Waters
THE SCIENCE OF WHAT'S POSSIBLE.®

The History of Jim Waters and Waters Corporation

1958 – Present

THE EARLY YEARS OF WATERS, 1958 TO 1978

Out of the heartland

What began as an office in the basement of a police station in Framingham, MA, in 1958, has evolved into an $1.9 billion corporation serving tens of thousands of scientists all over the world. The story of Waters Corporation is largely the story of James Logan Waters, who became an industry pioneer and entrepreneur.

The Waters family, whose ancestors were settlers of Salem, MA in 1640, gradually moved west to till the virgin plains of the Midwest, making stops along the way in New York state and Indiana, until finally settling in Nebraska in 1885. Both of Jim's grandfathers owned grocery stores in Nebraska, while an uncle, Paul Babson (cousin of Roger Babson, founder of Babson College in Wellesley, MA), distinguished himself back East in the financial services industry. In 1942 Jim's father took over as president of Boston and Worcester Bus Lines, returning the Waters family to Massachusetts.

With an aptitude for math and science, Jim enrolled in the Navy's V12 Program, an officer training program, and graduated from Columbia University as an ensign with a B.S. degree in Physics in 1946. Having grown up in a family of successful businessmen, Jim likewise strove to make his own way.

A love affair with research

After stints as a university math teacher, Naval officer, project engineer, and entrepreneur, Jim formed Waters Associates in 1958. His plan was to build instruments. The fledgling firm's first offices were in the rented basement of the Framingham, MA police station. Jim's office sat directly below the station's first-floor bathroom.

During these formative years, Waters Associates was what is now fondly referred to as a research boutique. Companies would contract Jim and his five employees to build one-of-a-kind instruments for various purposes. Early products included a boiler feedwater flame photometer, a balloon hydrometer, a nerve gas detector, a lab refractometer, and process control refractometers.

While from its start the company had been self-financed, with proceeds from an earlier business sale, Jim opened Waters Associates to external ownership in 1962. That year he sold a small stake to Hardie Sheppard, a venture capitalist with the firm Payson and Trask, whom he'd met at a chemical industry trade show. The investment: $150,000.

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Polymers – the first "killer app"

Waters Associates' first major break came in 1961 when Jim received a call from a young chemist at Dow Chemical in Freeport, Texas. The chemist, John Moore, wanted Jim to build a refractometer with a 0.1 mL volume flow cell. Jim politely argued the case for the company's 1 mL flow cell, but changed his mind when it was clear Dow Chemical would foot the bill for the new refractometer design.

WATERS HISTORY

During a later visit to Dow Chemical, Waters Sales Manager Larry Maley saw that what Moore had invented was an instrumental method of analyzing polymers using gel columns. Astutely, Waters Associates successfully negotiated with Dow for the exclusive license to Moore's patent. The price tag was $10,000 plus a 10 percent royalty on all sales.

Waters' first gel permeation chromatograph instrument, the GPC 100, debuted in 1963 with the first five units going to Dow Chemical (3), B.F. Goodrich (1), and Esso (1). A physical behemoth by today's standards, the instrument was larger than a refrigerator and weighed five times as much. Impressed with the young firm's progress and intent on making the GPC a commercial hit, Dow Chemical made an additional $400,000 investment in Waters.

According to Jim, GPC "took off like a rocket" in 1965 after Waters Associates sponsored its first GPC Symposium, held in Cleveland, Ohio in the dead of winter. As Jim recalled, about 40 scientists attended, many from the Cleveland area. Half were using GPC successfully; half weren't.

"Naturally, the 20 successful chemists all presented papers, and they taught the other 20 how to succeed –and the technique took off from there," Jim said. Other than Waters Associates, the only companies connected with the GPC business were Prometrics of Chicago, Ill. and another firm with the odd name of Problematics, of Concord, MA

In 1966, Dow converted their license to future royalties from Waters GPC sales into equity in Waters. By 1979, Dow would attain nearly 25 percent ownership in Waters.

A foothold in liquid chromatography

Since its invention in 1952, gas chromatography (GC) had reigned supreme as the most prevalent analytical technique; but only about 15 percent of the million well-characterized organic compounds were volatile and capable of analysis by GC. The remaining 85 percent were non-volatile polymers, carbohydrates, proteins, lipids, amino acids, and other compounds.

