

## The Company's History of ZEISS - At a Glance

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### How it all started

On 17 November 1846, mechanic Carl Zeiss, who was thirty years of age at the time, opened a small workshop and store in Jena's Neugasse No. 7. Equipped with theoretical knowledge and work experience, as well as contacts in the fields of natural sciences and mathematics at the University of Jena, within just a few months, Zeiss had established a customer base for the servicing or customized production of scientific tools and instruments. He also provided glasses, chemical weighing scales, drawing instruments and telescopes. The positive development of his business in the first year inspired Zeiss to hire journeymen and apprentices in 1847. He also rented two rooms in Wagnergasse No. 34 to do his work.

In the summer of 1847, following the advice of his teacher, the botanist Matthias Jacob Schleiden, Zeiss devoted his attention to the building of simple microscopes. In September 1847, he produced the first low-power microscopes. At the beginning of the 1850s, there was an increase in the demand for observation instruments from the Zeiss Workshops, which now enjoyed a good reputation among microscopists due to their meticulous workmanship.

At the time, the level of interest shown by scientists and medical professionals in compound microscopes was growing because these were the only instruments that provided the higher magnifications they wanted. The time-consuming trial-and error method required to build optical systems initially kept Zeiss from building such systems, particularly as he was convinced that there must be some scientific way of determining the individual elements of the optical systems. However, the competitive scenario forced him to build compound microscopes in the traditional way from 1857 onwards.

In the second half of the 1860s, Zeiss persuaded private lecturer for physics at the University of Jena, Ernst Abbe, to tackle the task of creating a mathematical foundation for designing microscope objectives. The collaboration of the two men started with Abbe suggesting that the lens elements should already be tested during the work process with the measuring instruments he had developed for the purpose. He recommended that the optical and mechanical work processes should be separated in microscope construction.

At the end of the 1860s, Abbe turned his attention to the calculation of optical systems. It took him five years to prove that increasing the size of the aperture perfects the function of the microscope. The physicist saw that the wave nature of light sets natural limits to the recognition of fine structures which are smaller than half the wavelength of light. During these examinations, Abbe found the formula for the sine condition as a criterion for sharp imaging in the area around the optical axis. The extremely complex theoretical work and practical experiments brought the Zeiss Workshop to the limits of its capabilities.

## The beginnings of modern optical instrument design

The microscopes produced using Abbe's theory soon enjoyed the recognition of the international professional world. In 1876, Abbe became a dormant partner in the Optical Workshop.

The growing market for the observation instruments produced in Jena prompted Abbe, who was increasingly growing into his role as the head of the company, to fundamentally change the conditions of production. A new, much more spacious production facility was found under his direction on the outskirts of Jena in the early 1880s. The Optical Workshop had now finally lost its small, cozy image. At the end of the 1880s, the Zeiss workforce totaled 360 people.

Of special importance for the Optical Workshop was that the glass chemist Otto Schott in Jena simultaneously succeeded, with the assistance of Zeiss and Abbe, in producing optical glass using a scientifically substantiated technique. The Schott & Gen. glassworks started operations in September 1884. Without the quality of the new optical glass, it would not have been possible to fully utilize the benefits of Abbe's theory in the Zeiss instruments.

## The Carl Zeiss Foundation in Jena

At the end of the 1880's, Abbe, who was forty-eight at the time, was looking for a way to ensure the long-term existence of the plant he had created with his partner. Abbe was determined to avoid the eventuality of the Zeiss workshops meeting the same destiny as the renowned precision engineering and optical institute in Munich. This company was ruined through the division of the estate of its former manager, physicist and glass chemist Joseph von Fraunhofer, following his death.

In 1889, one year after the death of Carl Zeiss, this prompted Abbe to create the Carl Zeiss Foundation, to which he transferred his own share of the assets in the optical workshop and the Jena glassworks in 1891. In 1896, Ernst Abbe gave the foundation a constitution in which, in a legally effective manner, he stipulated both what type of business activity had to be conducted by the foundation companies and how the profits generated by them should be used.

In this way, he realized his objective of ensuring that the activities of the foundation companies would be permanently focused on science and technology; that a permanent core of personnel would exist for the sophisticated production of precision-mechanical and optical instruments, and that at the University of Jena all those scientists would be promoted who could be beneficial for the foundation companies.

Foundation funds were used to set up university institutes, support professorships and promote research projects. A major proportion of corporate profits was used to enhance existing and create new products. Over the decades, the employees' awareness of working in an enterprise with unusual ownership conditions, the good specialist training available, the knowledge that the Jena products were very special and the social privileges provided created a mentality that extended right into the employees' families and society itself.

This Zeiss mentality made it difficult for political groups to gain any influence on the workforce. This presumably led to the view that Zeiss employees belonged to a "workers' aristocracy".

