

Bausch & Lomb

Perfecting vision, enhancing life for 150 years

A brief history of Bausch & Lomb's first 150 years

Anniversaries provide an opportunity to reflect on the past – and we at Bausch & Lomb have much to be proud of in our history. Our founders – John Jacob Bausch and Henry Lomb – were committed to innovation and to building lasting relationships based on mutual respect and shared objectives. Above all, they were committed to helping people see, first by selling imported spectacles and magnifiers, then by inventing rubberized frames that made spectacles affordable to those unable to meet the expense of basic vision correction. The company they began would take up their quest, inventing things like microscopes and telescopes to help better see things near and far, introducing the world's first soft contact lens and ultimately offering the products used in today's sophisticated ophthalmic surgeries. We're now poised on the next frontier in eye health: preventing, treating, perhaps even curing sight-robbing eye diseases.

Our success as a company was only possible through the efforts of our past and present employees and the support of our research partners and customers, particularly those in the eye care profession.

This book is dedicated to all those men and women who have played a role over the last century and a half of Bausch & Lomb's history and to those working at or collaborating with our company today. With the shared objective of discovering and bringing to the world innovative ways to help people see, we continue the quest of perfecting vision and enhancing life.

Ronald L. Zarrella
Chairman and Chief Executive Officer

Vision, Courage, Hope

J.J. Bausch

Jacob Bausch was born on July 25, 1830, in Gross Suessen, Germany. His father was a baker who struggled to provide for and raise his nine children after his wife died when Jacob was six. Jacob followed in the footsteps of his older brother, apprenticing as a woodturner and then as an optician. At eighteen, he left home for Berne, Switzerland, to work in a small optical store, where he scraped out a meager living, making eyeglasses for six cents a pair. After a year, he decided to try his luck in America. He sailed from Le Havre in May 1849 on a converted freighter; during the forty-nine-day voyage, the passengers slept on rough wooden berths and cooked their own meals over open fires on the deck.

Upon landing in New York City, Jacob was advised to head west and he set out at once for Buffalo, not realizing that a cholera epidemic was raging. Finding no opticians in Buffalo, Jacob worked as a cook's helper and then as a woodworker, but wages were paltry and work was scarce. After his clothes, shoes and watch were stolen as he slept, Jacob borrowed five dollars and traveled ninety miles east to Rochester, hoping for better opportunities. It was in Rochester that he changed his name to John Jacob Bausch – ever after to be known as J.J. – when he found that there was already a Jacob Bausch living in the city.

After several months, J.J. found work as a woodturner, earning a dollar a day. Still, he dreamed of working in the optical trade, and after a year he ordered a batch of spectacles from his brother in Germany and tried selling them out of a shop window on Main Street, rented from a watchmaker. The dollar-a-week rent for the window proved more than his sales, so J.J. briefly resorted to peddling his wares door to door before returning again to woodworking.

He might have stayed in this trade were it not for an accident with a buzz saw that cost him two fingers on his right hand. Married less than two months when this calamity occurred, the newlyweds had to rely on money borrowed from his employer and funds raised by their friends – funds collected by a fellow German immigrant and carpenter named Henry Lomb. After convalescing for four months, J.J. returned to work, but his fear of the saw made woodworking a nightmare.

Despite his worries of a second failure, J.J. decided to try the optical trade again and once more wrote to his brother in Germany for supplies. While continuing to earn money woodworking, he advertised in German-language newspapers and sold spectacles from his home. After six months, he imported another set of supplies and opened a little shop in the Reynolds Arcade, leaving woodworking behind forever. His persistence would be tested, for it would be eight years before his optical business turned a profit.

J.J. Bausch and his wife, Barbara, had six children, two of whom went on to play major roles in the development of the company he founded. All his life, Bausch remained active in the business and could usually be found on the shop floor, working alongside his employees. It was a common sight for workers arriving at the factory door early in the morning to be greeted by name by the firm's founder. He took great pride in his friendly relationship with the employees and was once vexed when one of them indulged in a rare show of deference; J.J. complained to one of his associates, "That yardman just took off his cap to me. I guess maybe he thought I was the foreman."

John Jacob Bausch died in 1926 at the age of ninety-six. At his funeral, his eulogist honored him as a "man of far-reaching vision, of undaunted courage, of unflinching hope" – justified praise for the man whose long, hard struggles in a new country gave birth to an industry.

Think of Others First ***Captain Henry C. Lomb***

Henry C. Lomb was born November 24, 1828, in Burgham, Germany. When his father, a prominent lawyer, died in 1837, Henry was sent to live with an uncle and was soon apprenticed to a cabinetmaker. Like J.J. Bausch, Henry sailed for New York City in 1849 as famine and revolution broke out across Germany. He went to Rochester and worked as a carpenter until he joined J.J. Bausch in the optical business.

The partnership that began the company was founded on Henry Lomb's loan of sixty dollars to J.J. Bausch. For years Henry continued working as a carpenter, living with Bausch and his wife to save money and investing in the business. When Henry left Rochester in 1861 to fight in the Civil War, Bausch's debts to him had grown to a thousand dollars. Henry had enlisted in the Thirteenth Regiment of the New York Volunteers, which saw action in more than twenty important battles including Bull Run, Fairfax Court House, Antietam and Fredericksburg. By the time Henry was mustered out in May 1863, he had risen through the ranks from sergeant to captain. Throughout the war, he sent part of his Army pay to J.J. Bausch in Rochester to keep the business afloat.