In 1965, the technique of liquid chromatography (LC) was a mere curiosity. Most chemists who were proficient in LC worked in university and industrial research labs. That year, Waters Associates embarked on its first LC system project. In an internal document, Jim wrote, "We believe LC can become a mass market, which will extend far beyond the research laboratory into production, quality control, and clinical testing."

To jump-start their LC project, Waters Associates licensed the design of a liquid-liquid chromatograph from Shell Development in Modesto, CA, but discovered that the RI detector drifted wildly. Waters switched to UV detection and liquid-solid packings. In 1967, the ALC 100 – the first Waters LC system – was born.

In the early days of LC, "everybody said that LC would never succeed. They said it would always be 100 times slower than GC. We just didn't understand the physics that applied to separations in a liquid chromatography column," said Waters.

A test of faithJim's faith in LC never wavered. During a visit to Mobil in 1968, an organic chemist told Jim "every organic chemist is going to have to have an LC on his bench to analyze and purify his reactions." Jim could smell his LC market brewing.

At the time, Varian Aerograph, Nester/Faust and DuPont were also on the scent for LC. In a 1990 interview with *Today's Chemist at Work* magazine, Jim was asked what it was like to compete against DuPont's Ph.D.-qualified salespeople. It was a challenge, he said, "but we could easily set up our instrument in a lab, crack the problem, and generally win the sale. We didn't always have the best instrumentation, but we certainly taught chemists how to use LC better than anyone else."

Yet it took a little longer for Jim's bet on LC to pay off

In 1972, Dr. Helmut Hamberger, chief post-doc for Nobel Laureate Dr. Robert Woodward of Harvard University, sought Jim's help. Woodward had won the Nobel Prize for Chemistry in 1965 for his work synthesizing chlorophyll.

"Woodward was trying to synthesize vitamin B12, but the molecule kept rearranging. He wanted us to purify the positional isomers, which were needed to give him the right compound for the final stages of the synthesis," Jim recounted.

Jim agreed to give it a try while Woodward left for a trip to Europe, and brought an instrument to the Harvard lab. Working with Dr. Hamberger, the pair took two days to develop a separation, five more days to obtain larger columns to scale up the separation, and three more days to prep his material. By the time Woodward returned, the two had isolated and purified 200 mg of the precursor compound.

It was then that Jim says he entered what he called "the realm of salesmen."

Emboldened by success, Jim had his photo taken with Woodward, obtained a mailing list of 1,200 U.S. organic chemistry professors, and made and mailed copies of that photo and a letter to each professor on the list. The letter read in part, "Look what we did for Woodward – can we help you?"

One hundred and ten professors responded. Jim phoned each personally.

Waters trademarked the tagline "The Liquid Chromatography People," and soon the young company became synonymous with LC. Jim's sales representatives, most of whom were former customers, eagerly scoured the country for prospects.

"When our salesman made a call, he would set up and run his demonstrator instrument in the customer's lab. People reckoned that if a salesman could use the instrument, then they would be OK," Jim said.

Reinventing the company

Part of the reason liquid chromatography took as long as it did to catch on was that Waters Associates had too many other irons in the fire – and had cast its lot with gel permeation chromatography.

Frank Zenie, who was to become Waters Associates' first president, later admitted in a 1979 *Forbes Magazine* article, "we creamed the market [with GPC] – a classic problem for entrepreneurial companies. The basic market didn't collapse, but the cream was running out at the time of an economic downturn."

In fact, at the time, Waters cash flow was negative. So Jim made several critical decisions: to focus the company on LC, sell off its process instrument business, and bring specialists in research, manufacturing, finance, and marketing on board.