The foundation's constitution granted legally enforceable social rights to the employees. Every member of the workforce was paid an agreed minimum wage or salary which could not be reduced under any circumstances. Every year, the employees received a wage or salary supplement which was dependent on the profits generated by the company. Six days' paid annual leave was granted.

If layoffs were necessary, the employees affected were given a severance payment by the company. A company health insurance scheme was put in place in 1875. Employees who joined the company before their 40th birthday were entitled to a disability or retirement pension after five years of service. In 1900, the Zeiss Works were one of the few German companies to introduce the eight-hour working day.

## Expansion of the Product Portfolio

With the assistance of creative scientists and engineers, Abbe started to expand the company's production portfolio in the late 1880s. From the refractometers and spectrometers originally created by Abbe for his own needs, the department for Optical Measuring Instruments set up in 1890 developed a large number of further instruments. These were used to analyze the composition of transparent solid and liquid materials on the basis of optical measuring parameters and were utilized in the food industry, medicine and, from the 1920s onwards, also in metallurgy and the metal processing industry. The department also produced rangefinders and photogrammetric instruments.

The Photo-optics department also founded in 1890 already launched the first photo-optical lens on the market in its first year of existence. In 1902, after a decade of intensive work, the Tessar lens, the "eagle eye" of the camera, was presented. This universal camera lens was further developed in many different versions.

Incorporated in the "Tele" department in 1894, the production of binoculars grew very rapidly. In the period to January 1900, 20,000 binoculars were sold. The relief telescopes, periscopes and binoculars were used by the armed forces in many different countries. After the turn of the century, the astronomical telescopes developed by the "Astro" department in the 1890s met with great interest in the public. With the first large instruments, the reflecting telescope for Heidelberg Observatory and the then most powerful instrument for Innsbruck Observatory, the Zeiss Works earned an excellent reputation in the world of astronomy.

Motivated by the Swedish doctor Allvar Gullstrand, the Zeiss Works turned its attention to the development of eyeglasses and measuring instruments for ophthalmology in the period 1908-1912. From 1908, geodetic instruments enriched the production spectrum of the Jena enterprise.

The expansion of the production portfolio was accompanied by an expansion of the production facilities and the workforce. In June 1914, the Zeiss Works employed 5,280 people. The First World War interrupted work on the instruments intended for civilian use. Production was almost exclusively focused on optical and other instruments for military use. Only the "Astro" department was able to build Europe's then largest reflecting telescope for the Potsdam- Babelsberg Observatory.

The military defeat of Germany and the armament restrictions imposed by the Treaty of Versailles prompted the Zeiss Works to devote its attention to precision metrology. The department set up for this purpose soon developed not only simple measuring devices, but also complex, powerful instruments for measuring screw threads, tools, gears, etc. Also in the other product groups, the following two decades saw the use of many different physical and chemical effects for the development of new instruments. Here, the Jena scientists repeatedly implemented the ideas of the instrument users. In microscope construction, not only white but also ultraviolet light was used, and luminescence phenomena were utilized to enhance contrast in the structure of specimens. In the 1930s, the development of the phase contrast technique and the use of polarized light opened up new fields of application. Specially developed cameras simplified the capture and documentation of microscope images.

The first planetarium built for the Deutsches Museum in Munich attracted the attention of wide sections of the public and resulted in many new orders from all over the world. Until the end of the 1930s, 21 planetariums were built, e.g. for Chicago, Milan, Philadelphia and Tokyo.

Although the production of instruments for civilian use had been dominant in the 1920s and early 1930s, Jena never lost sight of the development of military instruments, as the advances being achieved at that time in the field of precision engineering and optics were equally suitable for civilian and military purposes. With its new developments, the Jena enterprise wanted to also maintain its presence on the international military instrument market which experienced rapid growth during these decades.

In the years of the Nazi dictatorship, the company's scientific and production potential was increasingly focused on equipping the German armed forces. Airplanes, submarines, tanks and guns were fitted with Zeiss instruments.

After the unconditional surrender of the German armed forces, the allies also held Zeiss responsible for its contribution to the preparation and conducting of the Nazi war of aggression. The Americans, who occupied the Zeiss Works from April to June 1945, requisitioned patents, design documents and special production equipment. They weakened the potential of the company by deporting leading specialist staff to Heidenheim a.d. Brenz in the West. In 1946/47, the Soviet occupation power dismantled all production equipment and took scientists, engineers and specialist staff to the USSR.

The German Economic Commission (DWK) nationalized the industrial assets of the Carl Zeiss Foundation on 1 June 1948 on account of the company's role as an armaments manufacturer during the war. Robbed of its entrepreneurial character, the foundation then focused its activities primarily on social and cultural issues.