After Henry returned to Rochester, J.J. Bausch made him a partner in the business and renamed it the Bausch & Lomb Optical Company. By 1866, the company's rubber-framed spectacles had met with such success that the partners opened a sales office in New York City, and Henry moved there to run it until it closed in 1881. Upon his return to Rochester, Henry embarked on a series of philanthropic works that were to leave a lasting mark on both the company and the city. Always pre-occupied with the welfare of the employees, Henry started the factory lunchroom and pioneered the idea of a mutual benefit association to help those who were unable to work due to illness. He was active in the Grand Army of the Republic and he began a program, soon adopted all over the country, to interest public and parochial schoolchildren in planting flowers on the graves of soldiers on Memorial Day.

In 1885, he founded the Mechanics Institute to train skilled workers and replace the cumbersome apprenticeship system. A strong believer in the value of education, he anonymously paid the tuition for scores of employees to attend the school. Henry's personal donations kept the school operating during its early years; it survives today as the Rochester Institute of Technology. Henry also introduced kindergartens to the Rochester public school system, started (and helped to fund) a free dental clinic in the city and founded the Rochester Public Health Association. His last public appearance, eight days before his death, was at a Public Health Association meeting where he was reportedly asked for his advice. His reply, which illustrates his lifelong example of modesty, selflessness

and generosity, was, “You are all doing well; you need no advice; all I want to say to you is to be good ... thinking of others first, yourself afterward.”

Henry Lomb married Emilie Klein in 1865; their two children, Adolph and Henry, would both grow up to work for Bausch & Lomb. Henry Lomb died on June 13, 1908, at the age of seventy-nine. His funeral, held at Rochester’s Convention Hall, was considered by some to be the biggest ever held in the city, attended by thousands of citizens. The factory was closed for the day and employees marched as a group to the funeral to pay their respects. Almost twenty-five years later, a public monument was erected in Rochester to honor his memory. The black granite obelisk honors his war and peacetime accomplishments as founder, philanthropist and patriot. Later still, the U.S. government launched the S.S. *Henry Lomb*, a merchant ship named in his honor.

Sixty dollars and a handshake

In 1853, John Jacob Bausch opened a small shop in the Reynolds Arcade in Rochester, New York. Displayed in the window was an array of spectacles, telescopes, microscopes and opera glasses – all European imports sent by his brother in Germany. The American optical trade was in its infancy, and neither optical glass nor lenses were manufactured in the United States. The eyeglasses of the day, usually made of hand-ground lenses of uncertain quality set in expensive frames, were more fashion accessories than aids to vision. Likewise, microscopes were expensive curiosities; as late as 1870, it is estimated that there were only fifty microscopes in America.

In his first shop, Bausch shared space with a cobbler who, during the chill of winter, would throw old shoes onto the fire for warmth. Eager to find more hospitable surroundings, Bausch arranged to share a better shop in the Arcade the following year with a fellow German immigrant who manufactured hair goods. They, too, struggled and Bausch mended broken windowpanes and took on other odd jobs to pay the rent.

After three years in business, Bausch’s fledgling company was losing money and he was in debt to his brother in Germany. Bausch turned for help to his friend, Henry Lomb, who loaned him sixty dollars. The two men shook hands on the deal, and Bausch promised that if the business ever became profitable, he would make Lomb an equal partner.

Despite the loan, the business floundered until the day that J.J. Bausch literally stumbled upon his future – a piece of vulcanized rubber. The plastic of its day, vulcanized rubber – or Vulcanite – was used in a variety of products ranging from jewelry and dentures to pens and combs. It was inexpensive, versatile and, Bausch believed, ideal for eyeglass frames. And so he began to experiment with ways to craft frames out of Vulcanite, first by carving the rubber into the

appropriate shape, and later by melting it on the family stove and hand-forming it into frames. Finally, Bausch designed a hand punch press for stamping out frames from thin sheets of Vulcanite.

In 1861, President Abraham Lincoln put out the call for volunteers to fight in the Civil War. Henry Lomb was among the first to enlist, placing the needs of his adopted country ahead of his own. When Lomb left to fight in the Union Army, the company was struggling to break even and Bausch's debt to him had grown to one thousand dollars. But Bausch's inventive new Vulcanite frames had just gone on the market and the company was poised for success. By the end of the war, the company had grown to thirty employees, was prospering and needed larger facilities. True to his promise, Bausch made Lomb an equal partner and they renamed the firm the Bausch & Lomb Optical Company. Deciding to focus on manufacturing, they quit retail, sold the Reynolds Arcade shop to one of J.J. Bausch's brothers and moved to a small factory at Andrews and Water streets. In 1866, Bausch & Lomb negotiated the exclusive rights to manufacture optical instruments of Vulcanite from its producer, the American Rubber Company. They dissolved the Bausch & Lomb Optical Company and established the Vulcanite Optical Company, with J.J. Bausch and Henry Lomb controlling only two fifths of the stock; the rest was owned by American Rubber. Lomb moved to New York City to supervise the new sales office; Bausch remained in Rochester to oversee the move into a new, larger factory at Water and River streets. In the following years, the company kept growing, fueled by the popularity of Vulcanite frames and other rubber-mounted optical instruments. The steady income allowed Bausch to experiment and innovate, and during the early 1870s, he designed and built water-powered lens grinding machines at the Water Street factory.

Expanding again in 1874, the firm moved to a new three-story building at St. Paul and Vincent streets, a facility that would form the core of the company's Rochester headquarters for more than a century. During the factory's construction, J.J. Bausch's eldest son, Edward, questioned the wisdom of installing a slate roof. He suggested tin, arguing that they would probably have to add stories onto the building and discard the expensive slate. J.J. Bausch, believing that large-scale expansion was surely far in the future, replied that the slate roof would no doubt outlast him. Just fifteen years later, the slate roof was removed to make way for additional stories.