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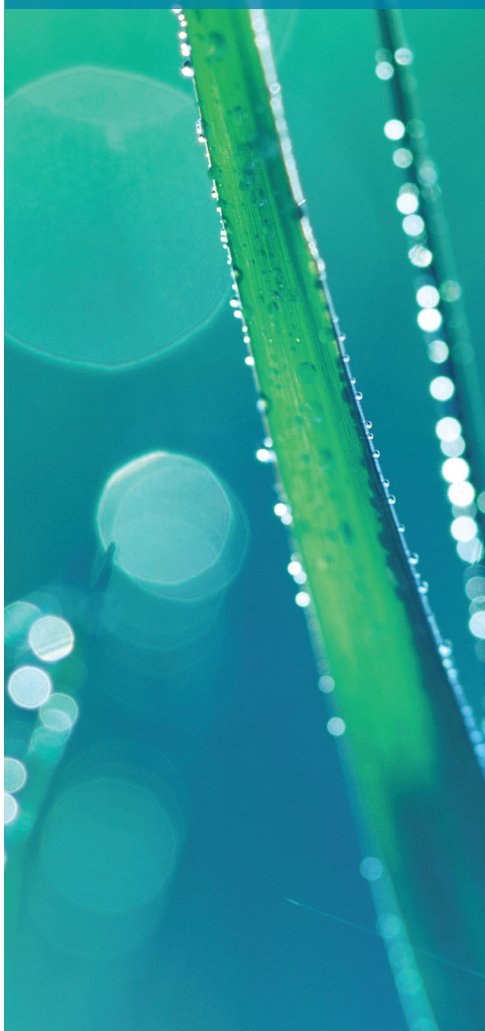


Earlier, in 1969, Hardie Sheppard had introduced Jim to Dimitri D'Arbeloff, then president of Millipore Corporation. Jim invited D'Arbeloff to join Waters' board of directors and to help steer the company back to profitability. Millipore's venture capital subsidiary did its part by making a $600,000 equity investment in Waters.

The expertise and funding came along at just the right time. "The most important thing they gave us was a lot of help with marketing. I've came to realize it was Millipore that taught us to get close to the customer and find out what he really wants. They suggested we do a lot of direct mail and advertise our applications literature, not instruments. It was a good recipe. After that we grew 40 percent a year for seven years."

Jim had another revelation in 1970. "I learned that price and cost have nothing to do with one another. Being idealistic, I didn't think I could charge more than two times what it cost to make an instrument, and that customers wouldn't buy if you raised prices on them. That position ignored the value we were creating for customers, which I later found out that customers were willing to pay for."

Nowhere but up

In 1972, Waters Associates appointed Frank Zenie president. Jim became chairman. "Frank was a much better manager than I," admitted Jim later. It was the first time Jim relinquished day-to-day control.

From 1972 to 1977, the company's sales grew at an astounding compounded annual rate of 40 percent. The company introduced its M6000 pump, the industry's first high-pressure, high-accuracy pumping system, and the firm's first product to win the prestigious Industrial Research Magazine IR100 Award. The company went public on the over-the-counter market (now NASDAQ) in 1973. Headquarters moved from Framingham to a semi-rural 26-acre site in Milford, MA, the same year.

Dr. Elias Corey, then professor of chemistry at Harvard University, was quoted in a *New York Times* article in 1978 as saying the Waters approach was "a revolution in liquid chromatography" and a "good example of the fine technological work in American industry." Waters share of the LC market grew to 40 percent, five times larger than its nearest competitor.

At the time, Jim predicted, "We see LC eventually coming down to every doctor's office and even every farmyard." By 1979, the company had 1,100 employees, more than 10,000 customers, and more than 12,000 instruments installed – all tracked by a computer Jim had programmed himself.

Asked later in an *INC. Magazine* profile about whether he had any regrets about stepping aside as the company leader, Jim said there were none. "Ambition overcame pride," he said. "I wanted that company to succeed more than I wanted to hold on to control of it. The company would have stopped growing if I'd kept my hands in every pie. The entrepreneur makes his biggest contribution simply by picking good people – and then staying out of their way."

Jim gradually removed himself from the day-to-day business, ceding more and more control over to his senior managers. From 1977 to 1979, he served as Waters' chairman, until the company merged with Millipore Corporation.

A NEW ERA, 1978 TO 1993

Millipore purchases Waters

In May of 1980, Waters Associates merged with Millipore Corporation in a stock transaction valued at $167 million.

Re-christened the Waters Chromatography Division, the merger began a challenging decade and a half for both firms. Competition, an economic recession, lost opportunity, and lost focus accounted for anemic growth through the latter half of the 1980s and on into the 1990s.

Complicating matters were the premature death of Chairman D'Arbeloff from cancer, and a helicopter crash that claimed the lives of Millipore's then-president and COO, Jack Mulvaney, and chief technical officer, Dr. Adrian Reti, as they commuted between Millipore and Waters headquarters. The sought-for synergies between the two companies never materialized.