## The Use of Forced Labor

*(Excerpt from: Johannes Bähr, "Die Carl-Zeiss-Stiftung und die Stiftungsbetriebe im 'Dritten Reich' " ["The Carl Zeiss Foundation and the Foundation Companies in the 'Third Reich' "], in: Werner Plumpe (ed.): One Vision – Two Companies. 125 Years of the Carl Zeiss Foundation, Munich, 2014, pp. 147-193)*

Both at Zeiss and Schott, the increased use of force labor was necessary for greater production output, because a large portion of the company workforce was drafted into the army. Prisoners of war and civilian workers who had been recruited or brought to Germany by force from the occupied countries were almost the only available source of manpower. This was particularly true at Zeiss, because the company was hardly in a position to establish other production sites in rural areas due to its manufacturing requirements. The systematic use of forced labor at Zeiss began in the summer of 1940 following the occupation of France, Belgium and the Netherlands, as it did throughout the German economy. Forced labor came into use at Schott a few months later.

According to a list, a copy of which is available in the Jena City Archive, from 1940 through 1945 a total of 8,081 forced laborers worked at the Zeiss factory, and 3,502 worked at the Jenaer Glaswerk Schott & Gen. The use of forced labor at Schott reached its peak in October 1944, with 2,034 forced laborers comprising 42 percent of the workforce. This was also the case at Zeiss, with 4,147 forced laborers making up 29 percent of all employees in October 1944. Among the Zeiss factory's subsidiaries, Feinapparatebau GmbH had the highest percentage of forced laborers. This can be explained by the lack of a permanent workforce at the production facilities located in Jablonec (German: Gablonz) and Tmorary (German: Turn), which the company operated but were owned by the army. At the end of August 1944, 1,128 German workers, 1,166 foreign civil laborers and 535 prisoners of war were working at the production site in Jablonec.

## Two ZEISS plants in Germany

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The reconstruction of the production sites in Jena began in the Summer of 1947. On 4 October 1946, the Zeiss Group in Heidenheim – supported by Jena – founded Opton Optische Werke Oberkochen GmbH, which from January 1947 operated under the name of Zeiss-Opton Optische Werke Oberkochen GmbH with the approval of the Jena-based management.

After the nationalization of the Jena factory, the people in Oberkochen were afraid that the Americans could confiscate the Zeiss assets in the ally-held zones. This was why the Oberkochen management did its utmost to ensure that, due to the fact that the Carl Zeiss Foundation no longer existed in Jena, the foundation bearing Abbe's unmistakable stamp was re-created in the Western federal state of Württemberg. On 23 February 1949, the government of this state ruled that the foundation's legal domicile should be Heidenheim in the West. On 15 January 1951, the firm Carl Zeiss was entered in the Commercial Register of Heidenheim district court. Initially, it only marketed precision-mechanical and optical products, but then took over Zeiss-Opton GmbH on 1 October 1953.

In the late 1940s and during the 1950s, not only the traditional production spectrum was resumed at both Zeiss locations, but the scientists and design engineers of the companies also devoted their attention to new fields of development. Examples include electron microscopes or the nuclear track microscope that Jena built for nuclear research institute near Moscow. Both companies started to produce large astronomical instruments again. The astronomy department in Jena constructed planetariums and 2 m telescopes for the observatories in Tautenburg and Hamburg. In Oberkochen the 150 mm Coudé refractometer and the 650 mm refractor were produced in the 1950s.

With their increasingly similar production lines, the two Zeiss factories became competitors on the German and international markets. Both claimed the trademark rights granted to Carl Zeiss Jena or the Carl Zeiss Foundation for Germany and other states in the period before 1945. The Oberkochen management held the opinion that only Heidenheim/Oberkochen could now rightfully claim these rights. As Jena did not share this view and offered their products on international markets with the trademarks that had existed before 1945, a fierce dispute began between Oberkochen and Jena in spring 1954. It was not until 1971 that both parties managed to reach an agreement in London whereby – provided that their respective location, i.e. Jena or Oberkochen, was appropriately highlighted – each firm was entitled to use the name Carl Zeiss and the lens trademark in specific agreed markets. For example, VEB Carl Zeiss JENA was permitted to offer its products in the Eastern Bloc countries, Syria, in the Lebanon and Kuwait using the agreed trademarks. Carl Zeiss Oberkochen, on the other hand, had the right to distribute the products bearing the name Carl Zeiss in West Germany, West Berlin, the Benelux countries, Italy, Greece and the USA.

From the 1960s onwards, the advances being made in electronics and information technology increasingly offered new possibilities to the field of optical instrument design. The combination of optical, precision-mechanical and electronic principles led to products featuring totally new properties. These new possibilities were pursued by both Jena and Oberkochen. However, the conditions available for such combination processes in instrument design were totally different at the two locations. Oberkochen had a powerful electronic and IT industry at its side and was able to use international developments without restriction.

VEB Carl Zeiss Jena, on the other hand, often had to compensate for missing or defective deliveries from East Germany or other Eastern Bloc states by developing expensive solutions of its own. This led to the inception of such world innovations as the laser micro-spectral analyzer, with which the industrial use of lasers was implemented for the first time in 1964, or the first industrial electron beam lithography system developed in the mid-1970s.