By 1875, when the American Rubber Company's patents expired, the business had become so profitable that J.J. Bausch and Henry Lomb had to pay almost eight times the original value of the stock to purchase it all back from American Rubber. Regaining full ownership of the company, the partners returned the firm to its former name: Bausch & Lomb Optical Company.

Now, the second generation began to make its mark on the company, with Edward Bausch leading the expansion of Bausch & Lomb's line of optical instruments. Born in 1854, just as his father's store was getting started, Edward

grew up with the business; as a child he was responsible for rushing batches of melted rubber from his mother's kitchen stove to his father's shed behind the house. A studious and enterprising youth, Edward designed and built his first simple microscope at age fourteen. He later won a scholarship to Cornell University where he studied engineering. Upon graduation in 1874, he returned home to help plan the layout of the St. Paul Street factory.

At Edward's urging, Bausch & Lomb began developing a line of microscopes, hiring Ernst Gundlach, an expert in microscope lenses, to head the project. The first microscope catalog, a small leaflet issued in 1875, listed five models ranging in price from twenty to one hundred forty dollars. The following year, Bausch & Lomb exhibited its microscopes at the Philadelphia Centennial Exposition, the second world's fair held in the United States. The exposition ran for six months, during which more than ten million visitors came to see the more than 30,000 exhibits in specially constructed buildings in Philadelphia's Fairmount Park. Bausch & Lomb's microscopes won several awards. Soon after this initial success, Gundlach left Bausch & Lomb, preferring research to manufacturing. By that time, Edward had learned enough to take over the nascent instrument division himself. Bausch & Lomb's use of standardized, high-quality machined parts made the company's microscopes affordable for high school and university students, as well as for doctors and research scientists.

In the 1880s, Bausch & Lomb expanded its product line by adding the manufacture of photographic lenses to its repertoire, again making innovations that changed an industry. Photographic lenses had to be accompanied by a diaphragm that controlled the size of the aperture, or opening, and a shutter that controlled the length of the exposure. The most common diaphragm was a large, flat disc with three or four circles of various sizes cut out of it. In 1887, Edward Bausch patented the "between-the-lenses" iris diaphragm and shutter. Although iris-style diaphragms – in which a set of overlapping leaves were used to create a circular opening – were not new, Edward's invention allowed the photographer to adjust the size of the aperture and to open and close it according to the desired exposure times. The iris diaphragm and shutter helped give the "snap" to the increasingly popular snapshot camera. George Eastman's first Kodak camera featured a Bausch & Lomb lens, and until 1912, the Rochester-based Eastman Kodak Company would rely heavily on Bausch & Lomb-made camera lenses and shutters.

During the 1880s, Edward Bausch traveled to Europe where he visited the Zeiss Optical Company in Jena, Germany, and made business contacts that led to an agreement for Bausch & Lomb to manufacture and sell Zeiss's patented photographic lenses in America. These lenses were first listed in the Bausch & Lomb catalog in 1892. Zeiss's new Anastigmat lens was a breakthrough in lens design, eliminating the blurry edges found in photographs taken with the previous "universal" lenses. While Zeiss equipped these lenses with the older insertable diaphragms, Bausch & Lomb offered customers the option of substituting its new

diaphragm shutters for an extra fifteen dollars. A flurry of photographic products followed, and so did expansion into new areas. By 1893, Bausch & Lomb was manufacturing telescopes and binoculars. With the introduction of the Zeiss Stereo-Prism binoculars in 1898, Bausch & Lomb established its dominance in this product line.

As the popularity of photography grew, so did the desire to project photographic images onto a large screen. Bausch & Lomb entered the still projection field in 1902 with the introduction of the Balopticon slide projector. Balopticon projectors and the glass slides they projected were commonly used in schools, universities, civic groups and households.

At the close of the nineteenth century, as Bausch & Lomb prepared to celebrate its fiftieth anniversary, its founders could take pride in the company's record of innovation and advancement, of adversity met and overcome. From a tiny shop in the Reynolds Arcade, the company had grown to occupy a plant with well over one hundred thousand square feet of floor space. There were offices in Chicago and New York, agents in Paris and Philadelphia, and more than a thousand employees. From eyeglass lenses and frames, the list of products manufactured by the company had grown to include microscopes, binoculars, projectors and camera lenses and shutters. J.J. Bausch and Henry Lomb had built more than a company; they had laid the cornerstone of the American optical industry. The partnership of John Jacob Bausch and Henry Lomb, founded on sixty dollars and a handshake, had succeeded beyond all expectations, and both recognized that a large measure of that success was due to the hard work and dedication of their employees. In 1905, J.J. Bausch wrote: "The various difficulties that have crossed our way were removed because every one of us did his level best."

Captions

Page 9: The windows of J.J. Bausch's little shop in the Reynolds Arcade were stocked with displays of microscopes, spectacles and other optical instruments imported from Europe.

Page 10: Edward Bausch, shown here holding one of the first microscopes he designed.

Page 11: A group of employees, photographed in front of the old factory at the corner of Water and River streets. J.J. Bausch is seated in the front row, eighth from the left.

Page 13 1861 J.J. Bausch's revolutionary Vulcanite eyeglass frames became the first great success for the young company.

Page 14: 1874 The new St. Paul Street factory housed the expanded manufacturing operations of the Vulcanite Optical Company. In the employee photograph at right, taken around the turn of the century, founders Henry Lomb

and J.J. Bausch stand in the second row, left. The metal-framed spectacles shown above feature a nosepiece of the type patented by J.J. Bausch.

