occurrence of an Event of Default payments will be applied to the Obligations under this Note as the Bank determines in its sole discretion. The undersigned may pay all or a portion of the amount owed earlier than it is due without penalty. If this Note is payable in installments, prepayments shall be applied to installments of principal in the inverse order of the date on which they become due. Amounts prepaid may not be reborrowed.

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1.2 (Intentionally omitted.)

1.3 DEFAULT RATE. To the extent permitted by applicable law, upon and after the occurrence of an Event of Default (whether or not the Bank has accelerated payment of this Note), interest on principal and overdue interest shall, at the option of the Bank, be payable on demand at a rate per annum (the "Default Rate") equal to 2% per annum above the rate of interest otherwise payable hereunder.

SECTION 2. DEFAULTS AND REMEDIES.

2.1 DEFAULT. The occurrence of any Event of Default as defined in a certain Amended and Restated Loan and Security Agreement dated as of March 2, 1999 entered into by and between, among others, the undersigned and the Agent, as amended through the date hereof (as amended and as may be further amended, the "Loan Agreement").

2.2 REMEDIES. Upon an Event of Default, or at any time thereafter, at the option of the Bank, all Obligations of the undersigned shall become immediately due and payable without notice or demand and, if the Obligations are secured, the Bank shall then have in any jurisdiction where enforcement hereof is sought, in addition to all other rights and remedies provided by agreement or at law or in equity, the rights and remedies of a secured party under the Uniform Commercial Code of Massachusetts. All rights and remedies of the Bank are cumulative and are exclusive of any rights or remedies provided by law or any other agreement, and may be exercised separately or concurrently.

SECTION 3. DEFINITIONS.

For purposes of this Note, the following definitions shall apply:

"Agent" shall mean Brown Brothers Harriman & Co., a New York limited partnership;

"Base Rate" shall have the meaning set forth in the Loan Agreement;

"Obligation" means any obligation hereunder or otherwise of any Obligor to the Bank or to any of its affiliates, whether direct or indirect, absolute or contingent, due or to become due, now existing or hereafter arising including, without limitation, any Liabilities as defined in the Loan Agreement; and

"Obligor" means the undersigned, any guarantor or any other person primarily or secondarily liable hereunder or in respect hereof, including any person or entity who has pledged or granted

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to the Bank a security interest or other lien in property on behalf of the undersigned to constitute collateral for the Obligations.

SECTION 4. MISCELLANEOUS.

4.1 WAIVER, AMENDMENT. No delay or omission on the part of the Bank in exercising any right hereunder shall operate as a waiver of such right or of any other right under this Note. No waiver of any right or amendment hereto shall be effective unless in writing and signed by the Bank nor shall a waiver on one occasion be construed as a bar to or waiver of any such right on any future occasion. Each Obligor waives presentment, demand, notice, protest, and all other demands and notices in connection with the delivery, acceptance, performance, default or enforcement of this Note or of any collateral for the Obligations, and assents to any extensions or postponements of the time of payment or any and all other indulgences under this Note or with respect to any such collateral, to any and all substitutions, exchanges or releases of any such collateral, or to any and all additions or releases of any other parties or persons primarily or secondarily liable hereunder, which from time to time be granted by the Bank in connection herewith regardless of the number or period of any extensions.

4.2 SECURITY; SET-OFF. The undersigned grants to the Bank, as security for the full and punctual payment and performance of the Obligations, a continuing lien on and security interest in all securities or other property belonging to the undersigned now or hereafter held by the Bank and in all deposits (general or special, time or demand, provisional or final) and other sums credited by or due from the Bank to the undersigned or subject to withdrawal by the undersigned; and regardless of the adequacy of any collateral or other means of obtaining repayment of the Obligations, the Bank is hereby authorized at any time and from time to time, after the occurrence and during the continuation of an Event of Default without notice to the undersigned (any such notice being expressly waived by the undersigned) and to the fullest extent permitted by law, to set off and apply such deposits and other sums against the

Obligations of the undersigned, whether or not the Bank shall have made any demand under this Note and although such Obligations may be contingent or unmaturred.

4.3 TAXES. The undersigned agrees to indemnify the Bank from and hold it harmless from and against any transfer taxes, documentary taxes, assessments or charges made by any governmental authority by reason of the execution, delivery, and performance of this Note and any collateral for the Obligations.