Both Zeiss locations rose to new challenges resulting from the progress being achieved in space research and microelectronics. Oberkochen provided the electronic industry with microelectronic optics, and Jena produced instruments for microelectronic technologies. In 1987, VEB Carl Zeiss Jena employed 32,378 people, while Oberkochen had a workforce of 8,278. Despite the similarity of the two Zeiss locations in the field of science and technology, it must be stressed that their workforces worked under totally different political, economical and social conditions.

VEB Carl Zeiss Jena, which since the 1960s had formed the core of a combine that eventually encompassed an entire sector of industry, was integrated into a central administrative system whose inadequacies became increasingly apparent in the 1970s and 1980s. As a result of the political change taking place in East Germany from fall 1989 onwards, the combine VEB Carl Zeiss Jena was dissolved. The privatization of VEB Carl Zeiss Jena began at the end of June 1990. The companies

Jenoptik GmbH and die Carl Zeiss Jena GmbH emerged from this process in 1991. The Oberkochen-based Zeiss company acquired Carl Zeiss Jena GmbH. When Carl Zeiss Jena GmbH was integrated into the Carl Zeiss Group, the precision engineering and optical industry in the western world was in the midst of a recessionary downturn. As a result, the Jena enterprise not only suffered the negative impact of the structural change in Eastern Europe, but also had to seek a new place on the international markets under the most unfavorable conditions imaginable. A large percentage of the Zeiss jobs in Jena were lost between 1990 und 1995. In 1995, a restructuring process took place in the Carl Zeiss Group, as a result of which Carl Zeiss Jena GmbH assumed responsibility for clear-cut business units.

## Crisis and change at Carl Zeiss

### Reorganization in the years following the reunification

*(Excerpt from Stephan Paetrow: "... Birds of a Feather – 20 Years of Reunification at Carl Zeiss." Hamburg 2011.)*

#### **Fear of being sold off: an uncertain future in the East**

The 2,800 employees that remained when the company Carl Zeiss Jena GmbH was founded in October 1991 initially saw the future through hopeful and enthusiastic eyes. But it soon became clear that orders were much lower than expected and that the company's earnings would fall far short of the forecast 200 million German marks. By the time it completed its first year of operations on 30 September 1992, the company had generated total sales of 101 million German marks – yet in the same period it had made losses of 146 million German marks.

The Jena management team clamored to take over product lines and business divisions in order to secure people's jobs, but Oberkochen made it clear they could not under any circumstances accept the staff cuts that this would entail in the West. In October 1993, the Jena management team faced the consequences of a second year of poor business results and announced an agreement with the Works Council to reduce the company's headcount to 2,000 by January 1994. The existence of the Jena site seemed as uncertain as ever.

#### **From competition to cooperation: conflicts and the first signs of collaboration between East and West**

Even though the company had been formally reunited, Zeissians were still singing from very different song sheets when it came to issues of organization and strategy. The idea of working together had transformed into a kind of competitive sport in which teams from East and West were locked in a struggle for market share.

Particularly for product portfolios that were relatively similar such as photogrammetric and geodetic systems, the competition between Jena and Oberkochen was obvious to everyone. After 1991, merging complementary ranges of products from the East and West proved difficult. The persistent internal competition was so fierce in some areas that it could only be resolved by either the eastern or western site abandoning the business altogether. In the Metrology division for example, the devices

produced in Jena were clearly inferior to Oberkochen's 3D coordinate metrology technology, which was based on modern computer engineering.

The Carl Zeiss company in the West, on the other hand, had long ceased to develop simple, basic devices. Ultimately, however, the production of Jena's devices proved to be too expensive and the precision measuring product range was abandoned.

However, after the signing of the agreement to merge Zeiss's core business, initiatives that successfully exploited the synergies between East and West began to emerge. One example that is familiar to many Zeissians occurred in the field of ophthalmic diagnostic equipment. The result was the SL 120, a slit lamp that was far superior to any competing product at that time.

When in 1992 it became clear that Carl Zeiss Jena GmbH had fallen short of its sales targets by nearly 50 percent – posting annual results of just 101 million German marks rather than 200 million – emotions began to run high on both sides. Distrust of the Executive Board some 350 kilometers away in Oberkochen grew. At the same time, Zeiss colleagues in western Germany were blaming the Jena employees for the fact that no profits were to be distributed for the 1990/91 fiscal year.

The company's second year of operations also fell short of expectations – even though sales rose by 50 percent – and by mid-1993 the Executive Board was warning of the worst recession since the end of World War II. The situation seemed hopeless: Jena needed full-scale business divisions in order to be profitable over the long term, but in the face of such a fragile economic situation Oberkochen was in no mood to worsen its position any further by handing over any of its own business areas. In August 1993, the decision was made to shift the 90 development and sales staff in the Microscopy division from Oberkochen to Jena.