Page 16: 1875 Bausch & Lomb began manufacturing microscopes under the direction of Edward Bausch. A replica of the first microscope he designed is at right. Above and opposite are other early Bausch & Lomb microscopes.

Page 18: 1891 Bausch & Lomb established a Mutual Benefit Association to provide insurance for its workers. Pictured are employees in the packaging department (above) and others grinding glass for lenses (opposite).

Page 20: 1887 Rochester-based Eastman Kodak Company relied heavily on Bausch & Lomb to supply lenses and shutters for cameras, like the one pictured here.

1887 Edward Bausch's between-the-lenses iris diaphragm and shutter (right; detail opposite) were constructed of overlapping leaves that could be adjusted to control the amount of light admitted through the lens.

Page 22: 1902 Bausch & Lomb entered the projection field with the introduction of Balopticon slide projectors (above and right).

Page 23: 1902 Balopticon projectors could be used to show both transparent and opaque images. Slide shows became frequent adjuncts to lectures, presentations and even dramatic entertainments. The glass slide shown here features Bausch & Lomb factory workers on lunch break.

Turbulent times, extraordinary accomplishments

The year was 1905. Intent on proving that the United States was ready to take its place as a world power, President Theodore Roosevelt was building the "Great White Fleet" – sixteen new battleships that would make up the first naval fleet ever to circumnavigate the globe. The U.S. Navy's gunsights had been produced since 1896 by the Saegmuller Company, a small instrument maker based in Washington, D.C. that bought its lenses from Bausch & Lomb. Now that the press of work had made alliance with a larger, more capable company desirable for Saegmuller, Bausch & Lomb purchased the Saegmuller Company and moved its entire operation to Rochester, thereby entering the field of optical measurement. A sign of the importance to the company of these new quantitative instruments – surveying equipment, range finders and gunsights – was that for a short time the company was renamed Bausch & Lomb-Saegmuller.

The year 1905 also marked the birth of Bausch & Lomb's Scientific Bureau, under the direction of German-trained optician A.H. Kellner. Prior to the establishment of the bureau, Bausch & Lomb's research in optical design and in

manufacturing methods had been performed informally by members of the family, but now the growing company required a separate staff to conduct this work. Operating for many years with only three or four staff members, the Scientific Bureau performed the research that made possible the development of new products and the improvement of old ones.

Before the decade was out, another relationship was formed that would shape Bausch & Lomb's future. By the early 1900s, the Zeiss Company had perfected its own precision range finders and gunsights in Germany and was eager to manufacture them in the United States. Zeiss sought to partner with an existing American firm and turned naturally to Bausch & Lomb. On December 31, 1907, Zeiss entered into an agreement with Bausch & Lomb that was known informally as the "Triple Alliance" because it brought together the expertise of three great optical concerns – Bausch & Lomb, Saegmuller and Zeiss. With the advent of this new relationship, Bausch & Lomb resumed the use of the name Bausch & Lomb Optical Company, and Zeiss purchased a one-fifth interest in the company and granted Bausch & Lomb free use of Zeiss patents for the American market. Zeiss, meanwhile, continued to manufacture its products in Germany for sale in the rest of the world. The Triple Alliance lasted until just after the outbreak of World War I, when Bausch & Lomb bought back Zeiss's interest. In the meantime, Bausch & Lomb had learned much from Zeiss about the development and improvement of optical measuring equipment.

Meanwhile, Edward Bausch's younger brother, William, was undertaking another ambitious and important research and development effort. Until World War I, the secrets of manufacturing optical glass were closely held. Only three firms in England, France and Germany could produce optical glass of reliable quality, and American manufacturers – Bausch & Lomb included – were entirely dependent on them. William Bausch set out to break the European stranglehold on optical glass production. In 1902, he developed a method for using curved iron molds to press heated blocks of glass into the approximate shape of finished lenses. This resulted in a tremendous saving of glass and drastically reduced the time needed for grinding. Still, there was the problem of the glass itself; by 1912, the company was importing several tons of glass each month. As political tensions escalated in Europe, the prospect of losing this supply loomed large. William redoubled his efforts, building several additional furnaces, locating materials for the clay pots in which optical glass could be melted and identifying the chemical components and their proper proportions for the nine different types of glass used in the company's military products.

By June 1915, William had succeeded in producing small quantities of two different types of optical glass; by early 1917, he had produced enough high-quality glass to manufacture several hundred anastigmatic camera lenses. The camera manufacturer who tested them pronounced them superior to lenses made from imported glass.

In March 1917, a month before the United States entered World War I, the U.S. government identified optical glass as a critical material and found that Bausch & Lomb was the only American company capable of producing sufficiently high-quality glass in significant quantities. The government established a glass research laboratory at Bausch & Lomb under the direction of Dr. F. E. Wright of the U.S. Geophysical Laboratory. At the time, the company was producing about two thousand pounds of glass per month – the Munitions Board estimated the need at two thousand pounds per *day*.

Rapid expansion followed, and by the end of 1917, Bausch & Lomb was producing forty thousand pounds of optical glass per month. By the end of the war, the company had made three quarters of the estimated six hundred thousand pounds the military had required; the rest was produced by other facilities using Bausch & Lomb's methods and specifications. At the end of the war, as imported glass once again became available, these other facilities ceased production, but Bausch & Lomb decided that reliance on imported glass would be detrimental in the long run and continued production. By then, the optical glass plant employed more than five hundred people and consumed enough gas each month to supply the needs of a city of sixty thousand.