4.4 EXPENSES. The undersigned will pay on demand all expenses of the Bank in connection with the preparation, default, collection or enforcement of this Note or any collateral for the

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Obligations, or any waiver or amendment of any provision of any of the foregoing, including, without limitation, reasonable attorneys fees of outside legal counsel, and including without limitation any reasonable fees or expenses associated with any travel or other costs relating to any appraisals, examinations, administration of the Obligations or any collateral therefor, and the amount of all such expenses shall be an Obligation secured by any such collateral.

4.5 BANK RECORDS. The entries on the records of the Bank (including any appearing on this Note) shall be prima facie evidence of the aggregate principal amount outstanding under this Note and interest accrued thereon.

4.6 FINANCIAL INFORMATION. The undersigned shall furnish the Bank from time to time with such financial statements and other information relating to any Obligor or any collateral securing this Note as and to the extent provided in the Loan Agreement.

4.7 GOVERNING LAW, CONSENT TO JURISDICTION. This Note is intended to take effect as a sealed instrument and shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts, without regard to its conflicts of laws rules. The undersigned agrees that any suit for the enforcement of this Note may be brought in the courts of The Commonwealth of Massachusetts or any Federal Court sitting in such Commonwealth and consents to the non-exclusive jurisdiction of each such court and to service of process in any such suit being made upon the undersigned by mail at the address specified below. The undersigned hereby waives any objection that it may now or hereafter have to the venue of any such suit or any such court or that such suit was brought in an inconvenient court.

4.8 SEVERABILITY; AUTHORIZATION TO COMPLETE; PARAGRAPH HEADINGS. If any provision of this Note shall be invalid, illegal or unenforceable, such provisions shall be severable from the remainder of this Note and the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby. The Bank is hereby authorized, without further notice, to fill in any blank spaces on this Note, and to date this Note as of the date funds are first advanced hereunder. Paragraph headings are for the convenience of reference only and are not a part of this Note and shall not affect its interpretation.

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4.9 JURY WAIVER. THE BANK (BY ITS ACCEPTANCE OF THIS NOTE) AND THE UNDERSIGNED AGREE THAT NEITHER OF THEM, INCLUDING ANY ASSIGNEE OR SUCCESSOR SHALL SEEK A JURY TRIAL IN ANY LAWSUIT, PROCEEDING, COUNTERCLAIM, OR ANY OTHER LITIGATION PROCEDURE BASED UPON, OR ARISING OUT OF, THIS NOTE, ANY RELATED INSTRUMENTS, ANY COLLATERAL OR THE DEALINGS OR THE RELATIONSHIP BETWEEN OR AMONG ANY OF THEM. NEITHER THE BANK NOR THE UNDERSIGNED SHALL SEEK TO CONSOLIDATE ANY SUCH ACTION WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED. THE PROVISIONS OF THIS PARAGRAPH HAVE BEEN FULLY DISCUSSED BY THE BANK AND THE UNDERSIGNED, AND THESE PROVISIONS SHALL BE SUBJECT TO NO EXCEPTIONS. NEITHER THE BANK NOR THE UNDERSIGNED HAS AGREED WITH OR REPRESENTED TO THE OTHER THAT THE PROVISIONS OF THIS PARAGRAPH WILL NOT BE FULLY ENFORCED IN ALL INSTANCES.

HARVARD APPARATUS, INC.

Witness:

/s/ Susan Lusinski

By: /s/ David Green

Title: President

Address:

84 October Hill Rd.
Holliston, MA

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Exhibit 2-1A

SUPPLEMENTAL COMMERCIAL PROMISSORY NOTE

\$1,000,000.00

Boston, Massachusetts
July 14, 2000

FOR VALUE RECEIVED, the undersigned promises to pay to the order of FLEET NATIONAL BANK f/k/a BANKBOSTON, N.A. (together with any successors or assigns, the "Bank") at the office of Brown Brothers Harriman & Co. (the "Agent") located at 40 Water Street, Boston, Massachusetts pursuant to the Loan Agreement (defined below) ONE MILLION 00/100 Dollars (\$1,000,000.00) as provided below:

In quarterly principal installments of (a) \$62,500.00 each payable on each September 30, December 30, March 30 and June 30 during the term of this Note, and (b) a final principal installment of the entire remaining principal balance on June 30, 2004;

with interest thereon calculated at a floating rate equal to 1% above the Base Rate per annum.

Interest shall be payable quarterly in arrears commencing on September 30, 2000 and on each December 30, March 30, June 30 and September 30 thereafter during the term of this Note and on the date the final principal installment under this Note becomes due or the entire amount of this Note becomes due and payable in full (whether by acceleration or otherwise). If this Note bears interest at a floating rate, the applicable floating rate shall change as and when the Base Rate changes. Interest shall be calculated on the basis of a 360-day year for the actual number of days elapsed including holidays and days on which the Bank is not open for the conduct of banking business.