For Jena, the decision was crucial psychologically, but it was still not enough to prevent the looming job losses. Meanwhile, in Oberkochen, people were afraid this marked the beginning of the end for their site, and when the official announcement was made at the works meeting on 8 September 1993 that microscopy would be shifting to Jena and some 400 jobs would be lost in Oberkochen, the Works Council and trade unionists vowed bitter resistance.

A factory meeting was called in Jena on 12 October, at which Labor Director Elk Littow explained why the company could not continue with its current annual sales figures of 60,000 German marks per employee: "We have to reduce our headcount to 2,000."

The reaction in Jena was similar to that in Oberkochen: the Works Council promised to use all the legal means at its disposal to fight for every job, and the employees backed them to the hilt. That left the Carl Zeiss management in both East and West facing protests against their planned cutbacks – and that was not their only problem: although the employee representatives emphasized time and again that they would not accept any attempt to play off the sites against each other, the reality was that the employees in the East and West were increasingly becoming rivals in a struggle for dwindling resources. Both sides had to contribute toward the cost-cutting measures, and the gradual reduction of the Jena headcount to 2,000 finally became a reality in January 1994.

In Oberkochen, some 400 jobs were eliminated through early retirement schemes, part-time working provisions and other impact-minimizing measures, but the Swabians still had to swallow the fact that their microscopy competencies were being relocated to Jena – and there was no guarantee that these staff cuts would be the last.



The years from 1992 to 1994 therefore evoke images of internal conflicts and inevitable downturn in business. Yet despite all the symptoms of a crisis, more and more people were coming to believe that any return to profit would have to be a joint undertaking between East and West – a realization that perhaps the inner reunification of Carl Zeiss was not just a political task, but also an economic necessity.

### **A time for restructuring: how the reorganization of Carl Zeiss began**

Someone from outside the company would have a much freer hand to implement the restructuring plan. During his work for Siemens, the Foundation Commissioner had already come across a suitable replacement for the post of President and CEO: Peter Grassmann. A physicist who had previously headed the medical technology area at Siemens, he was open to new challenges. As the boss of 20,000 employees at Siemens, he had driven forward the verticalization process, in other words the reorganization of development, production and sales into independent and full-fledged product areas.

Up until the end of October 1994, the company suffered walkouts on a regular basis, but after their first positive contact with Grassmann, the Works Council representatives agreed not to stage any more industrial action until further notice. Right from the beginning, Grassmann made it clear that a rigorous redundancy and social compensation plan were the only way forward. In a series of difficult negotiations, Grassmann managed to win the backing of the committees of the Oberkochen-based Carl Zeiss Foundation and pushed the restructuring plan through the Supervisory Board of Carl Zeiss Jena GmbH on 16 February 1995. One of its key components was a reduction in the number of divisions to leave a five-pillar model which would divide all the company's activities into the key business groups of Consumer Optics, Medical Technology, Microscopy, Optoelectronic Systems and Industrial Metrology. This required each former division and production area to be re-defined and assigned to one of the five pillars.

Business areas that were unprofitable or that did not reflect Carl Zeiss's core competencies were to be sold off, converted into joint ventures, or wound up. The plans also included consistent verticalization of the business groups. Instead of organizing production, sales and marketing as centralized services cutting across multiple product areas, the new plan called for everyone who was responsible for a specific product to share the same boat. The other requirement was that Oberkochen and Jena should each have their own, full-scale divisions.

Yet the biggest challenge for everyone who worked at Zeiss was still to come: without implementing the plans to cut 2,600 jobs within the Group, it was evident that the restructuring goals could not be achieved. In Jena, the approval of the restructuring plan proved to be an agonizing decision for the Works Council representatives. The meeting of the Supervisory Board on February 16, 1995 had to be temporarily suspended. Only when it became clear that a refusal to approve the plan would put the existence of the entire Jena site in jeopardy did the employee representatives agree to further cuts involving some 650 job losses, 150 of which were to be compulsory redundancies. It was in that same meeting that the CEO Peter Grassmann joined the management team of Carl Zeiss Jena GmbH, therefore pledging his support for the future of Carl Zeiss in eastern Germany. In terms of its future business fields, Jena was to take primary responsibility for running and developing the areas of microscopy, medical technology and geodetic systems. Jena would be expected to generate one quarter of the Carl Zeiss Group's global revenues. Meanwhile, the negotiations in Oberkochen were also taking their toll.