During the war, Bausch & Lomb had also stepped up production of binoculars, telescopes, range finders and searchlights, employing more than six thousand people in the process. At the war's end, it returned to peacetime proportions and began expanding its operations into ophthalmic instruments. Although spectacles had been around for centuries, the science of measuring the defects of a patient's eyes and crafting a set of lenses specifically designed to correct those defects remained in its infancy. In 1902, Bausch & Lomb's offerings were limited to two rudimentary ophthalmic instruments. But with increased research and development, by 1917, the company advertised its first set of trial frames and test lenses and the following year introduced the binocular corneal microscope and the Ives visual acuity meter. Bausch & Lomb offered several more instruments in the early 1920s, accompanied by a wide variety of charts and other smaller testing apparatus.

In 1921, at the behest of the U.S. Navy, the company entered into a new contractual relationship with the Zeiss Company. During World War I, Zeiss had developed an improved range finder that gave the Germans superiority in fire control. The Allies had captured some specimens but could not figure out how to manufacture them. The Treaty of Versailles gave the Allies control over the manufacture of all military products in Germany, and the Allies subsequently prohibited Zeiss from producing range finders. Under the 1921 contract, Zeiss agreed to share all information on the manufacture of its fire-control equipment with Bausch & Lomb in exchange for production royalties. Bausch & Lomb, in turn, established a special military department staffed by engineers from both companies and overseen by a resident Navy inspector. This relationship lasted until 1938, when Bausch & Lomb declared Zeiss in violation of the contract.

In 1926, John Jacob Bausch died. Edward, who had been largely directing the company's operations since becoming vice president in 1899, succeeded his father as president and served in that capacity until 1935, when he became the first chairman of the board of directors. During the late 1920s and the 1930s, Bausch & Lomb continued to develop new products for the military and across all other product lines. Orthogon and Panoptik eyeglass lenses and frames, improved binoculars, telescopes, spotting scopes and ophthalmic and scientific instruments all were introduced during these years, despite the added challenge of the Great Depression.

Like other socially conscious employers nationwide, Bausch & Lomb struggled to maintain the highest possible employment levels during the Depression. Temporary measures, including reduced salaries and shorter work weeks and days, were implemented to keep the company (and its workers) afloat. In 1933, as the Depression bottomed out, Bausch & Lomb joined with other major employers in Rochester to establish an unemployment insurance fund for local working people.

By 1937, military contracts began to come in and signs of an economic turnaround for the company were evident. Bausch & Lomb took the opportunity to provide employees with group life and health insurance as well as vacations with pay. The future again looked bright. It was an auspicious time, therefore, for the introduction of Ray-Ban sunglasses, developed in 1926 for military aviators and first sold to the public in 1937. The upward trend was confirmed the next year when Bausch & Lomb became a public company.

By this time, Europe was again marching toward war and Bausch & Lomb was again expanding facilities and production to help the defense effort. By 1941, the company occupied more than a million square feet of floor space in Rochester. In July of that year, Bausch & Lomb was among the first companies to win the Army-Navy E Award, conferred by the U.S. Navy to honor excellence in defense production. The Army-Navy E Flag, which flew over Bausch & Lomb's Rochester plant throughout World War II, was a coveted honor, and the Navy would mark further outstanding achievements by awarding additional stars for the flag. Between the attack on Pearl Harbor in December 1941 and October 1944, when the Navy awarded a fifth star for Bausch & Lomb's Army-Navy E Flag, the company produced three million pounds of optical glass, aerial mapping camera lenses and projection equipment, Ortho-Rater vision testers for members of the armed forces, binoculars, range and height finders, periscopes, spotting scopes, gas masks and improved Ray-Ban goggles. In a time of all-out mobilization, wartime employment at the Rochester plant topped ten thousand, and seventy percent of Bausch & Lomb's production was related to military contracts. Bausch & Lomb's wartime conversion was an impressive effort on short notice, and the company's flexibility would continue to prove pivotal for its success. When the

war ended in 1945, the company had already embarked on plans for reconversion to peacetime activities – and a new age for Bausch & Lomb.

Captions

Page 27: An early-1900s worker breaks cooled optical glass using a hammer and chisel.

Page 28: In Bausch & Lomb's St. Paul Street factory, dozens of employees crafted eyeglass lenses and frames.

Page 29: For several years, the Bausch & Lomb plant housed a small grocery store for the convenience of its employees, including founder J.J. Bausch, shown here.

Page 31: 1914 Bausch & Lomb's lines of precision optical measuring devices – range finders (below), gunsights, periscopes (left) and spotting scopes (opposite) – grew out of the Triple Alliance formed in 1907 among Bausch & Lomb, Saegmuller and the Zeiss Company.

Page 32: 1915 Bausch & Lomb's glass plant produces its first samples of optical glass. The company's production of this critical material would help U.S. and allied military personnel see through two world wars. Here, a 1940s-era worker inspects a piece of optical glass for faults and impurities.

Page 33: 1917 Optical glass was fired in large clay pots in the glass plant's gas furnaces. Once the glass cooled, the clay pots were broken open and the glass was chiseled into smaller chunks, like the one pictured here. Later, it would be ground and shaped to make lenses and prisms for Bausch & Lomb's many optical products.

Page 35: 1920s Employees in Bausch & Lomb's lens testing laboratory (opposite) inspected camera lenses for imperfections. The charts on the wall were photographed through the lenses, and flaws in the prints would reveal any potential defect in the lens.

1917 Photographic and cinematographic lenses, originally developed for commercial use, were utilized in the war effort as well.