SECTION 1. PAYMENT TERMS.

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1.1 PAYMENTS; PREPAYMENTS. All payments hereunder shall be made by the undersigned to the Agent in United States currency at the Agent's address specified above (or at such other address as the Agent may specify), in immediately available funds, on or before 2:00 p.m. (Boston, Massachusetts time) on the due date thereof. Payments received by the Agent prior to the occurrence of an Event of Default will be applied FIRST to fees, expenses and other amounts due hereunder (excluding principal and interest); SECOND, to accrued interest; and THIRD to outstanding principal. After the occurrence of an Event of Default payments will be applied to the Obligations under this Note as the Agent determines in its sole discretion. The undersigned may pay all or a portion of the amount owed earlier than it is due without penalty. If this Note is payable in installments, prepayments shall be applied to installments of principal in the inverse order of the date on which they become due. Amounts prepaid may not be reborrowed.

1.2 (Intentionally omitted.)

1.3 DEFAULT RATE. To the extent permitted by applicable law, upon and after the occurrence of an Event of Default (whether or not the Bank has accelerated payment of this Note), interest on principal and overdue interest shall, at the option of the Agent, be payable on demand at a rate per annum (the "Default Rate") equal to 2% per annum above the rate of interest otherwise payable hereunder.

SECTION 2. DEFAULTS AND REMEDIES.

2.1 DEFAULT. The occurrence of any Event of Default as defined in a certain Amended and Restated Loan and Security Agreement dated as of March 2, 1999 entered into by and between, among others, the undersigned and the Agent, as amended through the date hereof (as amended and as may be further amended, the "Loan Agreement").

2.2 REMEDIES. Upon an Event of Default, or at any time thereafter, at the option of the Agent, all Obligations of the undersigned shall become immediately due and payable without notice or demand and, if the Obligations are secured, the Agent shall then have in any jurisdiction where enforcement hereof is sought, in addition to all other rights and remedies provided by agreement or at law or in equity, the rights and remedies of a secured party under the Uniform Commercial Code of Massachusetts. All rights and remedies of the Agent are cumulative and are exclusive of any rights or remedies provided by law or any other agreement, and may be exercised separately or concurrently.

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SECTION 3. DEFINITIONS.

For purposes of this Note, the following definitions shall apply:

"Agent" shall mean Brown Brothers Harriman & Co., a New York limited partnership;

"Base Rate" shall have the meaning set forth in the Loan Agreement;

"Obligation" means any obligation hereunder or otherwise of any Obligor to the Bank or to any of its affiliates, whether direct or indirect, absolute or contingent, due or to become due, now existing or hereafter arising including, without limitation, any Liabilities as defined in the Loan Agreement; and

"Obligor" means the undersigned, any guarantor or any other person primarily or secondarily liable hereunder or in respect hereof, including any person or entity who has pledged or granted to the Agent a security interest or other lien in property on behalf of the undersigned to constitute collateral for the Obligations.

SECTION 4. MISCELLANEOUS.

4.1 WAIVER, AMENDMENT. No delay or omission on the part of the Agent in exercising any right hereunder shall operate as a waiver of such right or of any other right under this Note. No waiver of any right or amendment hereto shall be effective unless in writing and signed by the Agent nor shall a waiver on one occasion be construed as a bar to or waiver of any such right on any future occasion. Each Obligor waives presentment, demand, notice, protest, and all other demands and notices in connection with the delivery, acceptance, performance, default or enforcement of this Note or of any collateral for the Obligations, and assents to any extensions or postponements of the time of payment or any and all other indulgences under this Note or with respect to any such collateral, to any and all substitutions, exchanges or releases of any such collateral, or to any and all additions or releases of any other parties or persons primarily or secondarily liable hereunder, which from time to time be granted by the Agent in connection herewith regardless of the number or period of any extensions.

4.2 SECURITY; SET-OFF. The undersigned grants to the Bank, as security for the full and punctual payment and performance of the Obligations, a continuing lien on and security interest in all securities or other property belonging to the undersigned now or hereafter held by the Bank and in all

deposits (general or special, time or demand, provisional or final) and other sums credited by or due from the Bank to the undersigned or subject to withdrawal by the undersigned; and regardless of the adequacy of

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any collateral or other means of obtaining repayment of the Obligations, the Bank is hereby authorized at any time and from time to time, after the occurrence and during the continuation of an Event of Default without notice to the undersigned (any such notice being expressly waived by the undersigned) and to the fullest extent permitted by law, to set off and apply such deposits and other sums against the Obligations of the undersigned, whether or not the Agent shall have made any demand under this Note and although such Obligations may be contingent or unmatured.

