NOVARTIS

HOW A PHARMACEUTICAL WORLD LEADER WAS CREATED OUT OF CIBA, GEIGY AND SANDOZ
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HOW A LEADER IN HEALTHCARE WAS CREATED OUT OF CIBA, CEICY AND SANDOZ
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When Novartis was founded in 1996, it was the starting point of an entrepreneurial endeavor that helped form one of the world’s leading healthcare companies. But the merger of Ciba-Geigy and Sandoz also symbolized the historical peak of countless scientific and commercial achievements that stretch back more than 150 years.

Without these past efforts Novartis would be unthinkable. When our forerunners started out in the dyestuff business in the 19th century, there was little sign that their enterprises would culminate in the creation of one of the world’s largest healthcare companies. Yet the determined actions of the founding fathers of CIBA, Sandoz and Geigy, as well as the work of generations of successors, laid the foundation for a unique success story.

Although much of the old industrial heritage has disappeared since the first factories were built in Basel along the banks of the river Rhine, the values of our forerunners have survived. These principles, which still guide our global workforce today, have become part of our identity and are expressed in our unaltering dedication to the pursuit of innovation in order to address as-yet unmet medical needs.

As our corporate history shows, the leaders of our predecessor companies had the talent to react quickly to economic swings, and they cultivated an open and inquisitive attitude from the start. Their curiosity and long-term vision prompted them to venture beyond the borders of Switzerland early on, founding outlets as far away as Russia and the United States more than a century ago. These outlets would later become the launch pads for the internationalization of Novartis.

But history is never a seamless chain of events. More often than not the past is broken up by sudden reverses and unexpected failures. This holds true for our predecessor companies too. When the dyestuff business lost momentum, its leaders were forced to look for more promising business areas, even in the face of world wars and economic crises. Their decision to step up their fledgling chemical production and venture into the nascent pharmaceutical sector was fraught with high risks and was hit by repeated setbacks. But thanks to their determination, stamina and dedication, they eventually succeeded in building the basis for a world-renowned pharmaceutical hub that today helps develop therapies for millions of people to live longer and healthier lives.

Many of the values that were developed during the long history of our predecessor companies have become part of the DNA of Novartis. Innovation and entrepreneurial resolve were crucial in building a patient-centered healthcare organization with state-of-the-art research facilities that span the globe and in which thousands of talented scientists work toward developing effective therapies and medicines. The same lucidity also led Novartis to embark on its strategy of focused diversification, which reflects our conviction that healthcare companies need to be flexible and able to respond quickly to a fast-changing economic, demographic and regulatory environment.
Thanks to this determined focus on innovation, Novartis has been able to launch breakthrough therapies such as cancer medicine Gleevec/Glivec, hypertension treatment Diovan and multiple sclerosis drug Gilenya, to name but a few major medical achievements. At the same time the diligent expansion of our research and development facilities and the gradual extension into other healthcare areas such as generics and eye care have produced excellent results. Determination, courage and an unwavering focus on progress also helped Novartis foster this culture of innovation, which today pulses throughout the company and is most visibly expressed in our research and knowledge campuses in Basel, Cambridge (Massachusetts, USA), Shanghai and East Hanover (New Jersey, USA). There, a unique work atmosphere furthers and supports creative collaboration, inspiring and motivating our associates to seek novel solutions that promise to change the practice of medicine.

The ability of Novartis to provide reliable, high-quality medicines to more than one billion patients every year is the result of the collective effort of generations of associates who were and are dedicated to putting their work to the service of people in need. This book pays tribute to some of the great achievements of the past. And even though many important milestones remain unmentioned, it is clear that every single associate has contributed to the success of Novartis during the long history of this company.

These achievements fill me with pride and gratitude to those who were and are part of this great endeavor and make me confident that we will successfully continue our mission of caring and curing in the future.

January 2014
READY FOR LIFT-OFF

THE FOUNDING OF BASEL’S DYE FACTORIES
1859–1908
Europe first shone in artificial night-light 200 years ago. Instead of candles, gas now lit the houses of the well-off. Gas lights soon lit up the streets of the towns as well. The gas was obtained from coal, which produced large quantities of unpleasant, smelly tar as waste: this was tipped into rivers, resulting in severe environmental pollution. In 1834, the German chemist Friedlieb Ferdinand Runge investigated the possible uses of tar and discovered aniline in the process. In 1856, the English chemistry student William Henry Perkin conducted experiments with this colorless, oily liquid. He was hoping to produce synthetic quinine, for this efficacious antimalarial agent was very much in demand in the British colonies. Instead of white quinine, Perkin obtained an almost black product, from which he isolated a substance that dyed silk a violet color. He named it mauveine, after the French for mallow blossom. Perkin had his invention patented and founded a production site close to London with support from his family. But mauveine did not remain the only synthetic dye for long. In 1858, the French chemist Emanuel Verguin discovered aniline red. He sold his process to the silk dyeworks of Renard frères et Franc in Lyon (France). They patented the new dye, named fuchsine after the red blooms of the fuchsia, and started production. Fuchsine was easier to manufacture than mauveine and it was more productive and versatile. The product triggered a veritable gold rush: dyers and dye merchants, manufacturers and chemists tried to discover similar substances or at least to acquire formulations. Compared with the natural vegetable, animal or mineral-based dyes used since ancient times, these synthetic dyestuffs allowed greater fastness, lower costs and also the possibility of producing textiles in every conceivable shade of color.

**CIBA** Just three years after the discovery of mauveine, aniline dyes were being produced in Basel. In 1840, Alexandre Clavel (1805–1873) from Lyon (France) had taken over a silk dyeworks in Lesser Basel. Thanks to family connections with Renard frères et Franc he was able to acquire the license for the fuchsine process. He immediately began to produce dyes in a laboratory close to the dyeworks. Due to increasing complaints from the population about the pollutant emissions, production was forbidden in 1863. The operation had to be moved outside the city. Clavel built his new factory in what was then a rural district on Klybeckstrasse alongside the Rhine. In 1873, he sold this to the chemist Robert Bindschedler (1844–1901) and the businessman Albert Busch (1836–1884). The new owners quickly expanded the company: within a year the workforce of about 30 people had more than doubled. In 1884, Bindschedler & Busch became a modern corporation. It now called itself Gesellschaft für Chemische Industrie in Basel. The abbreviated form CIBA, which was initially used only for products, became the official company name in 1945.

**Basler Chemische Fabrik** In 1892, Robert Bindschedler left CIBA, which he had first run as a Director from 1884–1889 and subsequently helped to shape as a member of the Board of Directors. In 1893, he founded Basler Chemische Fabrik (BCF) in Kleinhüningen, also on the Lesser Basel side of
the Rhine. This company became a listed stock corporation in 1898 with capital of 1.5 million Swiss francs. Six years later, BCF acquired an additional production facility in Monthey (Canton of Valais, Switzerland). In 1908, the Board of Directors of BCF began to consider a merger with CIBA. Initial negotiations began in June, and just six weeks later representatives of both companies signed the merger agreement. According to this agreement, BCF merged retrospectively into CIBA from July 1, 1908. In November of the same year the General Meeting of BCF approved the merger. For every five BCF shares held, the shareholders received three CIBA shares. To finance the takeover, CIBA had to increase its share capital by 3.5 million Swiss francs. With the merger, the patents held by BCF were transferred to CIBA.

**J.R. Geigy** The trading company J.R. Geigy was founded in 1758. It traded raw materials used in the manufacture of dyestuffs or medicinal products. In the 1830s the company started to manufacture natural dyes itself, initially on an artisanal, then from 1859 on an industrial basis. In Lesser Basel, Johann Rudolf Geigy-Merian (1830–1917) built a so-called extract factory with a steam boiler and production plant where dyewood was milled and ground to extract the dyestuffs. In 1860, Geigy-Merian handed the extract factory over to the authorized signatory of Geigy, Johann Jakob Müller-Pack (1825–1899), who had founded his own company, J.J. Müller & Cie., in the same year. Immediately after the takeover, Müller-Pack expanded the small plant and began to produce synthetic dyes. In 1862 he bought a plot of land on Rosentalmatten to build a second factory there. At the Great London Exposition of 1862, the dyes of J.J. Müller & Cie. proved a sensation. But the meteoric rise of the company came to an abrupt end: in 1864 J.J. Müller & Cie. lost a lawsuit over the contamination of groundwater and was forced into bankruptcy. Geigy-Merian bought back the business, including the extract factory and the aniline production. In 1901 it became a corporation. Most of the stock stayed in the hands of the Geigy family, however.

**Gerber & Uhlmann** A few months after fuchsine was patented by Verguin, the Alsatian Jean Gerber-Keller (1809–1884) and his son Armand Gerber (1837–1886) discovered a new red dye. They called it azalein. Gerber-Keller wanted to have it patented. The French patent law of 1844 protected the end product, but not the process. Since azalein was similar to the fuchsine of Renard frères et Franc in color, Gerber lost a court case brought by the Lyon manufacturers. In 1862, the two Gerbers came to Switzerland and joined the dyeworks of Gaspard Dollfus (1812–1889) as chemists. In 1864, Armand Gerber set up in business himself, founding Gerber & Uhlmann on Klybeckstrasse together with a businessman named Uhlmann. The company was bought by CIBA in 1898.

**Durand & Huguenin** Louis Durand (1837–1901) was chief chemist with Société de la Fuchsine in Lyon (France) prior to emigrating to Basel. From 1866 to 1870 he worked in Clavel’s dye factory. In 1871 he took over a chemical factory in the north-west of the city. This had been founded by Gaspard
Dollfus, the builder and leaseholder of the Basel gasworks, in 1860. From 1872 Durand’s brother-in-law, Daniel Edouard Huguenin (1845–1899), also held a stake in the company.

Sandoz Alfred Kern (1850–1893), an extremely successful chemist, left CIBA at the end of 1884 due to differences of opinion on the use of his patents. Kern met with the wealthy businessman Edouard-Constant Sandoz (1853–1928) who, as authorized signatory for Durand & Huguenin, was prohibited from holding the interest he wanted in the company. The two of them founded Chemische Fabrik Kern & Sandoz as a general partnership in 1886. Like other dye factories, the new company was located outside the residential area of the time, on about 11,000 square metres of land right next to Durand & Huguenin and the municipal gasworks. In 1895, the company was changed to a corporation called Chemische Fabrik vormals Sandoz. From 1939 it was called Sandoz AG.

Why in Basel? At the end of the 19th century, there were six dye factories in Basel – an extraordinary concentration! Various factors had contributed to the attractiveness of the city at different times. A crucial reason why the chemical industry settled in Basel was its position at the hub of the important textile center of the Upper Rhine. The Basel silk ribbon weaving industry and the numerous textile factories and textile printing works in Alsace and South Baden needed large quantities of dyes. The first chemical companies obtained their know-how from France. French patent law, which was not favorable to chemists, prompted many of them to seek their fortune in Basel. Another important factor for the location was the Rhine: it provided the water that was needed for manufacture, and at the same time production waste could be easily disposed of in the river. A further advantage was the very good transport links offered by the city: the location on the elbow of the Rhine and its position on the border favored early connection with the sea and the international railroad network as well as the rapid development of transportation systems. Trains had been running daily from Basel to France and Germany since 1853. Furthermore, due to the high density of chemical and pharmaceutical companies in Basel, there was a vibrant culture of personnel exchange accompanied by an equally lively transfer of knowledge and information. And finally, the close proximity of competitors facilitated innovation.
Alexandre Clavel (1805–1873). Around 1860. Alexandre Clavel from Lyon (France) settled in Basel in 1838, and in 1840 took over a silk dyeworks on Rebgasse. The marriage of his stepdaughter Rosine Henriette Oswald to silk dyestuff manufacturer Joseph Renard from Lyon (France) provided Clavel with invaluable knowledge: he learned how to manufacture fuchsin (aniline red). From 1859, he became the first person in Switzerland to produce synthetic dyestuffs in his laboratory. However, Clavel’s activities slowed down due to complaints about the pollution his works was causing: in 1863, the government of Basel prohibited the production of aniline red and imposed constraints on the manufacture of other dyestuffs. In response to this, in 1864 Clavel moved his dyestuff production outside the city to Klybeckstrasse on the Rhine. In 1873, he sold his factory to R. Bindschedler and A. Busch.

Management and chemists from the Bindschedler & Busch chemical factory. Early 1880s. Robert Bindschedler (1844 –1901) – group photo: middle row, eighth from left – grew up with his five siblings in Winterthur (northeastern Switzerland). After completing high school, he studied chemistry at the Federal Polytechnic Institute in Zurich. From 1865, he worked as a chemist, including at Geigy. In 1871, he joined A. Clavel’s aniline dyestuffs factory, which he went on to acquire together with businessman Albert Busch in 1873. In 1884, Bindschedler & Busch became the Gesellschaft für Chemische Industrie in Basel (which later became CIBA), and Bindschedler was Director until 1889. In 1893, Bindschedler founded his own factory, which he expanded to form Basler Chemische Fabrik Bindschedler and later Basler Chemische Fabrik AG. The company merged with the Gesellschaft für Chemische Industrie in Basel in 1908. Bindschedler was awarded an honorary doctorate by the University of Zurich in recognition of his contribution to the chemical industry in Basel. He was convicted of fraud in 1900 after he had breached a contract with German company Hoechst governing sales of antipyrine, and died the following year in prison.
The Basel economy was dominated by silk ribbon weaving from the 17th to the early 20th century. In addition, there were a number of hosiery and textile factories. The second half of the 18th century also saw developments in Indienne manufacturing (hand-painted, later industrially printed cotton fabric). Dyers and textile printers needed chemicals for their work, which allowed trade in “dyers’ drugs” to flourish alongside the textile industry. Several so-called drug or material goods companies of this type emerged in Basel in the 18th century. As well as stocking up with acids and bases, dyers and printers increasingly employed ready-to-use dyestuff powders. In 1758, businessman Johann Rudolf Geigy-Gemuseus (1733–1793) opened a drug trading business: he imported and distributed dried plant-, animal- and mineral-based raw materials, which were used for manufacturing medications and dyestuffs.
Johann Jakob Müller-Pack (1825–1899).
Around 1862.
Johann Jakob Müller-Pack completed a commercial apprenticeship in Basel.
In 1856, he was appointed authorized signatory for J.R. Geigy & Heusler and in 1858 he took over management of Geigy’s extract dyestuff factory. Two years later, Müller-Pack acquired the company and began producing synthetic dyestuffs. When a family in the neighborhood suffered symptoms of poisoning, he was sentenced to a fine and high pension and compensation payments. The authorities also decided to install pipes leading to the Rhine and charge the costs to his company. Müller-Pack left Basel at the end of 1864 and moved to Paris. There he tried to exploit or sell his patents and processes in an aniline factory in order to pay his debts in Basel. He entrusted all his factories to J.R. Geigy-Merian, who purchased them by auction in 1868. Müller-Pack was unsuccessful in Paris so he returned to Basel. He tried to set up a new company together with a businessman friend, but it soon went bankrupt. In 1870, Müller-Pack opened a business for dyestuffs and the production of technical items in Basel.

Prints of aniline blue from a manufacturing inspection register of J.J. Müller & Cie. 1862.
The prints on wool muslin show various shades of the aniline blue produced by J.J. Müller & Cie. They can be found in an inspection register which is among the oldest of its kind in the world.
Frenchman Louis Durand was head chemist at Société de la Fuchsine in Lyon (France) before emigrating to Basel in 1866. From 1866 to 1870, he worked in A. Clavel’s silk dyeworks and aniline dye factory before joining F. Petersen & Sichler at Schweizerhalle near Basel. From 1871, he produced his own synthetic dyestuffs in the former chemical factory of G. Dollfus in Basel but was forced to cease production because he did not have a license. After being granted a license in 1872, he expanded the factory together with his brother-in-law Daniel Edouard Huguenin to form Durand & Huguenin. Durand withdrew from the business in 1899.