Waters continued its record of innovation while weathering the storm. The age of the microprocessor and the importance of computerized data analysis led to the development of the company's first personal computer software, known as ExpertEase. Other first-of-a-kind products included new chemistries, Microsoft Windows-based software, a system for amino acid analysis, and new detectors.

A NEW BEGINNING, 1993 TO 2003

Waters returns to independence

In 1993, at a time when health care reform loomed large on the horizon and many capital spending plans were put on hold, Millipore put Waters Chromatography Division up for sale.

An investor group led by Waters management bought the assets of the division for $360 million in 1994. Under the leadership of Chairman, President, and Chief Executive Officer Douglas A. Berthiaume, the company renewed its focus and regained its entrepreneurial spirit, ushering in a new era of record growth in sales and profits.

The company began gathering momentum in 1994 with the introduction of Symmetry® HPLC Columns for the "next generation of drug assays." It continued with the introduction of the industry's first bench top LC-MS – the Integrity® System – a novel system for identifying unknown compounds in chemical mixtures.

At the same time, management took steps to improve profitability. Encouraged by increasing sales and profits, the health of the economy, and the strength of the financial markets, management brought the company public in November of 1995, at the equivalent of a split-adjusted $3.75 per share. In 1996, Waters purchased TA Instruments, Inc., of New Castle, DE, to further strengthen its position with the chemical industry.

A prescription for success

When the curtain closed on health care reform in 1994, the pharmaceutical industry embarked on a prolonged period of investment and growth. With it came new and novel techniques for drug discovery. The drug pipeline filled faster than ever before. At the same time, the FDA acted to streamline the drug approval process.

Waters reaped the benefits of the drug industry's increased investment in capital and manpower. An estimated 70 percent of all pharmaceutical testing is HPLC-related.

Not long after its IPO, Waters introduced the Alliance® HPLC System, at Pittcon® 1996. Alliance would quickly become Waters' most successful new product ever and the engine behind Waters growth for the next several years.

Targeted mainly at pharmaceutical scientists in regulated laboratories concerned about the quality of their test results, Waters positioned the Alliance System as a product that raised the bar of performance by which HPLC would be measured. In 1998, Strategic Directions International, in its industry newsletter Instrument Business Outlook, termed Alliance as "one of the most successful products in the history of analytical instruments" and one which "has been an important influence in fundamentally transforming the industry."

Waters introduced Alliance to the market just as mass spectrometry was taking on more and more importance as a detector for HPLC. A revolution in design had moved the technology out of the MS lab into the general-purpose analytical laboratory.

In 1996, Waters Corporation made its largest, most important acquisition to date by acquiring Micromass® Ltd., of Manchester, England. The acquisition immediately put Waters in the forefront of the market for LC-MS instruments.

At HPLC 1999 in Granada, Spain, Waters embarked on its biggest chemistry product launch to date, introducing the revolutionary XTerra® Column brand for drug development applications. XTerra Columns are establishing a new benchmark for high performance by giving pharmaceutical scientists more of what they want – speed, peak shape, and usable pH range.

In late 2002, Waters and Micromass officially merged, allowing the two organizations to work even more closely together. Specifically, a unified distribution system was created to integrate sales, service and technical support for Waters and Micromass brand products under the Waters Corporation banner. This new organization has become a formidable resource with the power to respond to increasing pressures placed on labs that rely primarily on LC-MS.

WATERS' LABORATORY INFORMATICS SOLUTIONS HELP SHORTEN THE DRUG DEVELOPMENT PROCESS AND THEREBY INCREASE PROFITABILITY. THE MARKET EMBRACED THE CONCEPT AND WATERS' LABORATORY INFORMATICS SOLUTIONS ARE NOW INSTALLED AT THE TOP 50 PHARMACEUTICAL COMPANIES...