4.3 TAXES. The undersigned agrees to indemnify the Bank from and hold it harmless from and against any transfer taxes, documentary taxes, assessments or charges made by any governmental authority by reason of the execution, delivery, and performance of this Note and any collateral for the Obligations.

4.4 EXPENSES. The undersigned will pay on demand all expenses of the Bank in connection with the preparation, default, collection or enforcement of this Note or any collateral for the Obligations, or any waiver or amendment of any provision of any of the foregoing, including, without limitation, reasonable attorneys fees of outside legal counsel, and including without limitation any reasonable fees or expenses associated with any travel or other costs relating to any appraisals, examinations, administration of the Obligations or any collateral therefor, and the amount of all such expenses shall be an Obligation secured by any such collateral.

4.5 AGENT RECORDS. The entries on the records of the Agent (including any appearing on this Note) shall be prima facie evidence of the aggregate principal amount outstanding under this Note and interest accrued thereon.

4.6 FINANCIAL INFORMATION. The undersigned shall furnish the Agent from time to time with such financial statements and other information relating to any Obligor or any collateral securing this Note as and to the extent provided in the Loan Agreement.

4.7 GOVERNING LAW, CONSENT TO JURISDICTION. This Note is intended to take effect as a sealed instrument and shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts, without regard to its conflicts of laws rules. The undersigned agrees that any suit for the enforcement of this Note may be brought in the courts of The Commonwealth of Massachusetts or any Federal Court sitting in such Commonwealth and consents to the non-exclusive jurisdiction of each such court and to service of process in any such suit being made upon the undersigned by mail at the address specified below. The undersigned hereby waives any objection that it may now or hereafter have to the venue of any such suit or any such court or that such suit was brought in an inconvenient court.

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4.8 SEVERABILITY; AUTHORIZATION TO COMPLETE; PARAGRAPH HEADINGS. If any provision of this Note shall be invalid, illegal or unenforceable, such provisions shall be severable from the remainder of this Note and the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby. The Bank is hereby authorized, without further notice, to fill in any blank spaces on this Note, and to date this Note as of the date funds are first advanced hereunder. Paragraph headings are for the convenience of reference only and are not a part of this Note and shall not affect its interpretation.

4.9 JURY WAIVER. THE BANK (BY ITS ACCEPTANCE OF THIS NOTE) AND THE UNDERSIGNED AGREE THAT NEITHER OF THEM, INCLUDING ANY ASSIGNEE OR SUCCESSOR SHALL SEEK A JURY TRIAL IN ANY LAWSUIT, PROCEEDING, COUNTERCLAIM, OR ANY OTHER LITIGATION PROCEDURE BASED UPON, OR ARISING OUT OF, THIS NOTE, ANY RELATED INSTRUMENTS, ANY COLLATERAL OR THE DEALINGS OR THE RELATIONSHIP BETWEEN OR AMONG ANY OF THEM. NEITHER THE BANK NOR THE UNDERSIGNED SHALL SEEK TO CONSOLIDATE ANY

SUCH ACTION WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED. THE PROVISIONS OF THIS PARAGRAPH HAVE BEEN FULLY DISCUSSED BY THE BANK AND THE UNDERSIGNED, AND THESE PROVISIONS SHALL BE SUBJECT TO NO EXCEPTIONS. NEITHER THE BANK NOR THE UNDERSIGNED HAS AGREED WITH OR REPRESENTED TO THE OTHER THAT THE PROVISIONS OF THIS PARAGRAPH WILL NOT BE FULLY ENFORCED IN ALL INSTANCES.

HARVARD APPARATUS, INC.

Witness:

/s/ Susan Lusinski

By: /s/ David Green

Title: President

Address:

84 October Hill Rd.
Holliston, MA

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Exhibit A

CERTIFICATE

Date: July 14, 2000

Brown Brothers Harriman & Co., Agent
40 Water Street
Boston, Massachusetts

ATTENTION: TIMOTHY T. TELMAN,
VICE PRESIDENT

Dear Sir:

This Certificate is delivered to you in connection with the amendment of a certain loan arrangement between you as Agent and lender and Harvard Apparatus, Inc. (hereinafter, the "BORROWER"), a Massachusetts corporation with its principal executive offices at 84 October Hill Road, Holliston, Massachusetts as Borrower, and pursuant to Section 9-c of a certain Second Amendment to Amended and Restated Loan and Security Agreement of even date, which amends a certain Amended and Restated Loan and Security Agreement dated March 2, 1999 (hereinafter, as amended, the "LOAN AGREEMENT"). Terms used herein which are defined in the Loan Agreement are used as so defined.