Alfred Kern came from one of the oldest families in the Swiss town of Bülach near Zurich. Between 1868 and 1870, he studied chemistry at the Federal Polytechnic Institute in Zurich before becoming an assistant there to Johannes Wislicenus. In 1874, Kern completed a doctorate at the University of Giessen (Germany). From 1872 through 1878, he worked at the Chemische Fabrik Karl Oehler in Offenbach (Germany) and from 1879 to 1884, he was head of the department for triphenylmethane dyestuffs at Bindschedler & Busch in Basel. In the early 1880s, Kern came up with several valuable inventions in the field of technical chemistry. His process for industrial production of phosgene and its utilization in the synthesis of dyestuffs provided a lasting boost to the color chemistry industry. In 1886, he founded the chemical company Kern & Sandoz in Basel together with Edouard–Constant Sandoz. Thanks to Kern’s dyestuff developments, the company soon enjoyed success.
Edouard-Constant Sandoz (1853–1928).
Around 1915.

Edouard-Constant Sandoz began a commercial apprenticeship at a raw silk business in Basel in 1872. In 1878, he transferred to the aniline dyestuff factory Etablissements A. Poirier et G. Dalsace in Saint-Denis near Paris, before returning to Basel in 1880 and joining the dyestuff factory Durand & Huguenin. In 1885, he acted as intermediary in the negotiations between Durand & Huguenin and the chemist Alfred Kern. The aim of these negotiations was to set up a new dyestuff factory together. When the negotiations failed, Sandoz and Kern decided to found their own company. Kern donated his manufacturing processes to the new company as “start-up capital” along with 100,000 Swiss francs, while Sandoz contributed 300,000 Swiss francs. After Kern’s sudden death, Sandoz ran the company on his own. In 1895, he converted his company into a stock corporation, taking up the office of Chairman of the Board, but standing down after just three months for health reasons. In 1907, he left the Board of Directors entirely because he could no longer support the company’s business policies. As majority shareholder, however, he continued to influence the management of the company. He returned to the Board of Directors in 1916 and began advising the company on banking and stock exchange issues. In 1921, Sandoz gave up his mandate for good.

First Kern & Sandoz factory. Around 1890.
In the summer of 1885, Alfred Kern applied to the Basel government for permission to build a factory. The application was approved in September, with construction beginning later that year and being completed by the spring of 1886. The factory consisted of one office building with an attached laboratory, three linked production sheds and a boiler building housing a steam engine with a capacity of 12 horsepower.
Between 1870 and 1900, Geigy, CIBA and Sandoz dyestuffs became established on the Asian market. They lit up the shops of Vadgadi, Bombay (now Mumbai, India) and Armenian Street in Calcutta (India), and the bazaars of Shanghai and Kobe (Japan). The Basel companies sent their products to intermediaries and importers. Until the end of the 1930s, the dyestuff packets flooding into Asia were decorated with beautiful chromolithographs. This was the golden age of chromolithography in Europe; it spawned the mass distribution of commercial art as labels for consumer goods.

The chromolithographs from Basel are interesting for two reasons: on the one hand, they illustrate the beginnings of a kind of advertising which was specifically targeted at the individual markets of the world. Carefully crafted and costly to produce, they exercised a seductive effect on the new customer groups to whom they were introducing the dyestuffs of the Basel manufacturers. On the other hand, they were the precursors of trade marks and were legally protected. Contracts between manufacturers and importers regulated their use and distribution from early on. These “trade mark labels”, as they were called at the time, were often subject to negotiation. The importers took care in selecting the pictures and demanded exclusive rights to them. In return, they committed themselves to taking certain quantities of products from the manufacturers. Because they represented the combined interests of producers and importers against the competition, the dyestuff labels played an essential part in the economic process.

As early as the 1880s, dyestuffs came on to the Asian markets in complete packaging, consisting of a main label, a spine label and a suitable seal-like closure – all carefully bonded to a glossy paper envelope that often showed the color of the product inside.

A travel report from 1885 stressed that the Chinese attached less importance to the purity of the dyestuffs than to the careful crafting of the labels. The same appears to have been true in other parts of Asia. With this in mind, the Basel companies faced the fundamental issue about the psychological dimension of images and their emotional influence on the act of buying: they had to speak the client’s visual language. To guarantee a product’s success, the label had to be attractive, even if that meant raising the price. CIBA, Geigy and Sandoz brought in excellent lithographers to make the dyestuff labels, and they created works of art that reflected the tastes and culture of an international clientele. Unfortunately, the names of most of the original creators are unknown. Only the studios which employed them can be traced – in Paris, Winterthur (Switzerland), Aarau (Switzerland) and above all in Basel.

Towards 1880, pictures with a commercial character were already part of everyday life. Serving the major brands of the day, they enhanced a product’s value, as was the case with Nestlé and Liebig. But the dyestuff labels were not designed as advertising media to set the scene for a product. Far more, they communicated entirely autonomously, independently of the product. For their pictorial world was aligned to the clientele’s cultural...
To begin with, the dyestuff labels around 1880 manifested a European or partly oriental character. From 1900 the labels systematically took up cultural themes which appealed to the importing countries: local personalities and buildings for India, indigenous flowers and legends for China, women in kimonos for the Japanese Islands. The lithographers drew their inspiration from the Far East, as had the Impressionists before them – especially from Japanese art. In the wake of the flood of Japanese graphics that inundated Europe in the second half of the 19th century, CIBA, Sandoz and Geigy introduced Japanese-style pictures to the markets of Osaka (Japan) or Yokohama (Japan) – pictures which, however, had been reinterpreted from a European perspective. The images of flowers and birds destined for Shanghai reveal both knowledge of Chinese painting and a distinctly European formal language. From the end of the 19th century onward, Sandoz, CIBA and Geigy contributed to an important economic and cultural exchange by building a bridge between primarily Swiss artists and Asian customers, selling thousands of Swiss lithographs as labels in Delhi (India), Amritsar (India) and Hong Kong.

The golden age of the magnificent labels circulated by Sandoz, Geigy and CIBA came to an end before the Second World War. Production and administration costs combined with a shift in tastes led to styles that were more in keeping with the objectivity of the new age.
EXPORT AND EXPANSION
INTERNATIONAL AND INNOVATIVE FROM THE OUTSET
1881–1914
The aniline dyes manufactured in Basel were exported from the very beginning, initially to France, and then later to the UK and Germany too. In addition to European customers, North American and Asian customers also bought dyes from Basel from the 1870s. To begin with, distribution was undertaken by independent trading companies, but was increasingly taken over by subsidiaries as time went on. Basel’s chemical companies operated foreign production sites and regional offices from a surprisingly early stage. What initially prompted them to invest abroad? First of all, eagerness to expand or ensure future growth in every case. The protectionist policies of the French and Russian governments also played a significant role in the establishment of factories in those countries. However, there was another motive behind the direct investment of CIBA in the UK: the company was aiming to secure its own supply of products needed for manufacturing.

The first factories in France... In 1881, Durand & Huguenin founded the first Swiss dye factory abroad at Saint-Fons, within the sales area of the textile center of Lyon. Fifteen years after it began operations, 3 chemists and 85 production and office workers were employed at the 14,500 square metre site. The factory primarily produced fuchsine. When its two founders, Durand and Huguenin, retired from the business, the company began looking for a buyer for the Saint-Fons factory. This decision was not one against manufacturing abroad in general, but against the specific burdens created by the remote site. CIBA acquired the plant in 1900. Geigy had decided as far back as 1891 to set up a French production site. One year later, the company rented a vacant factory building in Maromme, close to the textile center of Rouen. In 1894, it purchased the building. It was a very modest production plant: up until the outbreak of the First World War, it employed only five to seven people manufacturing dyewood extracts.

...and in Germany It was again Durand & Huguenin who established a factory in the Alsatian town of Hüningen, on the border with Switzerland, in 1886. Following the Franco-Prussian War of 1870–1871, large parts of Alsace were annexed by Germany. The journey between the Hüningen production site and the company headquarters was extremely short. Ten years later, the 4,300 square metre site employed 1 chemist and 15 production workers. Geigy purchased a plot in nearby Grenzach in 1897 and built the first production, office and machinery buildings there over the following two years. Production began at the end of 1898. There were numerous reasons for this investment: first, the facilities at Rosental were outdated. Secondly, the site was becoming increasingly boxed in by residential streets, and residents were being disturbed by noise and odors. Thirdly, the Grenzach site was connected to the German railroad network. The foreign location of this production facility had little significance until the outbreak of the First World War. Before that, the borders in the Basel region were permeable, meaning labor and capital could circulate freely. Grenzach considered itself a suburb of Basel, like the Swiss towns of Muttenz and Birsfelden.
Locations in Russia  In 1890, Geigy rented a site with production buildings in Karavayevka, close to Moscow, and began to manufacture dyewood extracts there. The company also sold aniline dyes from Basel through this subsidiary. Geigy later entered into a partnership with a chemical factory in Liepāja (now in Latvia), which prompted Geigy to give up its previous location in 1910. Shortly before the turn of the 20th century, CIBA founded its first foreign production site in Pabianice (now in Poland) through a merger with the company Schweikert & Froelich. The town was close to the textile center of Lodz. The plant produced acetic acid and azo and sulphur dyes based on materials fabricated in Basel. Production volumes and the buildings used for manufacture grew continuously until the outbreak of the First World War.

The first direct investments in North America...  The USA became Geigy’s second most important market after Germany early on. From 1900, American customers were buying goods worth well over 1 million Swiss francs a year, imported via New York. Geigy products were sold through a retail company. In 1903, the newly founded Geigy Aniline & Extract Company, a subsidiary of Geigy Basel, took over distribution. The young company was based at 89 Barclay Street in New York, an ideal address in the heart of an area where many trading and haulage companies, textile firms and banks were based. The dyes manufactured in Basel were distributed by branches in Boston, Philadelphia, Providence and Atlanta in the USA, and Toronto in Canada. In 1904, Geigy set up a mixing plant at an existing factory site in New Jersey, reducing freight costs considerably. The company also set up production facilities for extracts, which could be produced far more profitably in New Jersey than in Basel thanks to the low cost of raw materials.

... and in the UK  The Basel-based chemical companies had to import coal tar and the primary products and intermediates derived from it, and did so almost exclusively from Germany. CIBA’s largest supplier of products needed for manufacture, Chemische Fabrik Griesheim-Elektron, gradually developed into a synthetic dye producer itself and adopted a very aggressive sales approach. CIBA came under ever greater pressure due to its dependence on the company and tried to free itself from this ruthless competitor. Management decided to acquire a company in the UK in order to secure purchases of products needed for manufacture. In 1911, CIBA acquired the English dye factory Clayton Aniline Company Ltd. in Clayton near Manchester. Sandoz followed suit: on December 8, 1911, The Sandoz Chemical Company Ltd. was entered in the commercial register with a share capital of £2,000. The company began operations at a building in Bradford, although production did not begin until the interwar period. This location was almost preordained, as Sandoz manufactured high-quality wool dyes and Bradford was the center of the prosperous Yorkshire wool industry and the undisputed wool capital of the world.

German chemistry takes a leading role  The first dyes were discovered by means of luck, intuition, and trial and error. In the early years of the
chemical industry, new dyes and simpler methods of preparation were found using empirical and experimental means. To start with, almost nothing was known about the chemical make-up or structure of dyes. This changed with the birth of structural theory (1858) and benzene theory (1865), both developed by German chemist Friedrich August Kekulé. His work became the basis for the logical development of the whole of dye chemistry. However, only German chemists recognized the full importance of Kekulé’s theories, with the French and English paying them little regard. By the end of the 1860s, this was already having an impact: while the early phase of dye chemistry had been dominated by English and French discoveries, German laboratories were now playing the pioneering role. The secret behind their success was simple and effective: an intensive exchange of knowledge between academic chemists and the chemical industry.

**Initial innovations from Basel** Basel companies initially produced only imitation dyes. As there was no patent protection for chemical processes in Switzerland until 1907, companies based there could copy foreign formulations without any problems. In the 1870s, however, the Basel dye chemistry industry began to market dyes that it had developed itself. In 1894, 15 of the 142 new industrial dyes had been developed by companies in Basel. While Basel was developing far fewer dyes than Germany (with 116), this number still exceeded those made by the English and French (11 in total). The relatively high rate of innovation in the Basel dye industry was partly due to its close relationship with the Federal Polytechnic Institute in Zurich (now the Federal Institute of Technology, Zurich). Chemists with practical training from Zurich played a key role in the Basel industry from the very beginning. Two of them – Bindschedler and Kern – even went on to found their own companies. The innovative successes of Basel companies were based not only on the applicable knowledge of the chemists, however, but also on the process technology expertise of engineers, who had to know the precise setting specifications for equipment and how to distribute temperatures evenly in vessels.

**The Basel dye factories move into the pharmaceutical business** The modern pharmaceutical industry came into being in the 1880s. In 1884, the German company Farbenwerke Hoechst brought fever-reducing antipyrine on to the market. This quickly became the most successful pharmaceutical product of the century. As there was no patent protection, in 1887 CIBA also began to produce this antipyretic drug. One of the first medications developed in Basel was the anti-inflammatory salol, discovered in 1886 by Professor Marceli Nencki from Bern (Switzerland). Durand & Huguenin acquired the manufacturing rights and brought the active substance to market as an antirheumatic. In 1895, Sandoz also began manufacture of its first pharmaceutical product: by joining the Antipyrine Agreement, the company secured itself a fixed portion of the business coordinated and managed by Hoechst. In addition to antipyrine, Sandoz also produced and successfully
marketed synthetic saccharine and plant-based codeine that had been developed and launched by German companies. The oldest Basel dye factory, Geigy, felt obliged to pursue a conservative business policy until the outbreak of the First World War, and ruled out entering the pharmaceutical sector. By contrast, the youngest company, Basler Chemische Fabrik (BCF) produced both dyes and pharmaceuticals from the outset. In the last financial year before its merger with CIBA, BCF generated 2.5 million Swiss francs from sales of dyes and medicinal products. Its pharmaceutical business accounted for 40 per cent of total sales – significantly higher than at CIBA, which generated only 7 per cent of its total sales in this sector. Through its acquisition of BCF, CIBA also gained access to interesting pharmaceutical products, including the antiseptic Vioform and the antirheumatic Salen.

**Pharmaceutical competition in Basel: the founding of Roche** In 1896, Fritz Hoffmann-La Roche (1868–1920) founded a company in Basel devoted exclusively to the manufacture and trading of pharmaceutical products. Hoffmann-La Roche was neither a pharmacist nor a physician, as was usual for founders of drug companies, but a proactive young businessman. The company soon expanded abroad (to Milan, Italy, in 1897, Paris in 1903 and New York in 1905). Until the outbreak of the First World War, it generated sales primarily from Sirolin, a cough medicine launched in 1898. Its orange flavor and clever advertising quickly made this product a bestseller.
Vioform powder dispenser (CIBA). 1920s.


Aerial photograph of the Geigy plant, Grenzach (Germany). 1924.

Traugott Sandmeyer, born in Wettingen (Switzerland), completed an apprenticeship in precision engineering in Zurich. He went on to teach himself chemistry. In 1882, Professor Victor Meyer, who had recognized Sandmeyer’s extraordinary gift for chemistry, created an assistant post at the Federal Polytechnic Institute in Zurich especially for him. There, in 1884, Sandmeyer discovered the Sandmeyer reaction, which was named after him. In 1888, he joined Geigy, where he made numerous important discoveries on the synthesis of dyes and their associated products. His work had lasting benefits for the global growth of Geigy. Sandmeyer was awarded an honorary doctorate by the University of Heidelberg (Germany) in 1891, and in 1915 was made Doctor honoris causa of the Federal Institute of Technology, Zurich.

CIBA production facilities, Pabianice (Poland; Russia before the First World War). 1930s.

Sandoz Basel. Chemists
Oskar Knecht, Heinrich Fulda (sitting on chair) and
Alfred Raillard (right, standing). May 14, 1910.

CIBA Pabianice (Russia, now Poland). Factory fire department.
Around 1910.

CIBA Basel. Repair center. 1911.


Gas absorption system from the 1880s at the Geigy Rosental plant in Basel. 1944.
Geigy production facilities, Karavayevka, near Moscow (Russia). 1892.

CIBA industrial plant, Saint-Fons, near Lyon (France). Around 1910.