There was no way of preventing the loss of 1,300 Carl Zeiss jobs in the Ostalb region, but in May 1995 the Works Council and trade union managed to push through the creation of a retraining and upskilling company in order to minimize the number of redundancies. The Bopfingen plant with its 80 employees did not survive Grassmann's radical restructuring process and closed in July 1996. The employees received severance packages or were relocated to Oberkochen. In contrast, the Semiconductor Manufacturing Technology business group, which was so essential to Carl Zeiss's recovery, was massively expanded under the leadership of Dieter Kurz, who subsequently became President and CEO of Carl Zeiss AG. By February 1995, many of the Zeissians in western Germany agreed with Oberkochen's mayor Peter Traub, who wrote an open letter to Grassmann to thank him for finding a way out of the crisis that had threatened to engulf Carl Zeiss.

### **Looking back and moving forward: Carl Zeiss celebrates its 150th anniversary**

"Carl Zeiss mirrors the problems, but also the opportunities inherent in German unity," said German Chancellor Helmut Kohl in his speech to mark the company's 150th anniversary. These words certainly found an echo among the guests gathered in the auditorium of Jena's Volkshaus on 9 November 1996. Since the reunification of Germany, Carl Zeiss had undergone one of the worst crises it had ever experienced, with mass layoffs and elimination of everything but the core business in Jena, plus a structural crisis and job losses in the West. Nonetheless, the reunification of the Carl Zeiss company had been signed and sealed, and by 1995 the newly reunited group of companies had even reached a turning point in its economic fortunes. Just in time for the anniversary celebrations, CEO Peter Grassmann announced that the Group had finally reached breakeven point and was once again operating in the black. So it was no longer so hard to believe when the Foundation Commissioner, Hermann Franz, promised that Carl Zeiss could genuinely become "a flourishing enterprise".

### **Back into profit: the Carl Zeiss Group completes the restructuring process**

In 1995, the Carl Zeiss Group accepted full responsibility for the Jena site. 1995 also saw numerous changes for the group of companies as a whole. The Carl Zeiss Group had divested itself of the companies Kieler Anschütz GmbH and Medizingerätebau Berlin GmbH and the American company Titmus Optical, which had belonged to Carl Zeiss Oberkochen since 1973. At the same time, Carl Zeiss had significantly increased its efforts to cooperate with other organizations. ZEISS ELTRO OPTRONIC GmbH in Oberkochen was founded in collaboration with Daimler-Benz Aerospace AG – precisely the kind of strong partner Carl Zeiss was looking for. Further joint ventures followed, including the company LEO Electron Microscopy, which was founded as a joint venture with Leica.

In business fields such as semiconductors, the development of networks was the only way to make any real headway in the market, and the success of this new strategy was evident in the very first year of the restructuring process. In the 1993/94 fiscal year, the sales of optics for semiconductor fabrication came to 40 million German marks, but by the 1994/95 fiscal year this had doubled to 80 million German marks. At the same time, profits rocketed from 2 million to 17 million German marks.

Nevertheless, the Carl Zeiss workforce still suffered losses as a result of the restructuring scheme, dropping from 15,545 employees on 30 September 1994 to 13,575 employees just one year later. Yet the majority of Zeissians in both the East and West still see the radical changes that began in

1995 as unreservedly positive, and many of them feel that this drastic solution was the only thing that saved Carl Zeiss from ruin.

“We can do it!” – in May 1996, CEO Peter Grassmann wrote an article for the Carl Zeiss in-house magazine that eliminated any lingering doubts as to whether the restructuring plan would succeed. The reason for his upbeat assessment was the half-year report for the ongoing fiscal year, which revealed a 12 percent increase in new orders for the first seven months compared to the previous year’s figures and an eight percent increase in earnings. This positive development was once again driven by the extraordinary growth figures of the Semiconductor Manufacturing Technology area. The demand for high-performance optics for chip fabrication was a phenomenon that was here to stay, with the proportion of microelectronics increasing steadily in just about all everyday products from laptops to ‘intelligent’ refrigerators.

As a result, the Executive Board decided to run the semiconductor manufacturing technology unit as a separate business group effective 1 October 1996. In the 1996/97 fiscal year, Carl Zeiss returned to profit for the first time since the 1994 crisis with a jump in earnings of some 2 million German marks. And Carl Zeiss Jena GmbH could at least point to a qualified success by capping its losses at 38 million German marks. In 1997/98, the Group increased its earnings to some 15 million German marks, and Carl Zeiss Jena managed to cut its losses by 50 percent over the previous year.

As well as the success of the Semiconductor Technology business group, the Industrial Metrology business group was also booming, exceeding its prior-year result by almost 20 percent and recording total revenues of 435 million German marks. In the 1998/99 fiscal year, the ongoing economic crisis in South-East Asia put the profitability of the company’s key semiconductor business in jeopardy. In October 1998, CEO Peter Grassmann appealed to all Zeissians to curb costs wherever possible – but there was no avoiding the inevitable. In the first half of 1999, the Semiconductor Manufacturing Technology business group saw a huge drop in revenues: its earnings plummeted as new orders dropped by almost 50 percent.