Page 36: 1930s The U.S. military began requiring vision testing for pilots and enlisted personnel, and Bausch & Lomb supplied the armed forces with a range of ophthalmic instruments. Many of these instruments found their way into doctors' offices in the United States and around the world after World War II, as regular eye examinations became a part of routine health care for children and adults. Pictured left to right are: the Ferree-Rand Perimeter, used to measure visual efficiency in the indirect field; the Ortho-Rater vision tester, used to measure overall visual acuity; the Universal Slit Lamp, a microscope for studying

the cornea; and Green's Refractor, which provided examining ease and improved prescription accuracy. Pictured left is another view of the Universal Slit Lamp.

Page 38: 1930s The Green's Refractor shown here and eye chart projectors (opposite) were among the many ophthalmic instruments Bausch & Lomb began producing during this period.

Page 40: 1941 With the outbreak of World War II, Bausch & Lomb once again expanded its production capacities, making mirrors for searchlights and signal lights (left), gunsights, range finders, lenses for aerial mapping cameras, microscopes for the armed forces and binoculars (opposite page, clockwise from top left). Above is an image of the Army-Navy E Flag, awarded to Bausch & Lomb in 1941 for its contributions to the war effort.

Page 41: 1942 The three-star general shown using binoculars is General Omar Bradley. The women at the microscopes were members of the WAVES (Women Accepted for Volunteer Emergency Service), created as a branch of the U.S. Navy in 1942.

Page 42: 1943 Binoculars, long popular with civilians, were vital equipment in all branches of the military during World War II. The posters opposite, produced by the Works Progress Administration, helped persuade thousands of Americans to "lend" their binoculars to the armed forces.

Page 44: 1943 Ray-Ban aviator goggles, first produced by Bausch & Lomb in 1937, were continually improved throughout the war years. The pilots pictured below were members of the Flying Tigers Squadron, celebrating a successful mission. Left, workers at the glass plant oversee the pouring and spreading of molten optical glass.

Page 45: 1947 After the war, Ray-Ban sunglasses, associated in the public mind with the romance of the military aviator and with the indelible image of General Douglas MacArthur, became popular fashion accessories for civilians.

Page 47: 1950s Bausch & Lomb continued to excel in the production of a wide range of camera lenses (opposite) and filters (above) for use by both professional and amateur photographers. The company also continued to produce a variety of magnifiers and other photographic accessories, like photographers' loupes with interchangeable lenses (left).

From family business to global leader in eye health

As it approached its one hundredth anniversary, Bausch & Lomb was poised in the balance between past and future. Senior management was still largely made up of members of the Bausch and Lomb families, and the stock, though publicly

offered, was closely held. More importantly, with large-scale cancellations of Bausch & Lomb's government contracts, the company's long-term direction was very much in question. In the late 1940s and early 1950s, Bausch & Lomb returned to its well-established strengths and rededicated itself to research and development – a decision that would take it in very new directions.

The company began its reconversion efforts by purchasing the facilities that had been used for Navy production and converting them to eyeglass production. Expansion spread overseas as well, with the opening of manufacturing subsidiaries in Canada, Brazil and Argentina. Bausch & Lomb's Research and Engineering group, successor to the Scientific Bureau, became central to the postwar effort. Much of its work went into the development of new lines of eyeglass frames created and marketed with an eye to the fashion and styles of the time. Ray-Ban sunglasses, famously worn by General Douglas MacArthur, became increasingly fashionable accessories for civilians.

The decade of the 1950s was marked by a rise in leisure-time activities for most Americans. Movie theaters were fighting hard to retain viewers, though, as more and more people bought television sets and chose the small screen over the big one. Bausch & Lomb had been producing camera lenses for the motion picture industry since 1915; its Super Cinephor projection lens had been the industry standard since its introduction in 1922. Movie makers, eager to recapture audiences, were experimenting with ways to make movie viewing more exciting than television – introducing stereo sound and three-dimensional and wide-screen movies – but getting a wide-screen effect still required at least two projectors. Bausch & Lomb helped revolutionize the movie-going experience in 1952 with the introduction of the CinemaScope lens by 20th Century Fox. This technology finally delivered the wide-screen effect by using special attachments on the camera lens to compress the filmed images in width but not height and attachments to the projector's lens to expand those images to fill a screen twice as wide as conventional movie screens of the time. In 1952, Fox made its first movies using CinemaScope technology, *The Robe* and *How to Marry a Millionaire*. The new technology was so popular that MGM and Warner Brothers quickly took it up as well. The subsequent conversion of movie theaters around the country – and around the world – to accommodate wide-screen motion pictures kept Bausch & Lomb busy supplying CinemaScope lenses for several years. In 1955, the Motion Picture Academy of America honored Bausch & Lomb with an Academy Award – the Oscar – for its contributions to the industry.

In the late 1950s, Bausch & Lomb continued to develop high-technology applications for science, industry and the military, expanding its research and development efforts and acquiring several subsidiaries that produced sophisticated scientific instruments. The company's growth in these applications led to the decision to change the company's name from Bausch & Lomb Optical Company to Bausch & Lomb Incorporated in 1960. In the early 1960s, management created two divisions – the Ophthalmic Division and the Scientific

Instrument Division – reflecting the company’s two main areas of research and development emphasis. The Ophthalmic Division specialized in eyeglass and sunglass lenses and frames and ophthalmic instruments. The Scientific Instrument Division produced everything from twelve-dollar student microscopes to advanced spectrophotometers and optical equipment for use in space exploration. Geographic expansion had meanwhile continued apace – by this time, Bausch & Lomb had subsidiaries in seven countries.