Pump at the Geigy Rosental site. 1893. This photograph of a suction pump is taken from an old photo album and is entitled “Master Hiltbold and his pump, 1893.” Master Hiltbold, seen on the right, designed the system himself. It pumped water from a canal into the Rosental reservoir. It was dismantled on May 22, 1919.

CiBa Basel. Workers from the Pharmaceutical department. 1911.

Geigy manager for the Indian dye business, Walter Sänger, with Indian agents. 1912.
THE FIRST WORLD WAR

HOLDING FIRM IN TROUBLED TIMES
1914–1918
Historians describe the First World War as the seminal catastrophe of the 20th century. Millions died in the first “industrial war” and the previously stable global trading system collapsed abruptly. The First World War destroyed the old order and the traditional power structure in Europe. Three empires collapsed: the German Reich, the Austro-Hungarian monarchy and the Czarist empire. Two new superpowers with conflicting social systems emerged: the USA and the Soviet Union. However, states whose neutrality was respected – the Scandinavian countries, the Netherlands and Switzerland – were not so affected by the war. They even gained some economic advantages from it.

**Record profits thanks to loss of competition** When hostilities broke out in August 1914, the head offices of the Basel companies were anxious and bewildered. There were no indications that the Basel chemical industry would soon be posting record profits. Half of all production workers and three-quarters of chemists employed by CIBA had to join the army. But the First World War fundamentally changed economic conditions in favor of neutral Switzerland. On the eve of the war, the global market for textile dyestuffs was almost exclusively the preserve of German and Swiss companies. Germany manufactured around 85 per cent of textile dyestuffs, and Basel around 10 per cent. The outbreak of the war changed these market shares almost overnight. The Germans suspended their exports, and the British and French were unable in the short term to compensate by expanding their own industries. The British and French therefore turned instead to the Basel chemical companies, whose dyestuffs were primarily needed for uniforms. The absence of previously overwhelming German competition from the markets of Germany’s enemies opened up unprecedented opportunities for Swiss dyestuff manufacturers – albeit to varying degrees. CIBA made the strongest gains in absolute terms, and Geigy the weakest. In relative terms, Sandoz was the biggest winner: its turnover in 1914 was 6 million Swiss francs (of which 10 per cent was from pharmaceutical products), but this had already increased to over 14 million Swiss francs by 1915. Management’s annual report to the Board of Directors stated: “Sales went very smoothly; everything we could produce was taken off our hands immediately.” Sales by Sandoz rocketed the following year to almost 30 million Swiss francs, and rose in the last two years of the war to 37 million Swiss francs. The largest purchaser by far was the UK textile industry, which was the industry leader at the time. In 1917, Sandoz exported some 40 per cent of its dyestuffs to the UK. Other sales markets included the USA (22 per cent), Italy (13 per cent), Switzerland and Japan (5 per cent), China (4.4 per cent), France (4.3 per cent) and Spain (3.4 per cent).

**Sandoz establishes in-house pharmaceutical research** The establishment of independent pharmaceutical research at Sandoz is a milestone in the history of the predecessor companies of Novartis. The initiator of this move was presumably Sandoz Director Melchior Böniger (1866–1929): in 1915, he asked Professor Robert Gnehm (1852–1926) to find a competent person...
who could establish a pharmaceutical department in his company. As a former Director and member of the Board of Directors of CIBA and the former Chairman of the Board of Directors of Sandoz, Gnehm was very familiar with the chemical industry. Furthermore, as Chairman of the Swiss School Board (now the ETH Board) and a former Professor at and Director of the Federal Polytechnic Institute in Zurich, he had a good insight into research and knew the reputations of individual scientists. At Gnehm’s suggestion, the Board of Directors of Sandoz appointed Swiss chemist Arthur Stoll (1887–1971) on March 15, 1917. In hindsight, this landmark decision seems both farsighted and carefully considered. However, in the context of the time, it was hardly either of these, as Sandoz lacked experience in this area. Profits were also only expected in the medium term. The decision was assuredly not a strategic one: the matter came up under “Any Other Business” and was approved without discussion. Everything indicates that the members of the Board did not realize the import of their decision.

The company had succeeded in attracting a high-ranking scientist in Stoll. He had worked closely with Nobel Prize winner Richard Willstätter, first in Zurich, and then in Berlin (Germany) and Munich (Germany). Stoll had made the area of chlorophyll research his own and gained new insights there. For these achievements, he was awarded the title of Royal Bavarian Professor in 1917 on Willstätter’s recommendation. From the outset, Stoll focused the research programme of the new Sandoz department on highly effective natural remedies. He aimed to isolate their active substances in pure form, and to manufacture medications from them that could be precisely dosed and were consistently effective. It had long been known in traditional medicine that plants such as belladonna and foxglove had healing properties, but extracts from medicinal plants at that time were usually not pure enough, did not keep well and were often unpredictable. Dosages had to be based on instinct and their effectiveness was inconsistent. Stoll’s first study involved ergot (Secale cornutum). This growth on rye and wild grasses, caused by a fungus (Claviceps purpurea), had been used since the Middle Ages to induce childbirth. In 1918, using a new process that he had helped to develop in Willstätter’s laboratory, Stoll was able to isolate a crystalline alkaloid which he called ergotamine. Working together with pharmacologists and clinicians, he was able to prove that ergotamine is the active substance in ergot. Three years later, ergotamine was launched under the brand name Gynergen as a drug to staunch the dreaded postpartum haemorrhages. However, the innovative isolation process was to prove more important than this novel product itself for the further development of the pharmaceutical department: the process could be transferred to other areas, such as belladonna alkaloids and cardioactive glycosides. Management at Sandoz recognized the potential of the discovery and patented the “Procedure to isolate a high-quality product from Secale cornutum” in April 1918 with the Swiss Federal Institute for Intellectual Property.
Robert Gnehm, born in the small Swiss town of Stein am Rhein, graduated in technical chemistry from the Federal Polytechnic Institute, Zurich, in 1872. There he met Alfred Kern, with whom he would remain friends until Kern’s untimely death. While Kern moved into practice after his studies, Gnehm stayed at the Federal Polytechnic Institute, gained a postdoctoral qualification and was made a professor in 1876. However, in 1877, he decided to leave Zurich and followed his friend to the Karl Oehler dyestuff factory in Offenbach (Germany). Both men returned to Switzerland the following year, with Gnehm heading first to Schwanden and then in 1880 to Basel, to the Bindschedler & Busch aniline dyestuff factory. When the company became CIBA in 1884, he was appointed a member of management. In 1892, he was elected to the Board of Directors, but stepped down in 1894. That same year, Gnehm was appointed Professor for Technical Chemistry at the Federal Polytechnic Institute, Zurich. In 1895, he joined the Board of Directors of Sandoz, and was its Chairman from 1896 to 1900.

Stein am Rhein. Soccer players from the FC Geigy team, founded in 1920. 1920.


Geigy Basel: “tribelhörner” (Swiss vehicles with electric motors) and trucks driving through the Rosental site. May 24, 1919.


Spanish rail pass for Melchior Böniger (1866–1929) and Ida Böniger-Ris. 1926. Melchior Böniger, born in Nidfurn in the Swiss Canton of Glarus, completed his studies in natural sciences at the Federal Polytechnic Institute, Zurich, in 1888. He gained his doctorate at the University of Zurich in 1889, and joined Sandoz in the same year as a chemist. Böniger was a director there from 1895 to 1921; in 1922, he was elected to the company’s Board of Directors. Sandoz is indebted to him for the decisive course taken to develop in-house pharmaceutical research. Böniger supported welfare institutions for production and office workers and was involved in a number of committees on economic policy.

Gynergen packaging. 1930s.

Arthur Stoll (1887–1971). Around 1930. Arthur Stoll was born in Schinznach-Dorf (Switzerland). He studied natural sciences at the Federal Polytechnic Institute in Zurich from 1906, where he became an assistant to Professor Richard Willstätter. He completed his doctorate in 1911. When Willstätter was appointed to the Kaiser Wilhelm Institute of Chemistry in Berlin-Dahlem in 1912, Stoll went with him as his senior assistant. Four years later, he followed his teacher to Munich (Germany). In 1917, Stoll was awarded the title of Royal Bavarian Professor. That same year, Sandoz entrusted him with the task of setting up the pharmaceutical research department. He quickly achieved scientific success with products based on ergot and cardioactive natural substances. At the same time, he built up a sales and advertising organization. Stoll became a Director of Sandoz in 1923, and was a member of the Board of Directors and CEO of Sandoz from 1933 to 1963. Stoll received numerous awards, including the Marcel Benoist Prize in 1942 and the Paul Karrer Medal in 1959. He was also awarded 18 honorary doctorates.
The young pharmaceutical department of Sandoz isolated the active substances from known medicinal plants in pure form and used them to produce medicines with precise dosages. Using this successful technique, Arthur Stoll managed to isolate the highly active substance ergotamine in pure form in 1918. This ergot alkaloid was launched on the market under the name Gynergen in 1921. After initially being used to stop postnatal bleeding, thereby saving many women’s lives, a further application as a remedy for migraines was added in the late 1920s.

Ergot alkaloids are natural substances produced by the fungus Claviceps purpurea. This sac fungus is parasitic, living primarily on rye. It invades the ovary of its host plant and forms a violet-black sclerotium which protrudes from the plant’s spikes. This protruding growth contains alkaloids and is also known as ergot (Secale cornutum). Cereals infected by this fungus must not be eaten. If consumed in large quantities, ergot causes poisoning. “Ignis sacer” (holy fire) or “Saint Anthony’s fire” were medieval terms for ergotism, the symptoms of poisoning by infected crops. In those days, mass poisonings caused by ergot alkaloids were not uncommon.

The first precise description of ergot can be found in the Kräuterbuch, published in 1582 by Adam Lonitzer, botanist and town physician of Frankfurt am Main (Germany). Lonitzer looked on ergot primarily as a medicine and knew that midwives used it to induce labor. The first chemical experiments to isolate the active substances in ergot were performed in the 19th century: in 1875, Frenchman Charles Tanret extracted a crystalline mixture of three alkaloids from ergot, calling it ergotinine. This compound did not gain acceptance in medical practice, however. English chemists George Barger and Francis Howard Carr managed to isolate a mixture known as ergotoxin in 1907. This did have a certain physiological effect, but was not strong enough to be used for treatment purposes. Stoll, therefore, was able to build on an existing tradition of research into ergot. With the isolation of ergotamine in 1918, Stoll laid the foundations for systematic research into ergot at Sandoz. In the late 1930s, Sandoz chemists succeeded in partially synthesizing the natural ergot alkaloids. They began varying the chemical structure and, consequently, the pharmacological effects, which opened up new areas of application. The substances were used to treat disorders of the vegetative nervous system (Bellergal), age-related symptoms of cerebral insufficiency (Hydergin), hypotonic circulatory disorders (Dihydergot) and tension headaches (Cafergot, Deseril). They were also prescribed as a prophylactic against postoperative thromboembolisms (Heparin-Dihydergot). When the product Parlodel/Pravidel was launched in the 1970s, it attracted considerable scientific attention: the partially synthesized ergot alkaloid it contained, bromocriptine, was the first in a new class of medicines which stimulated dopamine receptors. Today, the dopamine agonist Parlodel is still used in the treatment of a range of disorders such as hyperprolactinemia (abnormally high prolactin concentrations in the blood), Parkinson’s disease and acromegaly.
THE INTERWAR PERIOD
A BOOM IN PHARMACEUTICALS
1918–1939
The First World War brought an end to the era of free trade. Protectionism took hold of the global economy. Many countries either introduced tariff protection for the first time or increased their tariffs. Trade barriers ranged from export and import licenses to import quotas and bans to foreign currency controls. A protectionist mentality became widespread during the 1920s to an extent previously unheard of. It affected not only mass-produced commodities, but also specialist and high-quality goods. The Swiss chemical industry had to adapt to this development. The Great Depression hit in 1929, marking a low point in international trade relations.

**Tackling the new competition: the founding of Basler IG**

The end of the war changed market conditions at a stroke. The victorious allies, in particular the UK and the USA, had developed their own chemical industries in the interim, and these were now penetrating the international market. In response to this, the Basel dyestuff producers closed ranks: CIBA, Sandoz and Geigy formed an interest group in September 1918 known as Basler IG. Unlike the German dyestuff manufacturers that merged to form IG Farben in 1925, the companies in Basler IG retained their independence. The aim of the interest group was to strengthen the Basel companies in an increasingly competitive environment. The companies centralized and rationalized, operated a collective purchasing policy and established joint production sites: one such was built in Cincinnati (Ohio, USA) in 1920, and another in Seriate (near Bergamo, Italy) in 1925. To avoid internal competition, the three companies divided specific areas of research and production between themselves. They agreed to pool all profits, which were then still largely generated from dyestuffs, and distribute them amongst one another based on fixed proportions. After initial difficulties regarding the distribution formula, they agreed on the following: from 1920 onwards, 52 per cent of total annual profits would be allocated to CIBA, and 24 per cent each to Geigy and Sandoz. This basically continued to apply until Basler IG disbanded prematurely at the end of 1950. While Geigy and Sandoz generated similar profits in the late 1920s, the proportion contributed by Geigy fell steadily during the 1930s: in 1939, it accounted for only 14.5 per cent of the group’s income. As the weakest partner, Geigy therefore benefited from the profit-sharing arrangement, which led to continual conflicts between the three companies.

**Pharmaceuticals gain in importance**

Why did the development in the IG partners’ profits vary so greatly? The key reason lay in their differing structures: when Basler IG was founded, CIBA and Sandoz secured the areas of vat dyestuffs and alizarin for themselves, which brought them considerable success. In addition, they had exclusive rights to pharmaceutical production, as they had already established corresponding departments before Basler IG was founded. By contrast, Geigy only started to set up a pharmaceutical department in 1938. Pharmaceutical products in particular proved to be highly profitable and experienced considerable growth in the interwar period. Thus, in 1934, Sandoz managed to sell 14 per cent more
pharmaceutical specialty products than it did the previous year, and sales of specialty products continued to develop very positively in the subsequent years. Sandoz regularly launched new products and took a great deal of care over their marketing, to good effect: in 1935, sales rose by 22.5 per cent. At its meeting on March 25, 1936, the Board of Directors was proud to note that the Sandoz pharmaceutical business “has already reached 55 per cent of CIBA’s business”. In 1938, sales of pharmaceutical specialty products rose again by 13.5 per cent over the previous year, achieving around half the sales reported for dyestuffs. At this time, Germany was the most important customer for Sandoz pharmaceuticals, with around a 30 per cent share of total sales.

Hormones at CIBA... Prior to the First World War, CIBA manufactured three categories of products: the first group included pure substances (e.g. the iodine product Lipojodin); the second, standardized extracts from animal (e.g. the blood-clotting product Coagulen) and plant substances (e.g. the cardiac medication Digifolin); and the third, synthetic products (e.g. the sleep medication and sedative Dial). During the war, CIBA decided to move into an area with promising future prospects: between 1918 and 1939, the company launched eight gonadal and hormone products. The oldest products, Agomensin and Sistomensin, were used to treat menstrual disorders. In 1927, CIBA launched Prokliman to treat the symptoms of menopause. This was followed in 1931 by Androstin, which targeted “Climacterium virile”, or the male menopause, and impotence. These four products were purified extracts from the female and male gonads, rather than pure sex hormones. CIBA scientists achieved synthesis or “artificial” manufacture of human sex hormones in the mid-1930s. Perandren was launched in 1936, followed by Ovocyclin and Lutocyclin in 1938 – all three were synthetic hormone products. From 1939, CIBA marketed Percorten, the first synthetic hormone product to replace the natural substances produced by the adrenal cortex. It was prescribed for adrenocortical insufficiency.