1. The undersigned, acting on behalf of the Borrower, has reviewed each of the loan documents executed in connection with the subject loan arrangements and has had the benefit of independent counsel of the Borrower's selection in connection with the review and negotiation of the loan documents.

2. The undersigned has also reviewed the Loan Agreement and the other loan documents and has made such investigation of the business and affairs of the Borrower and such inquiry of the officers of the Borrower as the undersigned deems appropriate in the circumstances. Following such review and investigation, the undersigned CERTIFIES that, to the best knowledge of the undersigned, as of this day:

(a) All representations and warranties made by the Borrower in the Loan Agreement, and in any other loan document to which the Borrower is a party are true and complete in all material respects on and as of the date hereof.

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(b) No event has occurred or failed to occur, which occurrence or which failure to occur constitutes, or solely with the passage of time or the giving of notice (or both) would constitute, an Event of Default.

Very truly yours,

HARVARD APPARATUS, INC.

By: /s/ David Green

Name: David Green

Title: President

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SCHEDULE 6.2

RELATED ENTITIES

Ealing Scientific LTD.
D/B/A Harvard Apparatus Canada
6010 Vanden Abeele
Saint-Laurent Quebec H4S-1R9
Canada

Harvard Apparatus S.A.R.L.
6 avenue des Andes
Minipare Bat 8
91952 LES ULIS CEDEX
France

Harvard Apparatus LTD.
Fircroft Way
Edenbridge Kent TN8 68E
England

Biochrom Limited
Cambridge Science Park
Milton Road
Cambridge CB4 4FJ
England

Hugo Sachs Elektronik - Harvard Apparatus GmbH
Gruenstrasse 1
D-79232 March-Hugstetten
Germany

SCHEDULE 6.4

TRADE NAMES

i. Trade Names & Styles

Harvard Apparatus Inc.
HAI Acquisition Corp.
Guell LTD.
Harvard Apparatus LTD.
Ealing Scientific LTD.
Harvard Apparatus Canada
Harvard Apparatus S.A.R.L.
Harvard Biosciences
Biochrom Ltd.
Hugo Sachs Elektronik-Harvard Apparatus GmbH

AmiKa Corporation

ii. Legal Names & Statuses

Harvard Apparatus Inc.
HAI Acquisition Corp.
Guell LTD.
Harvard Apparatus LTD.
Ealing Scientific LTD.
Harvard Apparatus S.A.R.L.
Biochrom Ltd.
Hugo Sachs Elektronik-Harvard Apparatus GmbH
AmiKa Corporation

iii. Entities/Parties From Whom Borrower Acquired Assets

Welsh & Bailey Inc., formerly Harvard Apparatus Inc.
Medical Systems Corporation of Greenvale New York
Pharmacia & Upjohn Inc. of Kalamazoo, Michigan
Clark Electromedical Instruments of Reading, United Kingdom
Trega Biosciences Inc. of San Diego, California
Hugo Sachs Elektronik of March-Hugstetten, Germany
Eppendorf-Netheler-Hinz GmbH of Hamburg, Germany
AmiKa Corporation of Columbia, Maryland

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SCHEDULE 6.5

LOCATIONS OF COLLATERAL

The following collateral are kept at other than the offices of the Borrower:

A. Original Stock Certificates:

Ealing Scientific LTD	17,500 shares
Harvard Apparatus LTD	35 shares
Biochrom Limited	35 shares

B. Key Man Life Insurance Policies:

\$1m	On Chane Graziano#00634149
\$1m	On David Green #00634151

Located in safe deposit box at: Middlesex Bank
830 Washington Street.
Holliston, MA 01746

C. Tooling, Molds, Dies and Artwork:

Various items of above nature kept a vendors' location

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SCHEDULE 6.6

TITLE TO ASSETS

Leasetec Systems Credit has made precautionary UCC filings with respect to certain leased equipment.

SCHEDULE 6.7

INDEBTEDNESS

Indebtedness under Subordinated Debentures of the Borrower dated as of March 15, 1996 in an aggregate principal amount outstanding as of July 12, 2000 of \$675,000.