Carpe diem

By 2002, the industry was at a turning point. Instruments generated so much data that paper-based and manual workflow processes could not keep up. An alternative way to manage and integrate different types of data was needed. Waters acquired two leading informatics firms, Creon Lab Control AG (Frechen, Germany) in 2003 and NuGenesis® Technologies (Westborough, MA) in 2004 to complement its existing Laboratory Informatics suite and successfully merged the two companies the following year. Now scientists can access and share data from previous findings, and apply that knowledge to current research. From the corporate point-of-view, Waters' Laboratory Informatics solutions help shorten the drug development process and thereby increase profitability. The market embraced the concept and Waters' Laboratory Informatics solutions are now installed at the top 50 pharmaceutical companies, with more than 200 seats deployed at the top 10.

REDEFINING SEPARATION SCIENCE, 2004 TO 2014

Disruptive technology – UltraPerformance Liquid Chromatography

Commercial LC systems had been around since 1972 and, after three decades of incremental improvements, they were thought by many to be as good as they would ever get. Not by Waters. After several years of intense development, Waters unveiled a new category of LC technology in 2004 winning a Pittcon Editors Gold Award for Best New Product at the 2004 Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), the industry's largest annual conference. The ACQUITY UPLC System fundamentally changed separation science. It brought laboratories greater speed, resolution and sensitivity to chromatographic separations. For laboratory managers, the benefits were obvious: more and higher-quality information per unit of time and greater productivity leading many managers to rethink their laboratory workflows. Using UPLC, laboratory dependent organizations have reduced solvent consumption by an estimated 10 million liters, which adds up to more than a billion dollars (U.S.) in savings.

The introduction of the ACQUITY UPLC System was a seminal moment in the history of separations science for reasons beyond its immediate impact on laboratories. By unveiling a breakthrough technology, Waters compelled others in the industry "to play an intense game of catch-up," as noted by Bob Stevenson, a long-time industry consultant, columnist and separations expert. The first ACQUITY UPLC System opened the door to a flood of innovation that continues to shape separations science today. What began as a single UPLC system in 2004 has since expanded into a family of fit-for-purpose products.

Propelling the mass spectrometry revolution

The development of atmospheric pressure ionization techniques in the late 1980s cemented the marriage between LC separations and mass spectrometry. This led to the widespread adoption of LC-MS and brought the analytical power of mass spectrometry to a new generation of analytical scientists, particularly in the life science arena.

Granting accessibility to every lab

Previously mass spectrometry had been the province of specially trained analysts working alone out of dedicated laboratories equipped with finely-tuned instruments the size of automobiles. Then, if a biochemist or biologist wanted mass spectral data, he or she would walk their sample down to the mass spectrometry lab, consult with the mass spec expert, submit their sample and wait days for the results to emerge. That all began to change with the introduction of smaller, more affordable, easier to operate and maintain, and more capable mass spectrometers. The introduction of the Waters Xevo® line of mass spectrometers accelerated the trend.

In October 2013, Waters unveiled the ACQUITY® QDa® Detector, a compact tool that was unprecedented in that it could be used by any analytical scientist without the need for any special training. That year, it was named one of the Top Innovations of 2013 by *The Analytical Scientist* magazine and it won a Pittcon Editors' Award the following year. It has since become the fastest-selling mass spectrometer in Waters history.