... and calcium at Sandoz Since its foundation during the First World War, the young pharmaceutical department at Sandoz had been growing slowly but steadily. Within five years, it had launched four medications. However, it was still costing the company money rather than turning a profit. At the meeting of the Board of Directors on May 12, 1922, Albert His-Veillon (1858–1935) remarked that “a number of very good specialty products” were being sold, but that the department “still [had] no money-spinner”; he said that the pharmaceutical department should “now turn its attention to developing this type of profitable product”. The pharmaceutical department finally turned a profit in 1924, albeit only 27,000 Swiss francs. Nevertheless, Arthur Stoll noted with satisfaction at the Board meeting of April 30, 1925, that “this area of the business has been able to cover its own costs for the first time.” Stoll had worked consistently towards an effective advertising organization and an efficient distribution system. His efforts were now bearing fruit. From 1927, the company also had a bestseller, in the form
of Calcium-Sandoz. By 1929, this product to treat calcium deficiency and related disorders had become the best-selling Sandoz pharmaceutical product. On average, Calcium-Sandoz accounted for over one-third of sales in the first half of the 1930s.

**Specialization, diversification and internationalization** The Basel companies specialized their dyestuff production during the interwar period. They focused on a wide range of high-value products, particularly patented specialties. This enabled them to offset losses from older classes of dyestuffs, where foreign competitors dominated. The Basel chemical industry also moved into new areas: it no longer only produced dyestuffs and medications, but also textile auxiliary substances, textile finishing products (e.g. wetting and leveling agents and fluorescent whitening agents), plastics, cosmetics and pesticides. The Basel chemical industry founded further foreign subsidiaries in the interwar period, and set up new production sites abroad: in the USA, the UK, Japan, Spain, Belgium, Italy, Canada, France, Germany, Czechoslovakia, Argentina, Brazil, China and Portugal. These foreign investments were made in order to increase competitiveness through lower production and transport costs, circumvent import restrictions and obstacles to market entry, gain greater proximity to customers and tap new markets.

**Expansion of the Basel sites** Thanks to their sensational performances, CIBA and Sandoz were able to start modernizing their Basel sites and expanding their production facilities even during the First World War. This continued during the 1920s and 1930s. The old production sheds at the Sandoz St. Johann site gave way to multistoried manufacturing premises. According to a contemporary Swiss architectural journal, the new industrial buildings “[took] into account the challenges of our time” by making allowance for “the demand for beauty in their external appearance, and the demand for efficacy as regards the interior”. The buildings were designed by Ernst Eckenstein, the company’s in-house architect from 1915 to 1939. His final project at the St. Johann site was the construction of the new administration building designed by architects Brodtbeck & Bohny. After the Second World War, this angular building (later known as building 200, now Forum 1) was extended by two new wings to make it rectangular.
The interwar period 1918–1939


Digifolin packaging (CIBA). 1920s.

Norwood production facilities for azo dyestuffs at the joint plant in Cincinnati (Ohio, USA). 1938.

Administration building at the joint plant in Seriate near Bergamo (Italy). 1939.
CIBA Saint-Fons near Lyon (France).
Correspondence office.
February 24, 1926.

CIBA Brussels (Belgium).
Laboratory. January 1938.

Lipojodin packaging (CIBA). 1930s.

Coramin advertising blotter. 1925.
*Coramin* was launched in 1924.
This respiratory and circulatory stimulant was among other things used for reviving people who had suffered drowning. It remained a key sales driver for CIBA for decades.

Basel production facility for *Calcium-Sandoz*. Early 1930s.
CiBA Company Inc.’s stand at the American Medical Association trade exhibition in Portland (Oregon, USA). July 1929.


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Advertising poster for CIBA Binaca toothpaste. 1941. © 2012 Pro Litteris, Zurich. Painter and graphic designer Niklaus Stoecklin restricted himself to the key message in this masterpiece of Swiss poster art: a glass, a tube of toothpaste and a toothbrush – strikingly plastic.

Rear of Sandoz Chemical Works, Inc. in Charlton Street, New York. 1930s. The US subsidiary of Sandoz was founded on July 16, 1919. Alongside import and sales, the commercial register entry already mentions production of dyestuffs, chemicals and pharmaceutical products.

Sandoptal, a barbituric acid derivative launched in 1927, was Sandoz’s first step into the field of synthetic medicines. Despite being highly effective, the drug never became properly established. Apart from the barbituric acid derivative marketed by the German companies Merck and Bayer under the generic name of Veronal, many other barbiturates had been available for some time. Sandoz had more success with Optalidon, a combination drug created from Sandoptal, pyridone, and caffeine, which was launched in 1928. This drug was highly successful with dentists in particular, although many other pain-relief products were already available.


Storage facility for intermediate products at the Sandoz site in Basel. Early 1930s.

Dining room in the welfare building at the Sandoz site in Basel. Early 1930s.

Sandoz Basel. Label storage facility of the pharmaceutical packaging department. Before 1939.


042
Construction of the new administration building at the Sandoz site in Basel. March 2, 1938.

043
Administration building at the Sandoz site in Basel. 1943.
Elbon packaging. Probably 1930s.
The first scientific publication on the treatment of tubercular fever with Elbon, a cinnamic acid product launched by CIBA, appeared in 1911.

Tuberculosis Day in Osaka (Japan). 1927. Nurses distribute brochures about the tuberculosis drug Elbon.
Correspondence office of CiBa Shanghai. Probably 1939.

Laboratory of CiBa Shanghai. Probably 1939.

Premises of CiBA Shanghai. Around 1938.

Accounting office of CiBA Shanghai. Probably 1939.
At the beginning of the 20th century, various physiologists, biologists and physicians suspected that the gonads – in other words, the ovaries and the testes – produced chemical substances which are distributed throughout the body via the blood. Three decades later, these substances were given the name “sex hormones”. By the mid-1930s, the five most important sex hormones had been isolated, synthesized and given the names by which we know them today: estrone, estradiol, progesterone, androsterone and testosterone. The pharmaceutical industry played a leading role in research into sex hormones. In Switzerland, CIBA in particular dedicated itself intensively and persistently to research into sex hormones from 1914 onwards, and in the interwar period, the company launched seven different hormone products as patented medicinal product innovations. In 1918, CIBA had launched its first two extracts from animal ovaries: Agomensin and Sistomensin, which were mainly used to treat menstrual disorders. Although both were patent-protected original CIBA products, the manufacturing processes had been discovered by external scientists who had sold them to the Basel-based company. By contrast Prokliman, launched in 1927, and Androstin, available from 1931, were based on processes which the CIBA laboratory had been using for some time to manufacture organ extracts. Prokliman was a combination drug: alongside the ovary extract, it also contained a laxative, a sedative, a vasodilator and a blood pressure regulator. It promised to alleviate the symptoms of the female menopause. Androstin, a testicular extract, was also aimed at treating climacteric complaints, namely problems caused by the “male menopause”.

CIBA worked on synthesizing sex hormones from the 1920s. A number of advantages were expected to result from synthetic replacements for hormone extracts. Raw material procurement would be simplified, meaning that production quantities would not be dependent on the availability of slaughterhouse waste – partly imported from South America. Furthermore, synthetic production methods were considered to be much more reliable in terms of purity and effectiveness than traditional extraction processes. From 1935 onwards, CIBA scientists were not only able to manufacture natural sex hormones by partial synthesis. They also managed to construct sex hormones which do not occur in nature, but are far more effective than their natural prototypes. This new knowledge was attained thanks to various forms of cooperation. The key factor was the collaboration with Professor Leopold Ružička of the Federal Institute of Technology, Zurich. In 1932, Ružička presented a plan for manufacturing synthetic hormones by means of partial synthesis. In just two years, his university research team in Zurich managed to artificially create the male hormone androsterone from cholesterol. Meanwhile, industrial chemists in Basel developed a method for isolating the hormone progesterone in crystallized form from animal ovaries. In 1935, Ružička was able to announce – together with CIBA chemist Albert Wettstein (1907–1974) – that he had worked out the chemical structure of the male hormone testosterone. The following year, CIBA launched its first
synthetic hormone: Perandren. This was followed in 1938 by Ovocyclin and Lutocyclin, CIBA's first synthetic female hormones. The active substance in Perandren was a testosterone derivative with a chemical structure that does not occur in nature. Ovocyclin, too, was based on a synthetic hormone, an artificial estradiol compound. Lutocyclin's active substance was synthetic progesterone. At the same time, Tadeusz Reichstein from the Federal Institute of Technology was researching the hormones secreted by the adrenal cortex. He obtained the organ extracts from Dutch pharmaceutical company Organon. In 1936, Reichstein was able to show that, like sex hormones, substances from the adrenal cortex (corticosteroids) are also steroids. CIBA was keen to prevent knowledge about the structure of steroid hormones reaching foreign competitors via Reichstein. Conversely, Reichstein and Organon had little choice but to continue working with CIBA, as the company held important patents in the field of steroids. In 1939, CIBA launched the first synthetic adrenal cortex product under the trade name Percorten, which was initially prescribed to treat Addison's disease (adrenal insufficiency).

The seven gonadal and hormone products together with Percorten remained on the market under various identities – new combinations, manufacturing processes and indications – until the 1950s and 1960s.
Calcium was used in China as a haemostatic as early as the pre-Christian era. In the 16th century, the famous doctor, alchemist and philosopher Paracelsus prescribed a compound made from calcium-rich corals for uterine haemorrhage. The scientific principles behind calcium therapy were first established in the 1890s, and the first quarter of the 20th century saw the launch of numerous calcium products on the market. They were used for a broad range of indications, including hives, rickets, scrofula, as a tonic during pregnancy and as a prophylactic against catarrh. In 1924, German pediatrician Kurt Blühdorn observed jokingly that “there is hardly a disease for which chalk has not been used as a treatment.” The calcium products were based on a range of salts, combinations and dosage forms. However, the calcium therapy of the day had a number of problems to contend with. If administered by injection, calcium was poorly tolerated, often leading to painful tissue injuries which were slow to heal. By contrast, orally administered calcium chloride, which was the most common product of that time, had a harsh, salty and bitter taste and often caused indigestion. Patients would usually refuse to continue taking it after a short while. The turnaround came with the launch of Calcium-Sandoz in 1927: made from calcium gluconate – an organic salt compound chemically derived from glucose – this product was completely taste-neutral, which gave it a considerable advantage over the other calcium salts. Of even greater importance was the fact that, in contrast to competitor products, Calcium-Sandoz had a very high tissue tolerance. Sandoz also emphasized the storage effect which occurred when the salt compound was injected intramuscularly.

Calcium-Sandoz turned out to be a stroke of luck for the company. Although the pharmaceutical department founded in 1917 soon enjoyed scientific success with products based on ergot and cardioactive natural substances, the market was slow to embrace the new medicines. First, the new specialties did not address the needs of the masses, such as treatments for fever and coughs, and were focused on narrow indication areas. Second, Sandoz was still a relatively unknown brand. This meant that, initially, the pharmaceutical department only generated costs. In 1919, company founder Edouard Sandoz accused it of causing a “useless increase in expenses”. And its head, Arthur Stoll, soon became known as the “expenses director”, while his colleague in the dyestuffs department was considered the “income director”. The pharmaceutical department only became profitable in 1924. However, even then the small profit of 27,000 Swiss francs did not come from its so-called pharmaceutical specialties (i.e. its own, patented inventions, which still generated a loss of over 300,000 Swiss francs), but from strong sales in the so-called alkaloid business (trade in active substances). Pharmaceutical specialties were only catapulted into the profit zone when Calcium-Sandoz was launched on the market. As the salt of an alkaline earth metal, it may have been anything but a “fine product” based on “physiologically specific active substances from the plant and animal kingdom”: it was dosed in grams and manufactured by the
tonne. But Calcium-Sandoz was a resounding market success, growing to become the company’s best-selling medicine by 1929. It became synonymous with calcium therapy and turned the company into a household name. In the following decades, Sandoz continuously expanded its range of calcium products. While previous applications such as the treatment of tetany, bronchial asthma, hay fever and bronchitis gradually faded into the background, the product became increasingly important as a prophylactic against osteoporosis.
THE SECOND WORLD WAR
AND THE EARLY POSTWAR PERIOD
STAGNATION AND MODERNIZATION
1939–1951
The Second World War is considered one of the bloodiest conflicts in history. After Italy had joined the war and France was defeated in June 1940, Switzerland was almost totally surrounded by the Axis powers. Following the occupation of Southern France in the fall of 1942, its isolation was complete. This was a new situation for Switzerland. Its economy – closely interwoven with international markets and dependent both on exports of goods and services and imports of raw materials and food – was now cut off from the world market.

**The Basel chemical industry – isolated, but well equipped** Unlike in 1914, the Basel chemical companies were already well established when the Second World War broke out in September 1939. In the interwar period they had undergone significant geographic expansion, entered new sectors and launched new products. With the outbreak of war, foreign branches and production sites became even more important. To some extent, they enabled the isolated Basel headquarters to continue to serve the international markets and maintain key customer relationships. Sales of medicines, chemicals and pesticides performed well, which made up for losses in the dyestuffs sector. In 1939, the Basel companies’ dyestuff business had recorded improved sales figures in its markets thanks to precautionary buying and stockpiling. During the course of the war, however, sales quickly fell below the figures for the 1930s. As the key industrial nations were producing fewer fashionable textiles, demand for dyes slumped. In contrast to dyestuff manufacturers in the countries at war, the Basel companies were not able to offset losses in their civilian business with orders from the armed forces. The economic war dampened exports, limited transport links to a few insecure routes and prevented currency exchange. However, the keenest challenge for the Basel chemical industry lay in raw material imports: most of its coal and starting products came from Germany. The Nazi regime only permitted exports within a certain framework, which had to be negotiated via the Swiss authorities responsible for the wartime economy. Geigy CEO Carl Koechlin-Vischer (1889–1969) was appointed Head of the Chemical and Pharmaceutical Industry section of the Swiss Federal Department of War, Industry and Employment. He provided the Basel chemical industry with an excellent link to the key offices of the Swiss economy in the difficult war years. Koechlin’s efforts to secure the best possible provision of raw materials and German coal can hardly be overpraised. To help meet the demand for energy, coal was also mined at various sites around Switzerland. Sandoz had the Schwarzenmatt AG mine in Boltingen (Canton of Bern), from which over 6,000 tonnes of additional fuel were extracted in 1943–1944. Towards the end of the war, German deliveries of raw materials dwindled to very low levels. In this precarious situation, Basel’s chemical industry focused on renovating and modernizing its production equipment. It also expanded its research activities, because – as was noted in the 1940 Sandoz Annual Report – “only by staying ahead in terms of the quality of our products will we survive the difficult war and postwar period.”
Revolutionary inventions: DDT In the autumn of 1939, Geigy research chemist Paul Hermann Müller (1899–1965) discovered the insecticidal properties of dichlorodiphenyltrichloroethane, or DDT. As it had a broad range of applications and permanently destroyed numerous insect species, DDT quickly became the most popular insecticide. Geigy supplied the international markets with the innovative DDT products Gesarol (for agriculture) and Neocid (for control of disease-carrying insects). The company not only exported these products directly from Basel; it also had DDT manufactured at its foreign production sites and by licensed external companies. It supplied both the Axis powers and the Allies. While the US government used DDT in the war only to combat the spread of typhus and malaria, the Germans mainly employed it to protect crops. However, the unrestricted global use of DDT as a pesticide in the postwar years soon began to have worrying adverse effects: the substance got into the fat reserves of birds, mammals and humans via the food chain. After being praised initially as a miracle weapon in the fight against diseases and pests, in the 1960s DDT became the epitome of menacing toxin.

... and LSD In the 1930s, Sandoz chemist Albert Hofmann (1906–2008) resumed the company’s research into ergot alkaloids begun by Arthur Stoll. Scientists at the Rockefeller Institute in New York had recently isolated the basic structural unit common to the ergot alkaloids, lysergic acid. As part of his search for a circulatory and respiratory stimulant, Hofmann synthesized various amide derivatives of lysergic acid in 1938. The 25th substance in this series was lysergic acid diethylamide, which he named LSD-25 for use in the laboratory. Pharmacological experiments with LSD-25 on animals showed that their behavior was unsettled during anaesthesia. No further effects could be ascertained. Five years later, Hofmann decided to re-examine the substance, and on April 19, 1943, he carried out his legendary self-experiment, by which he proved the psychotropic effects of this partially synthesized alkaloid. LSD-25 marked the birth of psychopharmacology, which led to the discoveries of the neurotransmitters serotonin and dopamine in the following decades. LSD research suffered a heavy setback when the psychedelic substance was caught up in the wave of recreational drug use which accompanied the hippy movement from the mid-1960s.