SCHEDULE 6.8

INSURANCE POLICIES

The Borrower has the following insurance policies in place:

Key Man Life Insurance	Lincoln Benefits Life Co.	Chane Graziano #00634151
Key Man Life Insurance	Lincoln Benefits Life Co.	David Green #00634149
Automobile Insurance	Arbella Mutual Ins. Co.	#Q2N070654-00
Flood Insurance	National Flood Ins. Co.	#FL 1-6405-8902-2
Package Policy	Chubb Ins. Group	binder
Foreign Liability	Chubb Ins. Group	binder
Worker's Compensation	Chubb Ins. Group	# 7163-99-07
Commercial Umbrella	Westchester Specialty Group	#CUA 102801-01
Crime/Fiduciary/Executive	Chubb Ins. Group	#8091-63-09-L
Business Travel Accident Ins.	AIG Life Ins. Co.	# GT0804628
Customs Bond	Roanoke Brokerage Serv. Co.	#0049601646/ser#1632552

SCHEDULES 6.9

LICENSES

The Borrower holds the following licenses for:

The manufacture and sale of CPK products

The manufacture and sale of Microdialysis Probes

The sale of pumps under US patent "Infusion Pump for at least one syringe" #8394481

The manufacture and sale of oxygen imaging products under US Patent #4,947,850

The manufacture and sale of Puretup under US Patent Application #09/591,009

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SCHEDULE 6.17

LITIGATION

15 Smith St.	Plaintiff alleges environmental contamination close to a site once occupied by The Harvard Apparatus Company. Harvard Apparatus, Inc. has no relation to The Harvard Apparatus Company.
Marie-Francois Lazzari (Pending)	Plaintiff is a former employee of Harvard Apparatus S.A.R.L. and is suing the company for wrongful termination.
Barry Cohen and Kent Scientific	The Borrower is suing for infringement of tradedress and unauthorized use of proprietary information.

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SCHEDULE 6.20

GOVERNMENT CONTRACTS

The Borrower holds no Government Contracts other than those received in the ordinary course of business in the form of purchase orders. At the present time there are no such orders of a material amount.

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SCHEDULE 6.21

PATENTS, TRADEMARKS & TRADE NAMES

A. The Borrower has the rights to the following Trademarks, trade names and patents:

CPK	-	US Trademark
STRONGHOLD	-	US Trademark
NaviCyte	-	US Trademark

Whole Rat	-	named owned
Oxymap	-	US Tradename
Oxyspot	-	US Tradename
Vertical Diffusion Chamber	-	US Patent #5183760
Horizontal Diffusion	-	US Patent #5591636
Infusion Pump for at Least 1 Syringe	-	Patent Application #08/394,441
Apparatus for Electroelution	-	US Patent #5,340,449
MicroDialysis/MicroElectro Dialysis System	-	US Patent #5,733,442
Micro Volume Dialyzer for Sample Preparation	-	Patent Application #09/272,420
Multi-Well Equilibrium Dialysis System	-	Patent Application #09/586,985
Interior Surface Coated Tube for Sample Preparation	-	Patent Application #60/145,559
Micro-Volume Spin Columns for Sample Preparation	-	Patent Application #08/908,931
Filtration/Separation Container Without In-built Filter	-	Patent Application #60/145,557
Low Fluid Level Warning Device	-	US Patent #5,625,344
Unanchored Sensor and Level Sensor	-	US Patent #5,767,775
Wireless Level Switch	-	US Patent #6,028,525
Unanchored Sensor for Fluid Characteristics	-	US Patent #6,057,773
Staining De-Staining and Quantification of Proteins by Coomassie Blue and Related Dyes	-	US Patent #5,922,186
Droplet Chemical Reaction Chamber	-	US Patent #5,773,238
Hydrophobic Particle-Coated Aqueous Droplet Reaction Chamber	-	Patent Application #09/360,581

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B. Biochrom Limited has the rights to the following trademarks, tradenames and patents:

Registered trademarks:

Biochrom* (Austria, Benelux, former Czechoslovakia, France, Germany, Hungary, Italy, Switzerland, former Yugoslavia)
GeneQuant (Great Britain)
Novaspec (Great Britain)
Ultrospec (Denmark, France, Great Britain, India**, Japan)
Ultropac (France)

* registered owner is Pharmacia Biosystems GmbH. There are two agreements with a German company regarding use of the "Biochrom" name.

** registered owner is Pharmacia AB.

Common law trademarks:

UniSpec	SuproTip
UviMaster	ProTip
UViMaster Plus	Ultra-Micro Spin Column
UViMaster PC	Macro Spin Column
AmiKa	Micro-Tip Column
AmiKa Corp.	LC-Alert
AmiKa Corporation	Smart Injector
Biodialyzer	Wetness-Alert
Dispo-Biodialyzer	CryoGenie
Electro-Concentrator	Cozap
Electro-Separator	Prozap
On-Line Biodialyzer	Disp-Equilibrium Dialyzer
Dynamic Dialyzer	
Micro-Equilibrium Dialyzer	

Copyrights:

Common law copyrights in connection with legally protectable drawings, circuit diagrams, printed circuitboard layouts, photographs for printed circuitboard production, manuals, catalogues, promotional materials, software and websites developed by Seller.