Probing molecular structure with ion mobility

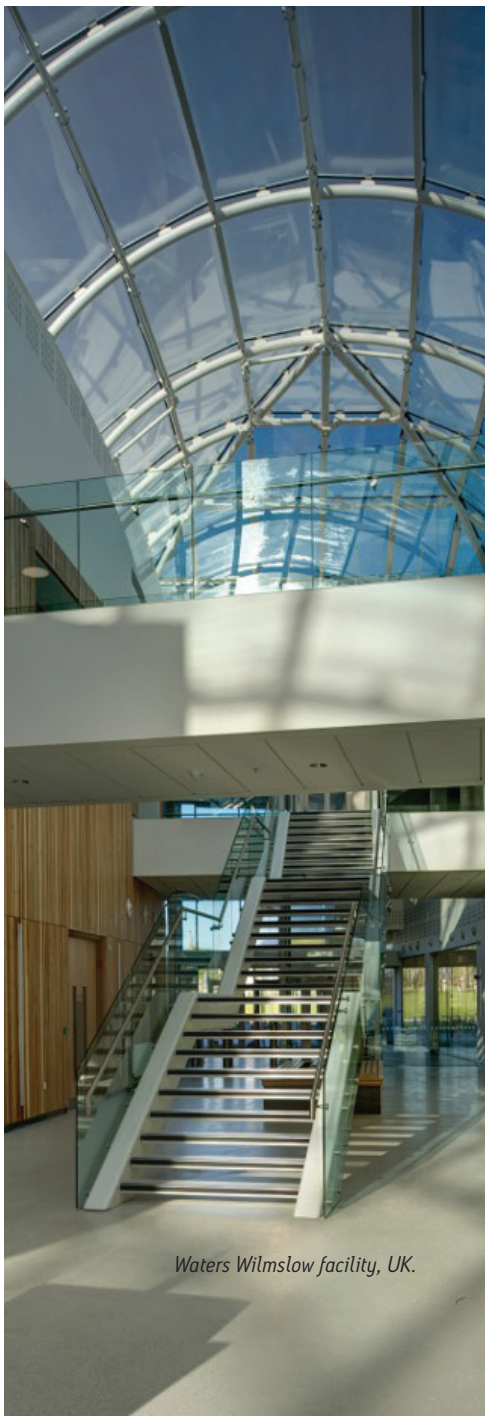
At the same time as the benchtop tandem quadrupole mass spectrometers were taking hold in analytical laboratories around the world, Waters continued to bring more capability to research-grade mass spectrometers. In 2006, Waters introduced the SYNAPT® HDMS® System, a research mass spectrometer and the first commercial instrument to incorporate ion mobility with mass spectrometry. It too, won an Editors Gold Award at the 2007 Pittcon. Ion mobility allows scientists to measure not only the mass and mass to charge ratio of a molecule (e.g. protein) – which all mass spectrometers can do - but reveals information and answers questions about molecular conformation which is important to how proteins function in a living organism.

Germany's world famous Max Planck Institute was one of the first clients to acquire the SYNAPT Technology. The institute's leadership commented, "Our initial impression of the SYNAPT HDMS System was of a very powerful two-dimensional separation device. We wanted a system that could measure large intact protein complexes with high accuracy. The ability to additionally separate species by ion mobility greatly enhances the appeal of this system."

The steady stream of innovations developed by Waters– punctuated by the SYNAPT HDMS System, Xevo TQ-S Mass Spectrometer, and ACQUITY QDa Detector – is a clear sign of Waters' capacity to create new systems and solve even greater analytical challenges with mass spectrometry. Each advance in capability has been a direct response to the needs of laboratory scientists requiring more information from every analysis.

Investing in the laboratory's changing needs, 2014 to present

In September 2014, Waters opened its new Mass Spectrometry Headquarters in Wilmslow, UK – the world's largest facility committed to the support and development of mass spectrometers and mass spectrometry systems. Located near Manchester, the historic epicenter of mass spectrometry invention and development – the facility has been designed to drive the next era of innovation through greater collaboration by providing experts a hub from which to create and share new discoveries.



Waters Wilmslow facility, UK.

The Mass Spectrometry Headquarters will support innovations across several scientific fields, including Health Sciences, an area Waters is particularly committed to supporting as we enter a healthcare revolution focused on improving patient care through molecular-level science. Enabling the prevention, diagnosis and treatment of diseases promises to be a central pillar of the Waters' long-term focus.

Celebrating the past with an eye on the future

For more than five decades, Waters Corporation has combined technological leadership with unequalled application and technical support to ensure customer successes worldwide.

In the 20 years since Waters became a public company in 1995, it has earned accolades from customers and investors alike under the leadership of chairman, president and chief executive officer Doug Berthiaume. With a laser-like focus on separations and mass spectrometry, and a commitment to understand and respond to the needs of its clients, Waters has outperformed its competitors and, for the matter, most other companies in the S&P 500 on many measures of corporate performance.

As one measure of success, Waters' market valuation has grown by 35-fold since its initial public listing. Berthiaume retired in September 2015, but will continue as chairman of Waters' board of directors. His successor as President and CEO is Christopher J. O'Connell, a former Medtronic executive with decades of experience in the medical device industry, who will lead Waters Corporation into a new era of scientific innovation leadership.

Waters has helped advance science in a wide range of fields, including; life sciences, industrial chemicals, environmental management, food safety, and water quality. As it celebrates more than a half-century of growth and achievement, the Company remains dedicated to supporting the next generation of groundbreaking analytical technology.

Endnotes

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