The immediate postwar period From an economic point of view, the war had a positive impact on Basel’s chemical industry. The production facilities had not only survived the war intact, but in some cases had also been modernized, which meant they were well prepared for peacetime business. Because the Basel chemical industry was virtually the only one in Europe with fully functioning production facilities, it profited exceptionally from the economic boom of the postwar years. Products from Basel were of high quality and therefore in high demand. Only production capacities and the availability of raw materials limited sales figures. In 1951, CIBA’s total sales were four times higher than in 1939.
May 17, 1968.
Having been educated at the Basel Humanist Grammar School, the Neuchâtel Commercial School (Switzerland) and the Berlin Commercial College (Germany), Carl Koechlin joined Geigy in 1908. After spending time in New York, in 1914 he was named Deputy Director and in 1918 Director. A year later he was elected to the Board of Directors, and was CEO from 1939. From 1949 to 1967, he was Chairman of the Board of Directors. Koechlin offered his services to numerous economic organizations, including the Swiss Federation of Trade and Industry (now economiesuisse), the Swiss National Bank and the Swiss Society of Chemical Industries.

The Summit site (New Jersey, USA).
August 1946.
The CIBA subsidiary in Summit opened in 1937 and became a leading provider in the US pharmaceutical market during the Second World War.

Sandoz Basel. Telephone operator. 1940s.

Geigy Rio de Janeiro (Brazil). Delivery vehicle in front of the warehouse entrance. 1951.

051
A can of Neocid and a can of Gesarol spray from 1942.

052
Paul Hermann Müller (1899–1965) being awarded the Nobel Prize. December 10, 1948. Geigy chemist Paul Müller, who discovered the insecticidal properties of DDT, received the Nobel Prize for Physiology or Medicine in 1948. The photo shows the Nobel Prize winner in the Concert Hall in Stockholm (Sweden) after receiving the certificate and gold medal.

053
A mother in the New York borough of Brooklyn disinfects her child’s room with a can of Neocid, also used by the US Army. 1945.
Albert Hofmann (1906–2008) and his colleague W. Bischoff (at left in picture), manufacturing the first large batches of dihydroergotamine and Hydergin for clinical trials. 1945.

Albert Hofmann was born in Baden (Switzerland), where he completed a commercial apprenticeship at Brown, Boveri & Cie. After passing his Matura (school-leaving exams), he studied chemistry at the University of Zurich, gaining a doctorate with distinction in 1929. From 1929 to 1971, he worked as a research chemist at Sandoz in Basel, for the last 15 years of which he headed up the department of natural products. During his research into ergot alkaloids he discovered the hallucinogenic properties of lysergic acid diethylamide (LSD) in 1943. His research led to the creation of medicines such as Hydergin and Dihydergot and the hallucinogen psilocybin. Hofmann was an honorary member of numerous associations, including the American Society of Pharmacognosy, and was awarded multiple honorary doctorates.


Montgomery’s official visit to Basel included a tour of Geigy’s DDT laboratories. The photo shows CEO Hartmann Koechlin-Ryhiner (1893–1962) and Paul Müller explaining an experiment cabinet (to the left; not in the photo) in which the first flies had been destroyed in 1939 using the new “miracle pesticide”.

Sandoz East Hanover (New Jersey, USA). Laboratory assistant. Between 1950 and 1952.


CIBA Hong Kong. Laboratory. 1949.
Sandoz Toronto (Canada). General Secretariat. 1944.

CIBA Copenhagen (Denmark). Commercial warehouse for pharmaceutical products. 1948.

CIBA Copenhagen (Denmark). Accounting. 1948.

Analytical balance, Sandoz East Hanover (New Jersey, USA). Between 1950 and 1952.

Sandoz branch in Los Angeles (California, USA). Around 1944.

The CIBA administrative building in Viale Premuda after Milan (Italy) had suffered heavy bombardment. August 1943.
Malaria (from the Italian *mala aria*, “bad air”) is an infectious disease spread via the bite of the Anopheles mosquito. Infected females transmit a parasite known as Plasmodium which multiplies in the liver and then attacks red blood cells. Malaria is the most common parasitic infection in the world (in 2009 it was contracted by 250 million people) and occurs primarily in the poorest countries. Without treatment, malaria leads among other things to circulatory problems, which can be fatal.

A predecessor company of Novartis first dealt with malaria in the 1810s. Among the colonial products sold by Hieronymus Geigy (1771–1830) was cinchona, which had been known to be effective against malaria since the 17th century. Originally coming from South America, this remedy was used to treat “stomach illnesses and fever”. In 1824, quinine was isolated from cinchona. The Geigy company was among the first buyers of this new pure substance, whose advantage was that it enabled standardized treatment and more precise dosage for malaria patients.

In addition to the draining of marshland, the discovery and industrial production of DDT (dichlorodiphenyltrichloroethane) at Geigy during the Second World War was a key milestone in the battle against malaria. Use of this product wiped out malaria in the USA, Canada and Europe in particular. In Italy alone, almost 300,000 people died of malaria in 1946; by 1950 there was not one fatality. DDT was banned in the 1970s due to environmental concerns. Later, the World Health Organization (WHO) reassessed DDT and ultimately, in 2006, authorized restricted use of the product inside buildings in order to reduce the number of infections in regions where malaria is epidemic.

The development of resistance in Anopheles mosquitoes and malaria parasites is hampering the treatment and eradication of this disease. For this reason, improving malaria treatments – which in some cases have become ineffective – is a top priority. Novartis achieved an important innovation here with the launch of Coartem in 1999. The active substances in this drug are lumefantrine, a molecule which is effective against malaria, and artemether. Artemether is a derivative of artemisinin, which is isolated from Artemisia, a plant very well known in Chinese medicine. The components of Coartem are not related to quinine, meaning that they are also effective against chloroquine-resistant malaria pathogens. The traditional malaria drug chloroquine has lost more than 50 per cent of its efficacy. For this reason, the WHO recommends a combination therapy using artemisinin derivatives as first-line treatment for malaria. Scientific studies show that Coartem is the most effective treatment today, leading to recovery in over 95 per cent of cases. But regardless of how effective a medicine is, it can only make a difference if it reaches the people who need it most. For this reason, Novartis has been campaigning on the front line for over ten years to ensure that even the poorest people gain access to Coartem. In 2001, a not-for-profit partnership with the WHO was unveiled – the “Novartis Malaria Initiative”. Novartis undertook to supply the WHO with Coartem at cost price.
As a result, authorities in 60 of the world’s poorest countries received over 400 million treatments, and more than a million lives have been saved. This public-private initiative met with great acclaim. In 2010, it was honored with the World Business and Development Award from the United Nations Development Programme and the International Chamber of Commerce.

The battle against malaria is also a top priority of the Novartis Foundation for Sustainable Development. In Tanzania, for example, the ACCESS health programme has been in operation since 2003. One of its goals is better access to accurate information and correct treatment. To achieve this, the programme focuses on optimizing the training of healthcare workers in rural areas and raising awareness of the disease among the population, particularly women and schoolchildren. Prevention, recognition of symptoms and quick diagnosis, followed by correct treatment, are the key factors that lead to success.

Novartis is also committed to the battle against malaria in its research work. Since 2003, over one hundred scientists at the Novartis Institute for Tropical Diseases (NITD) in Singapore have been concentrating on developing new treatments for tropical diseases like malaria and dengue fever. However, tackling such a widespread disease requires cooperation on a global scale. Only by means of additional partnerships between private and public organizations, intensified efforts by NGOs (non-governmental organizations), expansion of prevention and healthcare programmes, and further research and innovation will it be possible to rid the world of this scourge.
TWO DECADES OF GROWTH

GLOBAL EXPANSION AND A MARRIAGE

1950–1970
The economies of the West grew by leaps and bounds in the 1950s and 1960s. This ongoing boom brought about a phenomenal increase in the sales of the Basel chemical companies, with figures soaring from millions of Swiss francs into the billions. The Basel companies set up a network of sales channels, production sites and research centers around the globe and gained a foothold in new business sectors.

Sandoz on a global expansion course  Sandoz is a striking example of the globalization of the Basel companies in the middle of the century. After the end of the Second World War, Sandoz set up companies one by one in India, Ireland, Mexico, the Netherlands, Portugal, Canada, Venezuela, Sweden, Argentina and Uruguay. In 1956, the group had 19 subsidiaries abroad. By 1966, the number of foreign subsidiaries had risen to almost 40, and now included Australia, Cuba, New Zealand, Japan, Morocco, Chile, Peru, Colombia, Pakistan, the Philippines and Finland. Sandoz did not follow long-term or even medium-term strategies in these new markets: in the general economic upswing, everything was more or less improvised. In 1963, a pharmaceutical distribution department was set up which encompassed marketing consultancy, market research, product management, specialist medical consultancy, planning, journals, translation and four country units. This structure was designed to ensure more intensive management of markets and products.

Pharmaceuticals become a boom business  The quarter century following the end of the war was a phase of enormous growth for the pharmaceutical industry in all western industrial nations. The Pharmaceuticals Divisions of CIBA and Sandoz became their strongest business segments. Between 1945 and 1960, CIBA increased its sales in this area from around 100 million Swiss francs to over 500 million. These high growth rates can be attributed to various factors: on the demand side, rising prosperity and the expansion of the health insurance sector were crucial. In the USA, the most important sales market for medicines, the number of insured persons increased tenfold between 1940 and 1960, from just over 12 million to more than 120 million. On the supply side, increasing public and private research investment boosted the rate of innovation throughout the sector. From the late 1940s onwards, the number of medicines launched each year rose considerably. The industry introduced a broad spectrum of new antibiotics, allergy medications, sedatives, chemotherapy agents, cardiovascular medicines, psychotropics, analgesics, steroid hormones and vitamin products to the market.

Production is decentralized  In the 1950s and 1960s, the booming Basel chemical industry greatly expanded its production base in Switzerland and abroad. Two objectives lay behind these investments in the pharmaceutical business: first, the few existing chemical factories were to be upgraded, as they were having to produce ever-increasing quantities of active substances. Second, the pharmaceutical sector needed to have a large number of production facilities around the world in order to supply local mar-
kets. Another reason for building new production sites abroad was that more and more countries – especially the non-industrialized ones – had introduced customs duties, exchange regulations and import licenses with the aim of ensuring that, if possible, everything from the active substance through to the finished product would be produced in their own country.

**Research and development move abroad** The Basel chemical industry had been internationally active in sales and production for some time, and now it also began to cross national borders in its research and development work. From the 1950s onwards, CIBA massively expanded its US research and development activities in Summit (New Jersey, USA). In India, it opened a basic research center for dyestuffs and pharmaceuticals in Goregaon near Mumbai (India) in 1963. In late 1959, Geigy purchased a laboratory building for organic chemistry, biochemistry and pharmacology in Ardsley (New York). This step enabled the company to pursue its own pharmaceutical research in the USA. Sandoz followed suit five years later, building a pharmaceutical research center in East Hanover (New Jersey, USA) in 1964. 1970 saw the inauguration of the Sandoz Research Institute in Vienna (Austria).

**New diversifications open up new markets** At the end of the 1950s, CIBA entered the photochemistry, electronic equipment and animal health sectors. Sandoz acquired the Austrian company Biochemie GmbH in Kundl in 1963, thereby gaining a foothold in the antibiotics and biotechnology sector. In 1967, Sandoz laid the foundations of its nutrition business when it merged with Wander in Bern (Switzerland). This merger also expanded its own pharmaceutical range and allowed it to take over a broad, well-established international distribution organization. Rather out of necessity than voluntarily, the company also entered the hospital supply sector, as a Canadian subsidiary of Wander also joined Sandoz as part of the merger. With annual sales of some 40 million Swiss francs in the hospital supply business, this subsidiary was nevertheless making almost zero profit. Sandoz acquired numerous smaller firms from 1969, thereby rapidly expanding the new segment.

**Sandoz expands its headquarters** In 1940, the three partners in Basler IG had together secured a majority holding in the long-standing company Durand & Huguenin. The new owners did not want to strengthen a competitor further, so Durand & Huguenin continued to restrict its activities to the dyestuffs business. As that sector continued to decline, the company had few prospects for the future and was integrated into neighboring Sandoz in 1969. As a result, Sandoz gained an extra area of some 29,000 square metres, a useful addition to the Basel site.

**The “Basel marriage”: CIBA and Geigy merge** Both CIBA and Sandoz were expanding thanks to their pharmaceutical business. The spectacular rates of growth recorded by Geigy, however, were all due to its highly successful agrochemicals, which achieved terrific sales, especially in the USA. Between 1956 and 1966, group sales had risen from 511 million Swiss francs to almost 2 billion Swiss francs. In 1967, the company caught up with CIBA in
terms of sales, and figures surged to 2.7 billion Swiss francs in 1968. At the Board of Directors meeting of March 28, 1969, Geigy Chairman Louis von Planta acknowledged the excellent fiscal year and forecast a further upturn in the near future. However, the coming years would also bring enormous challenges, he said. “In this respect,” von Planta warned, “we are facing two dangers: the enormous cost explosion, in particular in the research sector, and growing pressure from competitors, not only from the large German, British and American chemical companies, but also from the oil industry, which has access to virtually unlimited resources. The problem for the Board of Directors and the Executive Committee is this: how can we guarantee the growth that is essential to survive in such a competitive environment?” Von Planta saw the solution in a closer collaboration with another Basel company. Sandoz had signaled “a certain willingness to enter into a precisely defined collaboration in specific areas, but not an all-encompassing cooperation agreement”. CIBA, on the other hand, had indicated “spontaneous willingness to enter into an extremely wide-ranging collaboration”. Two weeks later, the Boards of CIBA and Geigy announced that they were looking into a possible merger of their companies in more detail. On October 20, 1970, shareholders in the two companies approved the merger agreement at respective extraordinary general meetings.

Some criticism was voiced before the merger, however, in particular on the Geigy side. On April 5, 1969, Geigy Board member Johann Jakob Vischer (1914–1985) wrote to von Planta. He emphasized that Geigy had developed a management style which gave it an edge over other companies and “of which we are all a little proud. It would be a great pity if that were to be lost.” The collaboration did indeed prove to be difficult, as the two companies had developed completely different cultures. For a long time, the newly merged Ciba-Geigy workforce remained loyal to either the former Geigy or to the former CIBA – including all of their practices, cliques, procedures and products.

**The foundation of the Friedrich Miescher Institute (FMI)** During the merger negotiations with Geigy, CIBA decided to set up an institute for basic research in the field of biology. This was partly as a reaction to a local competitor who had taken a similar step: in 1967, Roche had founded an institute for basic biomedical research in the USA, and had set up another in Switzerland just one year later. This caused a certain amount of anxiety among the other three Basel chemical companies. On April 10, 1970, CIBA and Geigy signed a charter describing the tasks of the institute, which was named after the Basel-based physician and physiologist Friedrich Miescher, the man who discovered nucleic acid. These tasks included training young scientists and conducting basic biomedical research. Right from the start, the FMI placed great emphasis on acting out its role as a bridge between universities and industry, something which the Roche institutes took upon themselves too.

Sandoz Mexico City, Canteen. 1952.


S.A. Española de Colorantes Sintéticos in Hospitalet near Barcelona (Spain), a Sandoz holding. Laboratory. Probably 1964.

CIBA Wehr (Germany). Dyeworks. 1960s.

059

060
Laboratory at the CIBA site in Stein (Switzerland). Around 1960. CIBA built a new pharmaceutical production site in Stein in 1957. It went on to become the company’s most important pharmaceutical factory.
Geigy Rio de Janeiro (Brazil). Entrance to the pharmaceutical department on the 6th floor of the Edifício Mayapan. Around 1953.


CIBA Copenhagen (Denmark). Analytical pharmaceutical laboratory. 1960s.

CIBA Copenhagen (Denmark). Goods dispatch. 1960s.

CIBA Copenhagen (Denmark). Invoicing. 1960s.

061 Opening of the CIBA Research Center in Goregaon near Mumbai (India). March 21, 1963. Indian Prime Minister Jawaharlal Nehru opened the new research center established by CIBA and described this investment in his speech as a valuable contribution to the establishment of science and industry in India.