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SCHEDULE 6.24

PAYMENTS TO RELATED PARTIES

1. Interest and principal to Chane Graziano under sub debt and Series A Preferred Stock.

2. Intercompany Loans:

- a. Loan from Ealing Scientific LTD to Harvard Apparatus S.A.R.L. in the principal amount of CDN\$126,000.
- b. Loan from Harvard Apparatus LTD to Harvard Apparatus S.A.R.L. in the principal amount of \$52,000 British Pounds.

THIRD AMENDMENT TO AMENDED AND RESTATED LOAN AND SECURITY
AGREEMENT DATED MARCH 2, 1999 BETWEEN
BROWN BROTHERS HARRIMAN & CO., AS AGENT FOR ITSELF
AND FLEET NATIONAL BANK F/K/A BANKBOSTON, N.A.
AND
HARVARD APPARATUS, INC.

This Third Amendment to Amended and Restated Loan and Security Agreement (hereinafter, the "Amendment") is made as of this ___ day of October, 2000 by and between HARVARD APPARATUS, INC., a Massachusetts corporation with its principal executive office at 84 October Hill Road, Holliston, Massachusetts (hereinafter, the Borrower") and BROWN BROTHERS HARRIMAN & CO. (the "Agent"), as agent for itself and FLEET NATIONAL BANK f/k/a BankBoston, N.A., (hereinafter, the "Lenders"), in consideration of the mutual covenants contained herein and the benefits to be derived herefrom. Unless otherwise specified herein, all capitalized terms shall have the same meaning as set forth in the Loan Agreement (as defined hereinbelow).

W I T N E S S E T H:

WHEREAS, the Borrower executed and delivered to the Agent a certain Amended and Restated Loan and Security Agreement dated March 2, 1999, as amended by Amendments dated as of December 31, 1999 and July 14, 2000 (hereinbefore and hereinafter, as amended, the "Loan Agreement") pursuant to which, among other things, the Lenders extended in favor of the Borrower a Revolving Credit in the original maximum principal amount of \$3,750,000.00, Term Notes in the aggregate original principal amount of \$2,100,000.00, and supplemental Term Notes in the aggregate original principal amount of \$2,000,00.00; and

WHEREAS, the Borrower has requested that the Lenders (i) amend the Loan Agreement to increase the maximum principal amount available under the Revolving Credit from \$3,750,000.00 to \$4,125,000.00, and (ii) otherwise amend the Loan Agreement as provided for herein; and

WHEREAS, the Lenders have indicated their willingness to do so, BUT ONLY on the terms and conditions contained in this Amendment; and

WHEREAS, the Borrower has determined that this Amendment is in the Borrower's best interest.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. The Borrower hereby certifies to the Lenders that, to the best of the Borrower's knowledge and belief after due inquiry, the representations and warranties contained in the Loan Agreement, as

modified by this Amendment, are true as of the date hereof and that no Event of Default under the Loan Agreement or any document executed in connection therewith has occurred and is continuing.

2. The Borrower acknowledges and agrees that the Borrower has no offsets, defenses, claims or counterclaims against the Lenders with respect to the Loan Agreement, this Amendment or any other document, instrument or agreement executed and delivered by Borrower to any of the Lenders in connection therewith and, to the extent that the Borrower has any such offsets, defenses, claims or counterclaims, the Borrower hereby affirmatively WAIVES any such offsets, defenses, claims or counterclaims and specifically RELEASES the Lenders for any such liability on account thereof.

3. Section 1-1(b)(i)(A) of the Loan Agreement is hereby amended by deleting same in its entirety and substituting the following therefor:

"(A) Four Million One Hundred Twenty Five Thousand Dollars
(\$4,125,000.00),"

4. Article 4 of the Loan Agreement is hereby amended by deleting the

definition of "Commitment" set forth therein in its entirety and substituting the following therefor:

"Commitment": \$8,225,000.00 plus Acquisition Loans."