Yet the implosion of the chip market caused by events in Asia also showed that Carl Zeiss was capable of weathering a crisis, with the company’s other business groups absorbing virtually all the Semiconductor Technology business group’s losses. This was in large measure attributable to the much greater flexibility of the internal ‘job market’ at Carl Zeiss: just as Zeissians had previously been drafted in from other business groups to help tackle the huge rise in orders in the field of semiconductor optics, the Semiconductor Manufacturing Technology business group was now in turn able to cede part of its workforce to other areas.

Flexible working time accounts also helped the company to deal with the volatile markets, yet by the end of the fiscal year it had slipped slightly into the red. In fiscal 1999/2000, the lasting effects of the restructuring plan finally came to the fore. The Executive Board defined the key fields of future development at Carl Zeiss as the four growth markets of semiconductor/microelectronics, life sciences, eye care and industrial metrology. With consolidated earnings of some 2 billion euros, the Carl Zeiss Group had achieved its best results since the end of World War II – an increase of 22 percent over the previous year’s figure. And, nine years after it was founded, Carl Zeiss Jena GmbH finally made its first profit.

In recognition of the success of the restructuring process, the employees of Carl Zeiss Jena GmbH were incorporated in the Group’s occupational pension scheme with retroactive effect from 1 January. The “Pension Plan 2000” launched in April that year made some key changes to the pension

scheme originally introduced by the founder of the Carl Zeiss Foundation, Ernst Abbe. In the future, part of the pension provisions would be directly linked to the consolidated results, while the other part would continue to be income-related. Jürgen Dömel was delighted:

Jena had also made up ground in the development of new products. Following its success in the collaborative East-West project to create a new generation of slit lamps, Jena was now making waves in other areas, too, especially in eye care diagnostics: individual lens implants are the method of choice for treating cataract patients, and in 1999 Carl Zeiss Jena introduced the IOLMaster, a device that was designed to perform all the relevant measurements required to calculate intraocular lenses at a single workstation using a non-contact and largely automated process.

At the end of 2000, Peter Grassmann stood down as CEO as stipulated in his contract. After the dramatic crisis of 1994, the company was once again back on track and ready for whatever success the future may hold.

Unity becomes a way of life:

Carl Zeiss in its second decade following reunification

### **New autonomy: the founding of Carl Zeiss SMT and Carl Zeiss Meditec**

From computers and cell phones to navigation devices and flat screen TVs – it is amazing how many everyday products would not exist without Carl Zeiss technology. All these devices make use of microchips, the ‘artificial brains’ of our digital world. Modern processors and memory chips can fit billions of transistors into just a few square centimeters. Producing these components using purely mechanical methods would be impossible, so modern chips are fabricated using optical systems. This process – also known as lithography – relies on lenses that push the boundaries of what is technically feasible.

The company Carl Zeiss SMT (Semiconductor Manufacturing Technologies) GmbH (known as SMT AG up until 31 December 2010), which was created from the Carl Zeiss Semiconductor Technology business group on October 1, 2001, is one of the few companies in the world that can supply these kinds of lenses. An even more crucial component of this strategy was the construction in October 2006 of an independent manufacturing center for the optical systems used in the fabrication of semiconductor chips in Oberkochen-Königsbronn, two kilometers from corporate headquarters. The new facility was officially inaugurated in October 2006. Carl Zeiss invested a total of 450 million euros in the facility, which is the most modern of its kind anywhere in the world. It represents the largest single capital investment ever made by the Carl Zeiss Group. At the same time as SMT was being established in Oberkochen, the Jena management was also preparing to carve out another core area of the Carl Zeiss portfolio – the ophthalmic instruments business with sites in Jena and Dublin (USA) was transformed into an autonomous company. In late 2001, Carl Zeiss and the Jena-based company Asclepion-Meditec AG announced they would be merging their ophthalmology activities to create a new company under the name of Carl Zeiss Meditec AG which would be listed on the Neuer Markt of the Frankfurt Stock Exchange. As stock corporations under the Carl Zeiss umbrella, SMT AG and Meditec AG have served as models for the Group in a number of respects. Subsequent carve-outs such as Carl Zeiss IMT GmbH and Carl Zeiss MicroImaging GmbH benefited from the success of these ‘pioneers’ from the semiconductor technology and medical technology arenas, as did the conversion

of the entire Group into a stock corporation as part of the reform of the Carl Zeiss Foundation in 2004.

### **A keystone in the reunification process: reform of the Carl Zeiss Foundation in 2004**

A foundation that runs a company and is responsible for all its business operations and fully liable with its assets – sometimes referred to as a ‘corporate trust foundation’ – is a perfectly conceivable option under German law. However, in practice it has virtually no role to play, unlike a ‘shareholding foundation’, which functions as a shareholder in a company. For Carl Zeiss and Schott, who had continued to cling onto the legal structure of the ‘corporate trust foundation’ prescribed by Abbe’s 1896 statute, this unusual status under company law entailed certain difficulties. One foundation enterprise had to accept responsibility for the other’s losses without actually being able to exercise any direct influence on their business operations.