In 1956, Geigy USA moved from the old-fashioned Barclay Street in New York to the ultramodern buildings of its new head office in Ardsley. Since the entire building complex had been redesigned and constructed from scratch, every department was able to have specific rooms tailored to its needs.


Parasitology laboratory (snail breeding) at the Sandoz Research Institute in Vienna (Austria). Early 1970s.

Melleril packaging. 1980s.
Sandoz launched the neuroleptic Melleril in 1958. This new medicine was highly effective for a wide range of psychoses and was well tolerated. Melleril gained acceptance in clinical and outpatient psychiatric treatment as an efficient sedative for a broad spectrum of indications. In the 1960s and 1970s, it made a major contribution to the sales of the Sandoz Pharmaceuticals Division. In 1980, it was still the primary neuroleptic on the global market.

The Swiss industrial company Wander AG from Bern manufactured special foodstuffs (dietetics, in particular malt products, sports and infant nutrition and slimming products) and pharmaceuticals focused on the areas of pain relief, colds, gastrointestinal disorders, skin diseases, rheumatic disorders and psychiatry.

The best-known and strongest-selling product in the Wander nutrition business was the malt drink Ovaltine/Ovomaltine, which was launched in 1904.

Fermenter systems for performing microbiological processes at Sandoz in Kundl (Austria). Probably 1966.
Louis Fortunat von Planta (1917–2003). 1974. Louis von Planta attended the Basel Humanist Grammar School and went on to study law at the University of Basel. In 1939, he took his doctoral and bar exams. He was a partner at a Basel lawyer’s and notary’s office from 1946 to 1967. In 1965, he was elected to the Geigy Board of Directors, becoming its Chairman in 1968. He acted as a driving force behind the merger of CIBA and Geigy. From 1972 to 1987, he was Chairman and CEO of Ciba-Geigy, and became Honorary Chairman after that. In 1973, he was awarded an honorary doctorate by the University of Fribourg (Switzerland) and, in 1986, the Friendship Prize of the American-Swiss Association. As Chairman of the Swiss Federation of Trade and Industry (now economiesuisse) from 1976 to 1987, Louis von Planta gave lasting service to the Swiss economy. Thanks to his wealth of experience and contacts, he made a vital contribution to preparing the merger of Ciba and Sandoz to form Novartis. From 1996 to 2003, he was Honorary Chairman of Novartis.

Robert Käppeli (1900–2000). 1948. Robert Käppeli was born in Lucerne (Switzerland). After completing his commercial training, he studied macroeconomics in Basel, earning a doctorate in 1928. He then worked as an assistant at the Institute for the World Economy and Maritime Traffic in Kiel (Germany) and as Secretary to the directors of the Warburg Bank in Hamburg (Germany). He joined CIBA as secretary to the Board of Directors in 1934, becoming head of the finance department in 1939 and CEO in 1946. In 1956, he was promoted to Chairman of the CIBA Board of Directors. Käppeli was the first Chairman of Ciba-Geigy from 1970 to 1972, then Honorary Chairman of the Board and, from 1996, Honorary Chairman of Novartis. He was a member of several Boards of Directors and various art committees. He was awarded honorary doctorates by the Federal Institute of Technology in Zurich and the Swiss universities of Fribourg and Basel.
Ritalin packaging, 1960s.

Methylphenidate, a substance synthesized in the research laboratories at CIBA in 1944, was launched in 1954 as a stimulant under the trade name of Ritalin. Contemporary product information recommended the drug “for increased fatigability, lack of concentration, memory lapses with insufficient coordination and association ability (arteriosclerosis), depressive moods (e.g. reactive climacteric or convalescent depression), avolition and narcolepsy”.


In 1965, CIBA moved its head office in Italy from Milan to the nearby town of Origgio. The new buildings were constructed on the basis of the very latest architectural and functional criteria.


Origgio had open-plan offices. To reduce noise to a minimum, sound-absorbing material was used for the ceilings, the floors were covered with wall-to-wall carpets and all metal furniture was removed, as were typewriters and calculators that did not function quietly enough. Furthermore, the individual working groups were separated by half-height cupboards and numerous plants.


CIBA Dorval (Canada). Canteen. 1960s.
The dynamic growth of Geigy led to the foundation of a group-wide “publicity department” in 1941, which was renamed as the advertising department in 1966. The turning point was the launch campaign for the industrial moth-proofing agent Mitin in 1939. For the first time in its history, the company – which had specialized in dyestuffs until the 1920s – was faced with the challenge of appealing not just to industrial customers but also to private households. An agency was commissioned, but the advertising slogan it came up with failed to hit the mark with the public. This unsuccessful campaign prompted the conclusion that the company needed its own advertising specialists, and the emergence of intensively marketed Geigy pharmaceutical products made a central publicity department seem absolutely essential. The job of setting up this department was entrusted to René Rudin (1911–1992), who managed it until 1970. His advertising policy was based on five principles, which he outlined in 1944:

1. Our publicity must maintain a factual tone for all products.
2. To ensure the necessary penetration, we must employ suitable suggestive elements, tailored carefully to the consumer group being targeted.
3. We must ensure that certain artistic standards are maintained, by means of immaculate typographical design, high quality image material and flawless reproduction in printed form.
4. All printed material leaving our company and all our other statements must express the trustworthiness of the name Geigy, thereby functioning as goodwill publicity above and beyond their immediate purpose.
5. We must strive to give our publicity its own special character, with the goal of gradually creating a typical Geigy style.

To avoid the danger that internal advertising experts (in contrast to external agencies) would sooner or later fall into a routine and develop a blinkered attitude, Rudin always kept things fresh in his department: his team employed young, talented graphic artists, designers, editors and filmmakers, and also used the services of freelance photographers and artists for certain tasks. The studio at the firm’s headquarters maintained close ties with the Basel General Vocational School in particular, promoting a lively exchange between design training and practice. This was an important factor in turning Basel into a pool of talent which helped spread Swiss graphic design around the world and give it international recognition.

The development and quality of graphics and advertising at Geigy resulted mainly from astute HR policies, and not from prescribed design guidelines. In the three decades from 1941 to 1970, over 50 designers were employed internally or as freelancers at the Basel headquarters. A further two dozen or so worked primarily in the 1960s for the studios of subsidiaries in the USA and the UK, as well as in Spain, Italy, Canada and Australia, although these countries only had small advertising teams.

“That was how the specialist publication of 1967, Chemie, Werbung und Grafik (“Chemistry, Advertising and Graphic Design”), defined the core task of pro-
moting chemical and pharmaceutical achievements. Medicines for a broad range of indications, textile care products and pesticides differ at most in terms of their form; our senses do not directly perceive their effect. Their benefit is an abstract concept for the consumer and using them requires a great deal of trust, which is derived from the manufacturer’s image.

These specific circumstances unlocked extraordinary design potential among the Geigy graphic artists of the 1950s and early 1960s. In most cases, it was expressed in a distinctly modern formal language which does not seem schematic or formulaic but remains fresh, flexible and individual. As a result, design personalities such as Max Schmid, Karl Gerstner, Gottfried Honegger, Nelly Rudin, Roland Aeschlimann and Toshihiro Katayama created a corporate diversity that provided a platform for pictorial symbolism and incisive typography and also for lessons in non-representational art. The designs, which were soon referred to as being in the “Geigy style”, are characterized by reduction to a few elements, generous use of white space, equal use of graphics and photography, strong lines, stark contrasts between dark, light and color, geometric construction, unusual materials and processing techniques, and the almost exclusive use of sans serif fonts.

Geigy’s industrial design was soon looked upon as a new benchmark: in 1967, Princeton University began an exhibition series on modern graphic design. The first show was entitled “Geigy Graphics” and primarily presented works by Geigy USA under Fred Troller.
The research on psychological changes carried out in the 1930s only bore fruit after the Second World War. In 1952, surgeon Henri Laborit discovered by chance that the molecule chlorpromazine alleviates shock caused by surgery and improves the mood of postoperative patients. Consequently, psychiatrists began to use chlorpromazine to treat unsettled patients. It was the first in the class of medicines known as neuroleptics, and enabled use of the straitjacket – which was customary at the time – to be avoided.

Geigy, too, was involved in researching the efficacy of chlorpromazine. In 1953, Swiss psychiatrist Roland Kuhn asked Geigy to provide him with psychotropic substances to treat his schizophrenia patients at the Münsterlingen Cantonal Hospital (Switzerland). He was given samples of imipramine, a compound which had a tricyclic structure similar to that of chlorpromazine and which had been described by the Geigy pharmacologists. Kuhn tested the substance for two years and ascertained that it did not have the expected neuroleptic effect. After treatment of 150 patients, however, an antidepressive effect became apparent. In September 1957, Kuhn presented the findings of his clinical tests at the second World Congress of Psychiatry in Zurich. One year later, imipramine, under the name Tofranil, became the first antidepressant to be launched. It was soon established globally as a well-tolerated standard treatment for endogenous depression or melancholia, and triggered a genuine revolution in psychiatry. Before the launch of Tofranil, depression patients had to spend long periods in clinics and were often treated with electroshock therapy, as the only options were to stimulate or sedate them; it was impossible to restore their overall equilibrium and normalize their mood. With an efficacy rate of over 80 per cent, Tofranil was, for a long time, the gold standard in treatment of all types of depression, allowing a significant reduction in the number of inpatient treatments.

Based on these experiences, further research by Geigy led to the discovery of another substance with significant potential: chlorimipramine. It was presented to psychiatrists at a congress in 1961, and met with great acclaim. After five-year trials in renowned clinics, the new tricyclic was brought onto the market in 1966 under the name Anafranil. In addition to depression, this medicine is used to treat conditions such as obsessive-compulsive disorder, panic attacks, agoraphobia, certain types of bedwetting in children and neuropathic pain. Anafranil has proved to be an extremely effective medicine which brings about high remission rates.

In 1972, Ciba-Geigy launched the product Ludiomil. It contained a new substance called maprotiline, a tetracyclic indicated for treating various types of depression. It helps to restore high-quality sleep and reduces anxiety, although it is not employed specifically in the treatment of panic attacks. In the last 50 years, the therapeutic spectrum of depression treatment has widened significantly, but tri- and tetracyclics – although they are prescribed less often than in the past – still represent a reliable alternative.
Rheumatism comes in many different forms. This chronic disease, still incurable, involves a large number of painful inflammatory disorders of the joints, vertebrae, muscles, tendons and connective tissue.

Rheumatic symptoms were described as early as the 5th century BC by Greek physician and scholar Hippocrates of Kos. In those days, the juice of willow bark (*Salix* species) was the treatment of choice. The first medicines for rheumatic complaints were only created at the end of the 19th century, however. In 1828, the willow bark extract salicin was isolated, which the body metabolizes into biologically active salicylic acid. From 1874, this substance was manufactured industrially at Dr. F. von Heyden’s salicylic acid factories in Dresden (Germany) and Radebeul (Germany) and sold as a medicine. Owing to its side effects and bitter taste, further research was carried out. In 1897, the main Bayer factory in Elberfeld (now Wuppertal, Germany) managed to produce the structurally related acetylsalicylic acid – first synthesized by Charles Frédéric Gerhardt in 1853 – in pure form. Bayer called the product Aspirin and had it patented in 1899. Acetylsalicylic acid turned out to be very useful for therapeutic purposes. However, in the 20th century, new substances with superior analgesic and anti-inflammatory properties emerged.

From 1953 to 1964, Geigy led the market for antirheumatics with its product *Butazolidin* (from phenylbutazone, which was discovered in 1946). When US pharmaceutical group Merck presented the one hundred times more active indomethacin in 1964, Geigy began the search for a new, highly active and well-tolerated anti-inflammatory. First, Geigy chemists compared known non-steroidal antirheumatics. Due to remarkable physico-chemical similarities, it was possible to define crucial basic structural requirements for a new substance. When, during the development phase in 1966, this drug proved to be poorly tolerated by rats and dogs – as had also been the case with clinically active indomethacin – the group leader decided to try it out on himself. A two-day trial of the new active substance diclofenac caused no complications and encouraged Geigy to push ahead with its development. Tolerability studies in healthy volunteers and the subsequent clinical trial confirmed the substance’s activity and tolerability. Ciba-Geigy launched the product in Japan and Switzerland under the brand name *Voltaren* in 1974. Since then, it has become established in over 140 countries as a reliable medication for all forms of rheumatism and numerous conditions involving acute pain and inflammation. With 200,000 participants in clinical trials and over a billion patients treated, it is one of the best-studied medicines in the world. Its numerous dosages and dosage forms (including ampoules, eye drops, emulsion gels, patches, tablets and suppositories) ensure individually tailored medical care and contribute to the product’s continuing popularity.
FIRST ONE MERGER, THEN ANOTHER

FOCUS INSTEAD OF DIVERSIFICATION
1970–1996
The 1973 oil crisis brought the longstanding economic boom in the western industrialized nations to an end. What followed was recession, inflation and currency turmoil. A new wave of globalization set in around 1980, which intensified in the 1990s. Companies striving for profitable growth were forced to set clear priorities and maintain a consistent international focus.

**Diversification – the magic formula of the 1970s** In the recession of the 1970s, both Ciba-Geigy and Sandoz sought new ways of spreading risks rationally. The two companies examined numerous diversification options. In 1971, Sandoz entered the fitness business, acquiring a majority stake in John Valentine. The Executive Committee saw in this project “the only immediately realizable diversification opportunity” for the pharmaceutical department, but the undertaking failed and was dropped a few years later. In 1974, Ciba-Geigy acquired Airwick Industries in Carlstadt (New Jersey, USA), a manufacturer of air fresheners, disinfectants and cleaning agents for households and large-scale consumers as well as of chemicals for swimming pools. In 1974, Ciba-Geigy entered the seeds business, a move followed by Sandoz in 1975.

**The recession of the 1970s: a slump in the industrial divisions** The pharmaceutical business proved to be largely resistant to economic fluctuations. Ciba-Geigy and Sandoz survived the recessions of the 1970s relatively unscathed. The oil crisis did not hit the corporations as a whole particularly hard, although energy costs did rise considerably. Only the industrial divisions – in other words dyestuffs, chemicals, plastics, additives and pigments – faced serious problems with the supply of raw materials. The strength of the Swiss franc also took its toll on business: between 1973 and October 1978, the US$ exchange rate fell from 4.375 Swiss francs to 1.45 Swiss francs. Within the companies, it was the industrial divisions which suffered the worst dip in sales and profits as a result of the recession, a development which, over the long term, sealed their decline in the group hierarchies.

**Sandoz cuts personnel costs: the overhead value analysis** The economic environment changed radically in the 1970s. Sandoz’s return on equity fell by more than half over the course of the decade. The results of this downward trend were particularly apparent at head office, which housed key research and production departments as well as various functions of the group headquarters. In 1976, personnel costs stood at 32 per cent of head office revenue, but by 1980 this figure had risen to 36.6 per cent. Sandoz was the first large European company to decide to reduce its administrative expenditure long-term. Consultancy firm McKinsey carried out an overhead value analysis at the Basel headquarters in 1981, with the aim of identifying weak points in the business in order to increase productivity and efficiency. All key functions and work processes were placed under critical scrutiny. The results showed that the departments examined could reduce their personnel by more than 15 per cent without weakening the company’s performance. This generated considerable cost savings, with staff numbers being...
reduced primarily by means of natural attrition and early retirements. The resources this released were then used for targeted acquisitions, which boosted Sandoz’s ability to compete.

**Diversifications in the 1980s** In 1980, Ciba-Geigy group management began to restructure in two directions. Firstly, it cut back activities with few prospects of generating a profit in the long term. Secondly, it sought out and entered new, lucrative areas for investment such as the precision balances and contact lens sectors, rapidly expanding both areas in the years that followed. Sandoz took over a US and a Japanese company in the construction chemicals sector in 1985, before acquiring a US environmental technology company in 1988. One year later, Sandoz combined the construction chemicals and environmental technology sectors into an independent division under the company name MBT Holding.