5. Section 7-8 of the Loan Agreement is hereby amended, effective as of December 31, 1999, by deleting same in its entirety and substituting the following therefor:

"7-8. PROFITS. The Borrower's consolidated net income (exclusive of imputed interest on warrants and options) after taxes shall be no less than (a) \$1,000,000.00 in fiscal year 1999, (b) \$1,200,000.00 in fiscal year 2000, and (c) \$1,400,000.00 in fiscal year 2001, to be tested upon the earlier of (i) completion of the Borrower's annual audited financial statements, or (ii) on hundred (100) days following the end of the Borrower's fiscal year."

6. This Amendment shall become effective as of the date hereof upon the satisfaction of the following conditions:

(a) LOAN DOCUMENTS. The Agent shall have received this Amendment executed and delivered by a duly authorized officer of the Borrower, with a counterpart for each Lender.

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(b) CORPORATE PROCEEDINGS OF BORROWER. The Agent shall have received, with a counterpart for each Lender, resolutions of the Borrower authorizing the execution, delivery and performance of this Amendment and all transactions contemplated hereby.

(c) OFFICER'S CERTIFICATE. The Borrower shall have delivered to the Agent an Officer's Certificate in the form of Exhibit A hereto.

(e) AMENDMENT TO MASTER NOTES. The Borrower shall have delivered to the Agent and the Lender an Amendment to each Master Note in form and substance satisfactory to the Agent to reflect the terms of this Amendment.

(f) ADDITIONAL ASSURANCES. The Borrower shall have delivered to the Agent such additional documents, instruments or agreements as the Agent may reasonably require in order to more fully confirm, vest and/or perfect the Agent's first perfected security interest in and to all collateral now or previously granted to the Agent more securely in the Agent and the Lenders and to otherwise give effect to the terms of this Amendment.

(g) FEES. The Borrower shall have paid to the Agent all fees and expenses due by the Borrower to the Agent and each Lender as well as all fees and expenses of the Agent's and/or any Lender's attorneys.

7. This Amendment and all other documents, instruments or agreements executed in connection herewith incorporate all discussions and negotiations between the Borrower and the Lenders, either expressed or implied, concerning the matters included herein, any statute, custom, or usage to the contrary notwithstanding. No such discussions or negotiations shall limit, modify or otherwise affect the provisions hereof. No modification, amendment, or waiver of any provision of this Amendment or the Loan Agreement or any provision under any other agreement, document or instrument between the Borrower and the Lenders shall be effective unless executed in writing by the party to be charged with such modification, amendment or waiver, and if such party be a Lender, then by a duly authorized officer thereof.

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8. Except as specifically modified herein, the Loan Agreement shall remain in full force and effect as originally written and the Borrower hereby ratifies and confirms all terms and conditions contained therein and further ratifies and reaffirms all representations and warranties made therein as of the date hereof.

9. This Amendment shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts and shall take effect as a sealed instrument.

10. This Amendment may be executed in one or more counterparts, each of which shall be deemed to be an original and all of which, when taken together, shall be deemed to be one and the same instrument.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals as of the date first written above.

HARVARD APPARATUS, INC.

By: /s/ James Warren

Title: CFO

ACKNOWLEDGED AND AGREED:

per pro BROWN BROTHERS HARRIMAN & CO.,
as Agent and as a Lender

By: _____
Name: TIMOTHY T. TELMAN

Title: VICE PRESIDENT

FLEET NATIONAL BANK f/k/a
BankBoston, N.A.,
as a Lender

By: _____
Name: _____
Title: _____

INDEPENDENT AUDITORS' CONSENT

The Board of Directors
Harvard Apparatus, Inc.:

We consent to the inclusion of our report dated October 19, 2000, except as to note 20 which is as of October 25, 2000, with respect to the consolidated balance sheets of Harvard Apparatus, Inc. and subsidiaries as of September 30, 2000, December 31, 1999 and 1998 and the related consolidated statements of operations, stockholders' equity (deficit) and comprehensive income (loss), and cash flows for the nine months ended September 30, 2000 and for each of the years in the three-year period ended December 31, 1999 which report appears in this Registration Statement, and to the reference to our firm under the heading "Experts" in this Registration Statement.

/s/ KPMG LLP

Boston, Massachusetts
December 1, 2000

CONSENT OF INDEPENDENT ACCOUNTANTS

We hereby consent to the use in this Registration Statement on Form S-1 of our reports dated February 26, 1998 (for the year ended December 31, 1997) and April 9, 1999 (for the year ended December 31, 1998), except for the US GAAP reconciliation as described in Note 24 which is at September 15, 2000, relating to the financial statements and financial statement schedules of Pharmacia & Upjohn (Cambridge) Limited, which appear in the Registration Statement. We also consent to the references to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers

PRICEWATERHOUSECOOPERS
Cambridge, England
November 29, 2000