Although Carl Zeiss and Schott have benefited on several occasions in the past from the mutual liability they share, this situation nevertheless posed some potential hazards. In the worst case scenario, bankruptcy of one of them could have dragged the other one down with it – and the financial difficulties faced by Carl Zeiss after reunification had once again raised the specter of this risk. The role played by the Foundation Commissioner presented the second problem: this figure acted as the sole supervisory authority for both companies, a task that was obviously too much for a single individual. Neither Carl Zeiss nor Schott could fall back on a Supervisory Board populated by key figures from industry and politics. And the legal status of the Carl Zeiss Foundation posed a third problem:

This kind of foundation was simply unheard of in international markets. Combined with the lack of a Supervisory Board, this fact often left Carl Zeiss and Schott in a tricky position when they attempted to set up subsidiaries abroad. For example, foreign banks were often reluctant to accept the Foundation as being creditworthy. And there was yet another sticking point which did not stem from the company’s legal status itself but rather from the provisions of the statute: the two foundation enterprises had no way of accessing additional capital through methods such as carving out parts of their businesses as stock corporations. This put them at a clear competitive disadvantage, especially in the fast-paced high-technology sector where continuous investment and innovation are the bread and butter of success.

In November 2001, Heinz Dürr, the Foundation Commissioner, wrote an article in which he attempted to allay employees’ concerns that reform of the Foundation could open the floodgates to cutbacks in the social benefits provided by Carl Zeiss: “Abbe would have adapted his statute to current conditions, obviously without giving up his commitment to social causes.” The advocates of reform put forward various arguments to support their case, such as the fact that the statute would continue to exclude any possibility of a future Carl Zeiss stock corporation going public. The “Pension Plan 2000” had already linked part of the Carl Zeiss company pension scheme to the Group’s operating results and simultaneously extended it to all German sites. Transforming Carl Zeiss into a stock corporation and establishing a Supervisory Board would also yield benefits for the Works Council in terms of co-determination and control – benefits that were already actively enjoyed by their colleagues at Carl Zeiss Jena GmbH, for example.

The statute came into force on 1 July 2004, and the two foundation companies Carl Zeiss and Schott were converted into independent stock corporations with retroactive effect to the beginning of the fiscal year on 1 October 2003. Each company was provided with a Supervisory Board, and the Carl Zeiss Foundation remained the sole shareholder of Carl Zeiss AG. The provisions that governed the employees' legal status and the rights they had in respect to the company were incorporated in the new statute and extended to cover all employees within Germany. This move to ensure equal legal status for all the company's employees in Germany brought the legal process of reunifying Carl Zeiss to a close. For the first time since 1948, Zeissians in Jena were now also working under the umbrella of the Foundation statute. For the Group as a whole, the fundamental reform of the Foundation 108 years after it was created was the logical progression of the restructuring of the business groups carried out between 1995 and 2000. Carl Zeiss was now ready for a new era.

### **Weathering the storm: the 2009 economic crisis and a record year in 2010**

Between spring 2008 and spring 2009, industrial production in the Eurozone countries fell by more than 20 percent. Numerous German companies introduced short-time working or were forced to make job cuts. Carl Zeiss had recorded a profit in the 2007/08 fiscal year, but just one year later the Group was hit by the crisis. New orders fell by 19 percent, and revenues slumped by 23 percent. The Budget Control Measures (BCM) program introduced radical cost-cutting measures, achieving savings in the tens of millions in 2009. This gave the company the leeway it needed to continue investing significant amount of research and development despite the adverse market conditions.

At the same time, major efforts were being made to retain as many jobs as possible. A "general package to tackle the economic situation" was negotiated with the Group Works Council and the IG Metall trade union. The employees agreed to temporarily forego some of their collectively agreed pay increases and other financial incentives such as their Christmas and vacation bonus. In return, the Executive Board agreed not to make any compulsory redundancies through 30 September 2010. Instead, short-time working hours were introduced in areas where the workload had plummeted.

During the crisis, Carl Zeiss benefited from the wide diversity of its business divisions. In contrast to the difficulties experienced by the Semiconductor Manufacturing Technologies and Industrial Metrology business groups, which saw a sharp decline in orders due to their dependence on key industries such as the IT sector and carmakers, other business groups such as Microscopy and Medical Technology managed to maintain a steadier course.

A glance at the 2009/10 fiscal year confirms that Carl Zeiss came out of the crisis stronger, generating revenues of almost 3 billion euros – significantly higher than its pre-crisis results (2007/2008: 2.6 billion euros). After falling slightly in 2008/09, the company's equity ratio stabilized at 33 percent, and the net income for the year was 208 million euros following a loss of 161 million euros the previous year. Carl Zeiss had managed to return to profit with astonishing speed – with the most successful year ever recorded in the company's history.

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