**The Schweizerhalle blaze** In the early hours of November 1, 1986, there was a fire in a warehouse at the Sandoz site in Schweizerhalle near Basel. A disaster alert was sounded in the Basel region – the population was in shock. The water used to fight the fire washed tonnes of pollutants, mainly insecticides, into the Rhine, causing environmental damage as far downstream as the Netherlands. According to the official inquiry, the fire had been caused by glowing particles of the chemical Prussian blue. The blaze at the Schweizerhalle site undermined belief in the safety of the chemical industry. It happened just a few months after the devastating nuclear disaster in Chernobyl (Ukraine) and destroyed the myth that such technology-related catastrophes were impossible in Switzerland.

The chemical industry, the authorities and politicians all drew important lessons from the Schweizerhalle blaze. The chemical industry optimized its risk reduction measures. Legal regulations and checks were tightened, and the chemical and biological monitoring of water quality intensified. Sandoz also set up the “Rhine Fund”, which financed 36 scientific projects on the Rhine ecosystem. An overall evaluation shows that the water quality and the biological condition of the Rhine as a whole have improved considerably in the years since the disaster.

**Biotechnology: external knowledge for internal research** The first biotechnology companies began emerging in the USA in the mid-1970s; shortly afterwards, they were springing up like mushrooms. This was a result of considerable advances in molecular genetics and the interest of venture capital firms in new opportunities. Another boost for these new companies was the change in the legal framework in 1980, when the US Supreme Court authorized the patenting of genetically modified organisms. Numerous pending patent applications were quickly granted. Initially, the young companies were short of production capacity and sales outlets. In addition, they were not sufficiently familiar with official approval procedures for new products, and therefore sought contact with the major chemical-pharmaceutical companies. By the same token, the pharmaceutical industry was also interested in collaborating with the biotech firms, as they could provide impor-
tant information on the latest developments in biomedical research. From the mid-1980s, Sandoz and Ciba-Geigy worked closely with the biotech companies, in the area of agricultural biotechnology too. In 1986, Ciba-Geigy and the Californian genetic engineering company Chiron founded a joint venture by the name of Biocine, which developed and sold new vaccines. In 1995, Sandoz acquired the US company Genetic Therapy, with which it had been pursuing joint research projects since 1991.

**Ciba and Sandoz switch their focus** In the late 1980s, Ciba-Geigy revised its corporate self-image and formulated a new corporate philosophy, which it named Vision 2000. This placed social and environmental goals on an equal footing with economic objectives. In strategic terms, the company – named Ciba from 1992 – remained dedicated to broad diversification, with a strong parent company running and supporting the national subsidiaries worldwide from the head office. Sandoz also sought a new orientation: in 1990, it abandoned its head-office-based structure in favor of becoming a holding company – all divisions became independent business units which acted as economically autonomous stock corporations. In making this change, Sandoz was not just implementing a new organizational model; far more, it was launching a trend which would shape the future. It gradually began to focus all its activities on the areas of pharmaceuticals, nutrition and agribusiness, with low-priority business lines being outsourced. In 1994, Sandoz acquired Gerber Products, the leading baby food manufacturer in the USA. The following year it spun off its Chemicals Division, which included dyestuffs, to form the listed company Clariant.

**A coup that came out of nowhere: Sandoz and Ciba join forces** The dynamic reorientation processes inspired the management of Sandoz to think in even greater dimensions: acquisition, collaboration or merger? Chairman of the Board Marc Moret (1923–2006) considered the various options – first in Europe, then in the USA – and established initial contacts. At the same time, he also looked at the possibilities for new partnerships in Switzerland and ordered internal studies on the matter. These pointed to the significant synergy potential of Sandoz and Ciba, especially in the areas of pharmaceuticals, agrochemicals and seeds. Moret decided to arrange a semi-official exploratory meeting with Ciba, which took place in his office on November 30, 1995. Moret’s discussion partner was Louis von Planta, Honorary Chairman of Ciba. The talks were encouraging, and on December 4, 1995, Alex Krauer, Chairman of the Board of Ciba, indicated that he would be very interested in continuing the discussions. A plan of action was drawn up and the team members required to implement the merger project were quickly and discreetly nominated.

When Swiss radio station DRS announced the merger of Ciba and Sandoz early in the morning of Thursday March 7, 1996, the presenter remarked that the report was no hoax. This unusual comment demonstrates the incredulity with which the news was received. Managers and office and production workers had expected further acquisitions, spin-offs and relo-
cations of entire parts of the company, but that Ciba and Sandoz – two companies with radically different corporate cultures – would agree to a merger was an unparalleled surprise. In hindsight, the large-scale merger seems to be both an expression and an accelerator of the global consolidation processes in the chemical-pharmaceutical industry.
Grinding lenses at CIBA Vision in Atlanta (Georgia, USA). 1988.

As part of its diversification policy, the Ciba-Geigy Pharmaceuticals Division entered into the contact lens and lens care products market in 1981. The vision care business soon reached dimensions which justified making it independent, especially since the synergy effects with the traditional pharmaceutical business were modest. The optical lens and lens care products unit was separated from the Pharmaceuticals Division. From 1987, it became the independent group CIBA Vision.

Aerial photo of Basel including the St. Johann (Sandoz) and Klybeck (Ciba-Geigy) sites. 1981.


In 1982, Sandoz acquired the Swedish group Wasa, the world’s largest manufacturer of crispbread. This significantly strengthened the position of the nutrition department within the corporation.

Ferrari with red Ciba-Geigy pigment. 1990.

In 1986, the Plastics and Additives Division of the Ciba-Geigy group launched a new red pigment for automotive paints. The car paint industry reacted quickly and positively.
In 1978, Ciba-Geigy began collaborating with US company ALZA Corporation. Together, they developed three transdermal therapeutic system (TTS) products: Scopoderm TTS for nausea and vomiting due to travel sickness, Nitroderm TTS for long-term treatment of angina pectoris and Estraderm TTS for alleviating postmenopausal complaints.


Biotechnology research workers at Ciba-Geigy in Basel with a structural model of the molecule interleukin-1 beta. 1990.
CiBa Vision Atlanta (Georgia, USA). Casting lenses, 1988.


Ciba-Geigy Origgio (Italy). Gate staff. 1988.


Ciba-Geigy Tongi (Bangladesh). Staff training. 1990.

Sandoz production site in Ringaskiddy, near Cork (Ireland) during construction, 1992. In 1995, Sandoz opened what was at the time the world’s most modern and environmentally friendly production site for active pharmaceutical substances.

Marc Moret (1923–2006). 1986. Marc Moret was born in Ménières (Switzerland) and studied economics in Fribourg (Switzerland) and Paris, gaining a doctorate in 1948. His career took him via various medium- and large-sized companies (including Nestlé) to Sandoz in 1968, where he initially headed up sales and marketing in agrochemicals, and later the agrochemicals and agrochemicals/nutrition departments. In 1976, he became head of corporate finance. In 1977, he was elected to the Sandoz Board of Directors and appointed Executive Member of the Board, and in 1980 he became Vice Chairman. Moret took over operational management of the Sandoz Group in May 1981 as Chairman of the Executive Committee. In 1985, he was elected Chairman of the Board of Directors. Although Moret formally gave up managing the company in 1993, he remained its key figure thanks to his role as Chairman of the Board. Moret made economic history in 1986 when he engineered the merger of Sandoz and Ciba to form Novartis. After he retired from an active role, he was named Honorary Chairman of Novartis.
Alex Krauer was born in Basel in 1931. After gaining his university entrance qualification at school, he studied economics at the Universities of Basel and Paris and at the London School of Economics. In 1955, he was awarded a doctorate by the University of Basel. He joined the finance department of CIBA in 1956, where he initially worked as head of accounting and later as head of finance and administration in the Italian group company of CIBA/Ciba-Geigy. When he returned to Switzerland in 1972, he took over management of the central control and management services function in Basel. He became a member of the Executive Committee in 1976. In 1982, he was appointed Deputy Chairman of this committee, and from 1987 to 1995 he was Chairman and CEO of Ciba-Geigy. Following the merger of Ciba and Sandoz to form Novartis he worked as Chairman of the Board until 1999. Since then he has been Honorary Chairman of Novartis.
In the 1960s, it was customary for scientists to return from their travels with soil samples. From these, the laboratories in natural substances departments would then routinely isolate fungi and bacteria. Microorganisms form an abundance of natural substances still studied today by pharmaceutical researchers in order to discover therapeutically interesting active substances. This was how, in the summer of 1969, Sandoz discovered a fungus (*Tolypocladium inflatum*) in “holiday soil” from the Hardangervidda, a Norwegian plateau. While it did not show any antibacterial effects in the various tests, it did inhibit the growth of other fungi. The active substance was analyzed and identified as a new type of cyclic peptide (a circular protein from two or more amino acids). It subsequently turned out that the compound – later named cyclosporine – demonstrates highly specific suppression of cells that play a key role in the immune system.

Immunosuppression is desirable in the case of certain diseases in which the immune system attacks the body’s own tissue (autoimmune diseases) and for organ transplants. After a transplant, the immune system normally attempts to reject the new organ because it recognizes it as foreign tissue. Cyclosporine has the important property of inhibiting immune cells which are key to rejecting foreign tissue, while still allowing the immune system to defend against infection. This sets the new immunosuppressant apart from classic cytostatic substances, such as azathioprine, which non-specifically inhibit all cells from dividing.

At Sandoz, the decision to begin developing cyclosporine opened up a second key area of natural substance research after ergot alkaloids – the search for new immunosuppressants. This step was a decisive contribution to the establishment of a new research field in transplantation medicine. Preclinical development revealed that cyclosporine does not reach the blood when administered in capsules. This setback prompted scientists to investigate on themselves which dosage form would allow the substance to be best absorbed by the body. Ultimately, they discovered that a mixture containing olive oil is the most suitable. After many preclinical and clinical studies, transplants in animals and trial treatments in patients, the first pharmacological publication on cyclosporine appeared in 1976. The compound was first launched on the market in 1982 under the trade name Sandimmune, followed by Neoral, an improved formulation in a microemulsion, in 1994. These medicines enabled a breakthrough in transplantation medicine and, over three decades, have saved, extended or improved thousands of people’s lives. In addition to kidney, heart, liver, lung, pancreas, bone marrow and tissue transplants, cyclosporine also proved to be extremely effective as a treatment for autoimmune diseases such as psoriasis and rheumatoid arthritis.


3 Packaging of Sandimmune and Neoral. 1980s and 1990s.
There are few illnesses which have been met with more revulsion, fear and superstition than epilepsy (once known as falling sickness). Whereas the disease was (and sometimes still is) viewed in some cultures as a punishment by dark forces, epilepsy sufferers are revered in other cultures as “chosen ones”. Even in industrialized societies, attitudes toward epilepsy are still far from being free of prejudice and misconception. In addition to the illness itself, sufferers often have to contend with discrimination, ostracism and problems in the workplace. But epilepsy patients, who make up around 1 per cent of the world population, are “ordinary” people who occasionally suffer from certain “extraordinary” symptoms: they suffer epileptic seizures caused by a temporary increase in the activity of certain groups of brain cells. Epilepsy is not a mental illness, but a neurological disorder probably attributable to hereditary brain damage or brain injury. The symptoms and severity of epilepsy can vary considerably: there are either generalized seizures, which affect the entire cerebral cortex and are often associated with loss of consciousness; or focal seizures, which arise in restricted regions of the brain.

Modern epilepsy treatment began in 1857 when Sir Charles Locock demonstrated the anti-epileptic effect of potassium bromide. The bromide substance class alleviates epileptic seizures by sedating the functions of the central nervous system. Chemists continued their research on this basis until phenobarbital became available, a sedative and hypnotic whose anti-epileptic effect was known from 1912. The broadly effective phenobarbital soon became so firmly established in clinical practice that, as late as 1987, one-third of all epileptics were still being treated with medication containing this active substance. The subsequent generation of anti-epileptics was the result of a better understanding of the pathology of epilepsy. Animal models were helpful here: it was recognized that animals react to certain electrical and chemical stimuli with epileptic seizures. Consequently, research on animals has enabled a targeted search for new epilepsy treatments and their development to clinical maturity.

An excellent example of the breakthrough that these models achieved is the development of carbamazepine. In 1957, Geigy managed to synthesize this compound from a series of ureas. Carbamazepine was patented in Switzerland in the same year and proved to be a highly effective and very well tolerated anticonvulsant. Its broad clinical spectrum was recognized at the same time: carbamazepine is effective not only for generalized and simple focal seizures, but also for the previously hard-to-treat temporal lobe epilepsy and a host of other neurological disorders. This innovative medicine was first launched on the Swiss and UK markets in 1963, under the name Tegretol, and was eventually registered in around 150 countries. By the turn of the millennium it had become established as a mainstay epilepsy treatment, being used in some 15 per cent of all epilepsy cases.

In the meantime, Tegretol has undergone successful further developments and been launched as a new anti-epileptic under the trade name...
Trileptal. This is just as effective as Tegretol, but better tolerated and easier to dose. A major advantage of Trileptal is that it has fewer interactions with other drugs. However, its development was more difficult than that of Tegretol.

Oxcarbazepine – the active substance in Trileptal – had already been synthesized in 1966, but its effect potential remained undiscovered until the mid-1970s. When Ciba-Geigy scientists renewed the search for a new anti-epileptic, one of the substances they studied was oxcarbazepine, and they recognized its advantages from animal experiments. Although initial clinical studies were disappointing, the researchers did not give up. They ultimately discovered that a higher dosage was required than with Tegretol in order to achieve comparable results. Positive outcomes enabled the drug to be launched on the market – in 1990 in Denmark, in 1999 throughout the EU and in 2000 in the USA.

It is in large measure thanks to pioneering medicines like Tegretol and Trileptal that, today, 60–80 per cent of all children and adults newly diagnosed with epilepsy can be successfully treated with medication that brings seizures completely under control.
8

NOVARTIS

FROM LIFE SCIENCES TO FOCUS ON HEALTHCARE
1996–2013
Since the second half of the 1990s, the number of people in the world has increased from 5.8 billion to over 7 billion. Not only increased life expectancy for individuals, but also the constant increase in the world population have strongly fueled demand for healthcare services and products. Further reasons for this development are advances in diagnostics and research into the causes of illnesses, new possibilities of treatment for previously incurable diseases or ones which were hard to cure, and the medical backlog in threshold and developing countries.

**A single company: focus on integration** When Novartis was formed on December 20, 1996, the largest company merger in the history of the industry at that time was entered in the Basel Commercial Register. The name is inspired by the Latin “novae artes”, meaning “new arts, new skills”. The merger was one of equals and took place by means of a stock swap, i.e. with no payment of takeover premiums. For this reason, the Board of Directors (16 members) and the Executive Committee (8 members) comprised equal numbers of leading figures from Ciba and Sandoz. Alex Krauer (Ciba) became Chairman of the Board of Directors, and Daniel Vasella (Sandoz) CEO and Executive Member of the Board of Directors. The leaders involved attached great importance to amalgamating Sandoz and Ciba to form Novartis as rapidly as possible. Planning of the merger process lasted until April 1996. Subsequently, an integration office took on the role of coordinating and guiding the 200 taskforces and 600 project teams through the integration process. Before officially completing the merger, 3,500 management positions had to be assigned, the global organizational structures and staffing levels defined, business processes evaluated and locations selected. By 1998, the integration process was largely completed. In April 1999, Krauer retired and Vasella took over the role of Novartis Chairman, whilst also remaining CEO until 2010.

**Three business areas: focus on life sciences** When Ciba and Sandoz merged, both groups were completely restructured. From its inception, Novartis devoted itself to three business areas within life sciences: healthcare, agribusiness and nutrition. This strategic focus required the spin-off of the industrial divisions. In 1996, the precision balances manufacturer Mettler Toledo and the construction chemicals firm MBT were divested. Ciba’s other industrial divisions were merged in 1997 to form the new company Ciba Specialty Chemicals, which was listed on the stock exchange.