In 1966, Bausch & Lomb made perhaps its most important decision since William Bausch decided to manufacture optical glass, by negotiating an agreement with an American company that held a license for soft contact lenses. Contact lenses made of glass had been in use since before World War II. So-called “hard” lenses, made of Lucite polymer, were introduced after the war; they were a vast improvement but were still too bulky for comfort and could be harmful to the eye. Gradually over twenty years, the Lucite lenses had become smaller and thinner, but few users could tolerate wearing them all day. By 1971, only about half a million of the estimated one hundred million Americans requiring vision correction were wearing contact lenses, and about half those patients dropped out in the first year of lens wear.

Bausch & Lomb spent three years and more than three million dollars developing a viable soft contact lens from poly-HEMA, a patented hydrogel material invented by Otto Wichterle, a Czechoslovakian chemist who had created the first soft contact lenses in 1961. In 1969, just as Bausch & Lomb was ready to release its new product, the United States Food and Drug Administration (FDA) classified soft contact lenses as a drug, raising a host of new regulatory hurdles to be overcome. Two more years of testing and development went into the product before the FDA approved Bausch & Lomb’s *Soflens* contact lenses for sale to consumers in March 1971. In less than six months, sales reached a million dollars and, before a year was out, sales topped ten million dollars.

A few early problems were reported with the soft contact lenses, including bacterial infections resulting from their use, and some eye care professionals were reluctant to prescribe and fit the new product. Ultimately, however, Bausch & Lomb’s soft contact lenses revolutionized the vision correction industry and the company. Within three years, a number of competitors had entered the market, but Bausch & Lomb’s early lead was hard to overcome. By 1974, an estimated one million patients wore *Soflens* contact lenses, and five years later, the *Soflens* brand retained a commanding share of the soft contact lens market. The firm also sold huge quantities of lens cleaning and soaking solutions, capturing market leadership for these products as well. In 1982, a company executive remarked that the soft contact lens alone was responsible for making Bausch & Lomb a Fortune 500 company, a status it achieved in 1975.

In the 1980s and 1990s, Bausch & Lomb began a major shift in direction, divesting some long-standing product lines, bolstering others and entering entirely new markets through acquisitions.

The first divestiture was the historically low-margin prescription eyeglass business, which faced increasing competition from foreign producers. Additionally, Bausch & Lomb's strength in producing high-quality glass lenses had become a liability rather than an asset, because the prescription eyeglass market had started to transition to plastic lenses, where the company chose not to compete. In 1985, the industrial instruments division was sold, and two years later, the company parted with its microscope, photogrammetric and ophthalmic instruments businesses.

With the historic foundations of the company gone, Bausch & Lomb shored up its base in contact lens-related businesses. In 1983, Polymer Technology Corporation, a leader in the development of rigid gas permeable contact lens materials and solutions, became a unit of the company. The same year, a new line of extended-wear soft contact lenses was introduced and the company opened its contact lens solutions plant in Greenville, South Carolina, eliminating the need for third-party suppliers and significantly improving profitability.

Sunglass sales also continued to build the top and bottom lines during the 1980s, thanks in large part to an aggressive program of product placement that resulted in Ray-Ban sunglasses making notable appearances in hit movies including *Risky Business*, *The Blues Brothers* and *Top Gun* and on the highly rated television programs *Moonlighting* and *Miami Vice*.

Meanwhile, acquisitions took the company into a wide range of new science and healthcare fields including pharmaceuticals, laboratory animals for medical research and ear, mouth and skin care products like Miracle-Ear hearing aids, Interplak toothbrushes and Curél skin lotion. Bausch & Lomb stuck to tested distribution methods, entering areas in which the products were marketed to consumers on the recommendation of healthcare professionals.

Even as the company expanded into these new areas, it was focusing on expanding its core businesses outside the United States. In the 1980s, a soft contact lens manufacturing facility opened in Waterford, Ireland, sunglass assembly plants were built in Waterford and Hong Kong and the company acquired a group of privately held contact lens solutions manufacturers in Italy. In 1984, the International Division was created, an organizational change that placed greater decision-making authority in the hands of the frontline managers in Bausch & Lomb's foreign subsidiaries, enabling them to respond more effectively to local customers' needs and preferences. This period also saw the establishment of a groundbreaking manufacturing joint venture in the People's Republic of China for contact lenses and lens care solutions.

In 1986, Bausch & Lomb acquired Dr. Mann Pharma, a leading ophthalmic drug company based in West Germany, that was, at the time, the second largest acquisition in the company's history. The acquisition affirmed Bausch & Lomb's commitment to becoming a serious contender in global ophthalmic pharmaceuticals. Founded as a retail pharmacy in 1945, Dr. Mann had grown into a high-technology manufacturing operation, offering more than thirty successful pharmaceutical products by the time of the acquisition. In 1987, the company acquired Pharmafair, Inc., a U.S. manufacturer of generic ophthalmic pharmaceuticals, and a year later announced plans to build a state-of-the-art pharmaceuticals plant in Tampa, Florida.

At the end of the 1980s, the company's strategy seemed to be working. Reaffirming its commitment to innovation and research, the company opened a state-of-the-art research and development facility at its Rochester Optics Center in 1988. And, in 1989, the company's sales reached one billion dollars.

Exemplifying the company's expanding global reach and brand recognition, Bausch & Lomb joined an elite group of TOP (The Olympic Programme) sponsors of the 1992, 1994 and 1996 Olympic Games. TOP sponsorship was limited to just ten international corporations including Coca-Cola and Eastman Kodak, and provided Bausch & Lomb the rights to use Olympic symbols and mascots in advertising, promotions and publicity in more than one hundred countries.

Foreign expansion continued into the early 1990s. In 1992, Bausch & Lomb built a plant in northwestern India and began manufacturing and marketing sunglasses, contact lenses and lens care solutions under a joint venture.

By the middle of the 1990s, the company returned to its heritage and core competencies focused on eye health and divested the sunglass, biomedical, oral, hearing and skin care businesses between 1998 and 1999. The surgical division was established with the December 1997 acquisitions of Chiron Vision and Storz Ophthalmics, through which the company entered the cataract and refractive surgery markets. Presence in the cataract surgery and pharmaceuticals markets was further enhanced by the acquisition of Groupe Chauvin in 2000.

Today, Bausch & Lomb products are available in more than one hundred countries, and sales outside the United States account for about sixty percent of total revenues.

Captions

Page 51: An employee at Bausch & Lomb's glass plant prepares glass for lenses.

Page 52: Bausch & Lomb's work developing the world's first soft contact lens revolutionized the vision care industry.

Page 53: As the number of contact lens wearers increased, so did the need for lens care solutions. The opening of the Greenville, South Carolina solutions plant allowed Bausch & Lomb to meet this demand and significantly improved lens care profitability.

Page 54: In the 1980s and 1990s, Bausch & Lomb's global reach expanded rapidly, as did its brand recognition.

Page 55: The company's manufacturing facilities around the globe, like the contact lens plant in Scotland pictured here, produce Bausch & Lomb's market-leading eye health offerings.

Page 57: 1950s At the end of World War II, Bausch & Lomb converted the factory it had used for defense production for the U.S. Navy into a modern lens manufacturing facility (opposite). Pictured above is the headquarters of AGA Bausch & Lomb in Stockholm, Sweden – one of the company's first overseas subsidiaries.

Page 59: 1952 Twentieth Century Fox released *The Robe*, the first movie shot using Bausch & Lomb's CinemaScope lenses. Three years later, the Motion Picture Academy of America presented Bausch & Lomb with an Oscar in honor of the company's contributions to the film industry.

Page 60: 1960s Bausch & Lomb produced a vast array of microscopes and magnifiers, from sophisticated models for use in industry and cutting-edge science to inexpensive and durable models perfect for elementary schoolchildren.

Page 61: 1963 Bausch & Lomb's longstanding commitment to science education led the company to fund the building of the Edward Bausch Metallographic Laboratory at Cornell University (right).

Page 63: 1970s Bausch & Lomb's fashion-driven lines of sunglasses continued to change with the times. The Ray-Ban line of sunglasses was augmented by the addition of other trendy and chic brands late into the 1990s.

Page 64: 1980s Bausch & Lomb expanded internationally from its U.S. base and established a manufacturing and marketing presence in several countries. Pictured here are employees manufacturing contact lenses in Waterford, Ireland (left) and employees celebrating the production of the first lot of *ReNu MultiPlus* multipurpose solution in Beijing, China (right).

Page 65: 1983 The market-leading Boston lines of rigid gas permeable contact lens materials and solutions were acquired as part of the purchase of Polymer Technology Corporation.

Page 66: 1997 Bausch & Lomb established its surgical business through a series of acquisitions. The *Zyoptix XP* Microkeratome (left) and *Zyoptix* system for personalized vision correction (opposite, bottom left) are used to perform the LASIK refractive surgical procedure. The company's cataract and vitreoretinal business includes microsurgical equipment, viscoelastic products and intraocular lenses such as those pictured opposite (top and bottom right).

Page 68: 2003 At the turn of the twenty-first century, the company's ophthalmic pharmaceuticals portfolio includes proprietary and generic drugs, drug delivery implants, over-the-counter general eye care products and market-leading nutritional products like *PreserVision* ocular vitamins.

Page 69: 2000 Bausch & Lomb's European ophthalmic pharmaceuticals presence expanded beyond the Dr. Mann Pharma franchise in Germany (above left) through the acquisition of Groupe Chauvin of Montpellier, France (opposite).

Page 70 (closing): As Bausch & Lomb celebrates 150 years in business, it takes pride in its heritage of scientific discovery, technological innovation, quality and perseverance, much as J.J. Bausch did nearly a century ago. Bausch wrote, "Perseverance, industry, honesty, and a striving for knowledge have been my maxims." The company Bausch founded in 1853 was infused with those virtues, and they continue to inspire the work of Bausch & Lomb today. Seventy years ago, Herbert Eisenhart, the president of the company and a Bausch family member, wrote words that could as well speak of the company on the cusp of its 150th anniversary: "There is a sense of pride which you can take in the accomplishments of this institution in the advancement of science. You are entering a company which has aided in battling disease through the development of Optics, probably more effectively than any other industry." Today, in Bausch & Lomb's continuing dedication to *perfecting vision, enhancing life* around the world, the spirit of the founders and of the many dedicated people who have followed them through the long years of the company's history, lives on.

Page 71: 2003 Bausch & Lomb's World Headquarters building in Rochester, New York (left). Above, Bausch & Lomb Chairman and Chief Executive Officer Ronald L. Zarrella, alongside employee and customer representatives, celebrates 150 years of *perfecting vision, enhancing life* by ringing the closing bell at the New York Stock Exchange on November 3, 2003.

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Bausch & Lomb is the eye health company, dedicated to perfecting vision and enhancing life for consumers around the world. Its core businesses include soft and rigid gas permeable contact lenses and lens care products, and ophthalmic surgical and pharmaceutical products. The Bausch & Lomb name is one of the best known and most respected healthcare brands in the world. Bausch & Lomb products are available in more than 100 countries. More information about the company can be found on the Bausch & Lomb Web site at www.bausch.com.

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