**The key to success: innovation as strategy** Right from the start, Novartis declared its intention to become a market leader in all three of its business areas. The merger gave it a more broad-based market presence with a network of large sales organizations spanning the globe. Research and development were also called upon to sustain growth in all divisions through innovative products. To strengthen its internal research capabilities, alliances and cooperation agreements were forged with research institutes and biotech companies. In La Jolla (California, USA), the group founded the Genomics Institute of the Novartis Research Foundation.
A brilliant start In its first year, Novartis achieved superb results, with the group’s net profit rising by 43 per cent to 5.2 billion Swiss francs. This brilliant start was due in no small way to the initial synergy effects of the merger, with cost savings of 2 billion Swiss francs being made between 1996 and 1998. In 1998, the group commenced wide-ranging restructuring measures: the self-medication unit of the Pharmaceuticals Division was merged with the Nutrition Division to form a new Consumer Health Division. This grouped together the three businesses of over-the-counter, health and functional nutrition (including Gerber with its infant nutrition segment) and medical nutrition. In parallel with this, Novartis began to sell off certain parts of the company, including health food store brand Eden and the crisp-bread manufacturer Wasa.

Towards the end of the millennium, the agricultural business lost a significant amount of ground due to adverse market trends: in 1999, it recorded a 7 per cent decline in sales. But the Pharmaceuticals Division also posted less dynamic growth. Key products such as Voltaren and Sand-immune lost some of their appeal due to expiring patents. With growth of just 4 per cent, sales momentum within the Pharmaceuticals Division in 1999 was significantly below the overall market average. It was now time to replace the “blockbusters” which were no longer under patent protection with new, innovative medications. This required three areas of focus: bundling strengths in the pharmaceutical sector, driving research and development, and building a competent and committed management team.

Spin-off of agribusiness: the founding of Syngenta In 1999, the Board of Directors decided to spin off the crop protection and seeds business. In 2000, this division was merged with that of the Anglo-Swedish group Astra-Zeneca, thus creating the first company ever to focus entirely on agriculture: Syngenta, headquartered in Basel. Novartis retained the animal health unit and made it part of the Consumer Health Division. The spin-off of its agricultural business saw the official abandonment of the life sciences concept in favor of concentrating on the healthcare sector. The marginal synergies between the agricultural and health businesses had not compensated for the differences between them.

Turnaround at the turn of the millennium – innovation as the elixir of life In 2001, Novartis achieved double-digit sales growth, and also managed to increase operating income within the Pharmaceuticals Division by a further 8 per cent, despite making additional investments in new launches and key products. This development was mainly thanks to the pharmaceutical business in the USA, where sales growth of 24 per cent was achieved, not only by putting a great deal of effort into the expansion of sales and marketing, but also by significantly increasing the number of visits to doctors. Furthermore, the consistent strategy of innovation bore fruit: 2001 was the second consecutive year in which the US authorities granted more marketing authorizations to Novartis for new active substances than to any of its competitors. The products registered in record time included Gleevec/Glivec,
the revolutionary treatment for chronic myeloid leukemia. At the same time, Diovan, a very well tolerated antihypertensive, grew to become a key revenue driver due to its pharmacological profile. In 2002, through systematic investments, the company founded the Novartis Institutes for BioMedical Research (NIBR) in Cambridge (Massachusetts, USA). NIBR was tasked with attracting the best researchers to the group and increasing research productivity. In recent years, Novartis has been able to obtain more new regulatory approvals for drugs than its competitors. At the end of 2009, the group announced its intention to build a new research campus in Shanghai.

**With success comes responsibility: corporate citizenship** Right from the start, Novartis made social responsibility an integral part of its corporate strategy. To this end, Novartis continued the Foundation for Sustainable Development, already created by Ciba-Geigy in 1979. The foundation runs a number of programmes committed to facilitating access to medical treatment for disadvantaged population groups around the world who suffer from leprosy, malaria, tuberculosis, chronic myeloid leukemia and other diseases. On July 14, 2000, Novartis was one of the first companies to sign the UN Global Compact, which commits its members to the acknowledgment, support and implementation of a series of fundamental values in relation to human rights, labor standards, environmental protection and the battle against corruption. In 2004, the Basel group opened the Novartis Institute for Tropical Diseases in Singapore, followed by the Novartis Vaccines Institute for Global Health in Siena, Italy, in 2007. Both work on a not-for-profit basis, the former to develop new treatments in the fight against dengue fever and drug-resistant tuberculosis, and the latter to create vaccines for patients in developing countries.

**Focused diversification: Sandoz and Vaccines and Diagnostics** Since the turn of the millennium, Novartis has been pursuing a strategy of focused diversification, concentrating consistently on healthcare. Consequently, it sold the Health & Functional Food unit in 2002, and in so doing said goodbye to the legendary Ovaltine/Ovomaltine brand. At the same time, Novartis acquired the Slovenian generics group Lek and started to consolidate all its business with off-patent medicines under the Sandoz name. In 2005, Novartis bought and integrated the German generics provider Hexal together with the US company Eon Labs, Inc. One year later, Novartis acquired the remaining shares it did not yet own in vaccines producer Chiron, and created the new Vaccines and Diagnostics Division. By selling the medical nutrition and Gerber business units in 2007 to Swiss food corporation Nestlé, Novartis completed its process of focusing solely on healthcare.

**The integration of Alcon: the global leader in eye care emerges** In 1945, Robert D. Alexander and William C. Conner opened a pharmacy in Fort Worth (Texas, USA). They combined the initial syllables of their surnames to create the company name: Alcon Prescription Pharmacy. The pharmacists sold medicines, compounded medications according to doctors’ prescriptions and tried to manufacture injectable sterile vitamins. The two founders
of the company soon decided to focus on producing sterile ophthalmic products. In 1947, the company name was changed to Alcon Laboratories. In the 1970s, Alcon began to expand its activities, first with a compound to control bleeding, then with urological and pediatric products. Over-the-counter dermatological products for hair, skin and scalp followed. In 1978, Nestlé bought 97.4 per cent of the Alcon shares. Research was expanded, whereby the ophthalmology sector developed most rapidly thanks to scientific advances in glaucoma, cataract and refractive errors. When soft contact lenses established themselves in the market, CIBA Vision took the lead in the manufacture of innovative contact lenses, while Alcon capitalized on the growing demand for appropriate lens care products. At the end of the 1980s, Alcon gradually withdrew from the dermatology sector and captured new business areas through numerous acquisitions: intraocular lenses, therapeutic optical products, laser and imaging methods for the eye, refractive corneal surgery and laser surgery methods. With the acquisition of Cooper Vision Surgical in 1989, Alcon laid the foundation stone for the accelerated growth of its surgical business, which took it to market leadership in eye care. Alcon sales grew from about US$ 1 billion in the early 1990s to over US$ 7 billion in 2010.

In 2002, Nestlé listed Alcon on the stock exchange, but retained 77 per cent of the shares. Novartis acquired this majority holding in 2010. In April 2011, Novartis gained 100 per cent ownership of Alcon, uniting the strengths of Alcon, CIBA Vision and the Novartis ophthalmics portfolio to form the world’s leading eye care business. The newly created Alcon Division is the Novartis Group’s second largest after Pharmaceuticals.

Daniel Vasella was born in 1953 in Fribourg (Switzerland). He graduated in medicine from the University of Bern (Switzerland) in 1979, completing his doctoral thesis in clinical pharmacology in 1980. During the 1980s he worked as a physician in various hospitals, ultimately as senior physician for internal medicine at the Inselspital Bern. In addition to his work as an internist, he specialized in the area of psychosomatic medicine. He changed career in 1988, moving into industry, and worked for four years in the USA in the marketing department at Sandoz Pharmaceuticals.

In 1992, he returned to Switzerland as assistant to the Chief Operating Officer (COO) of the Pharmaceuticals Division, later becoming head of corporate product management. In 1994, he was appointed COO of the Pharmaceuticals Division and was assigned responsibility for global development in this sector. He took over as head of the Pharmaceuticals Division in 1995, becoming a member of the Executive Committee. Following the Sandoz-Ciba merger, Vasella was appointed Executive Member of the Board of Directors and CEO of Novartis. In 1999, he also took on the role of Chairman of the Board of Directors. Vasella passed on the position of CEO to his successor, Joseph Jimenez, in 2010. In 2013, he resigned as Chairman and was succeeded by Joerg Reinhardt. Today, he is Honorary Chairman of Novartis.

Novartis Nyon (Switzerland). Cross-functional team for major product launch in Europe. 2010.

Packs of medicines for different therapeutic areas: Zometa (bone metastases), Galvus (diabetes), Exelon (Alzheimer’s) and Exjade (iron overload). 2000s.

Novartis Wehr (Germany). Laboratory. December 2001.

What is effective in humans often works in animals too. There are synergies in numerous indications. The active substance in Fortekor, benazepril hydrochloride, is also contained in the medicine Cibacen (ACE inhibitor) for lowering blood pressure in humans and is prescribed for dogs with heart failure. Fortekor is approved for cats with kidney problems (chronic renal insufficiency) as well.

Novartis Saint-Aubin (Switzerland). 2009.
The Centre de Recherche Santé Animale in Saint-Aubin is one of the most important research facilities of Novartis Animal Health worldwide. Screening is crucial to successful research. This is a sifting and selection process in which the effect of active substances is tested in the laboratory.

The research laboratory situated at street level provides a fascinating glimpse into the future of medicine. Besides large facilities for genetic research and scientific imaging, the work of the researchers is illustrated by two-dimensional holographic projections.
NIBR in Cambridge received an Energy Excellence Award in 2007 for its ingenious energy conservation programme. The award-winning concept is all-embracing. It ranges from lighting and air-conditioning parameters through modernized building control systems to a code of conduct for associates.
Novartis Behring Marburg (Germany). Vaccine production associate. 2010.

Novartis Nyon (Switzerland). Production of Otrivin nasal drops. 2009.

Novartis Pharmanalytica Locarno (Switzerland). Analytical laboratory. 2009.


Alcon Barcelona (Spain). Research and development. 2006.

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Gilenya capsules. 2011. Gilenya, the first medicine in a new therapeutic class of so-called S1P receptor modulators, has the potential to revolutionize the treatment of multiple sclerosis (MS). Novartis acquired FTY720 in 1997 from a Japanese company to test the substance in transplantation medicine.

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Alcon Fort Worth (Texas, USA). 2009.
High blood pressure (hypertension) is a rapidly growing medical problem across the world—and a silent killer. An estimated one billion people around the world are currently affected. The majority of them do not feel unwell, but if their blood pressure is constantly too high, it can cause damage to the heart, kidneys and brain, the consequences of which are a major cause of death in industrialized nations.

Records show that the ancient Chinese knew about the “hard pulse” 4,600 years ago. But significant advances in the understanding and treatment of hypertension were made only in the 20th century. Diuretics were employed as the first antihypertensive agents around 60 years ago, followed in the 1960s by beta-blockers (such as Trasicor from CIBA or Visken from Sandoz), then by calcium antagonists, and later by ACE inhibitors (such as Cibacen, known as Lotensin in the USA). The latter were the first drugs to act directly on the hormone system which regulates blood pressure within the body—the renin-angiotensin system (RAS).

One hormone within the RAS is angiotensin II. It constricts the blood vessels, thus leading to increased resistance and raised blood pressure. One possible way of interrupting this cascade (a series of reactions in a metabolism) is to inhibit the enzyme that is responsible for converting the preliminary angiotensin I to angiotensin II—the angiotensin-converting enzyme (ACE). A dry cough frequently occurs as a side effect of this treatment. A more recent method of reducing blood pressure interrupts the cascade at a later stage: angiotensin II receptor blockers prevent the hormone from binding to its receptor and thus constricting the blood vessels.

In early 1988, US company Du Pont published a patent for the very first angiotensin II receptor blocker (losartan). At the same time, Ciba-Geigy was also engaged in research in this promising area. The competition was under way: at the end of 1989, researchers in Basel evaluated an angiotensin II receptor blocker with an innovative chemical structure, which works by reducing blood pressure on a continual basis and is very well tolerated. Ciba-Geigy applied for approval in Europe and the USA in record time: by mid-1996, the company launched the drug valsartan under the brand name Diovan. Although Merck as the successor to Du Pont had already launched its antihypertensive Cozaar (active substance: losartan) the previous year, Diovan soon led the angiotensin II receptor blocker market segment.

Diovan also turned out to reduce cardiovascular mortality if administered after a heart attack. This conclusion was reached in 2003 by the largest long-term controlled study ever conducted in individuals who had survived a heart attack. Thus the medication was employed as a new and effective first-line treatment for a high-risk group which is constantly growing. Even before this time, experts had identified the advantages of Diovan for over 4.5 million people with symptomatic heart failure. As a result, in 2002, the US Food and Drug Administration (FDA) approved this indication for Diovan on the US market; in 2005, the European Medicines Agency (EMA)

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1 Diovan production in Wehr (Germany). December 2001.
followed suit for the EU. The Diovan family of products brought in a record of over US$ 6 billion in 2010. Its patent protection in the USA expired in September 2012, but the expected fall in sales due to less expensive generics should be compensated by rapid growth in emerging markets such as Latin America and Asia, where the hypertensive is holding its ground very well, even without patent protection. Despite a flourishing trade in imitations of original products, patients are prepared to pay more for tried and tested brand quality.
“White blood” is the title that the German pathologist Rudolf Virchow gave to a case report in 1845 of a patient in whose blood the white corpuscles heavily outweighed the red ones, without there being any serious infection. Virchow later coined the term “leukemia” for this condition. Chronic myeloid leukemia (CML) is one of the four most common cancers of the blood cells, accounting for 15–20 per cent of all cases of adult leukemia. It is diagnosed in 1 – 2 people per 100,000 every year, mostly between the ages of 30 and 60. Over the course of the disease, the bone marrow produces increasing numbers of white blood cells (leukocytes), and this progressively changes the composition of the blood. Patients may hardly notice it for years, but as the disease progresses it causes tiredness, weight loss and spleen enlargement, and ultimately leads to a breakdown of the immune system. Without treatment, patients rarely survive this final phase for more than a few months.

Traditional treatments for CML often have devastating side effects and are relatively unspecific, which limits their success. From 1920 onwards, radiation therapy was used to treat the disease. This was followed in the 1950s by various chemotherapy regimes which – if carried out at an early stage – could increase life expectancy by up to five years. The only previous treatment with a chance of bringing the disease’s symptoms under control was bone marrow transplantation, which began in the 1970s. The following decade saw the introduction of interferon alpha therapy. However, many patients became resistant to this treatment over time. Bone marrow transplantation also has major disadvantages: a suitable donor of healthy stem cells can be found for only about 15 per cent of cases, and around one-fifth of transplant patients die after the operation. Furthermore, advanced age or other factors rule out transplantation in many cases.

Researchers at the University of Pennsylvania (USA) began laying the foundations for a new type of treatment for CML in 1960. In their quest to understand what happens in cells affected by CML, they discovered a genetic mutation: in all patients, chromosome 22 was shortened, with the missing section appearing incorrectly on chromosome 9. Conversely, a smaller part of the latter could be found on chromosome 22. This was the first time in the history of medicine that defective genetic material resulting from translocation of genes had been identified as a trigger for cancer.

It took almost 30 years to discover the mechanisms by which the “Philadelphia chromosome”, as it is known, causes leukemia. The success of the US researchers inspired Ciba-Geigy to launch a research programme at the end of the 1980s to investigate chemically manufactured substances which might reduce the effects of the genetic defect in a targeted fashion. By 1993, after working on this for two years, the researchers had developed a substance which blocks the specific protein that triggers CML (a tyrosine kinase). This marked the birth of Gleevec – a drug which can stop the proliferation of white blood cells without damaging normal cells and upsetting the balance of the body as a whole.
Successor company Novartis soon faced a new challenge: initial clinical trials in 1999 showed that the active substance normalized blood values in the early stages and was well tolerated by almost all CML sufferers. When this finding became widely known, more and more patients expected to be accepted on one of the clinical programmes. In order to reduce development time and make the new medicine available to patients as soon as possible, Daniel Vasella, CEO and Chairman of the Board of Novartis at that time, immediately arranged the necessary investments. In 2001, several tonnes of Gleevec were produced.

In February 2001, just under 32 months after commencement of the first clinical trials in humans, the Basel-based pharmaceutical company submitted applications to authorities worldwide for approval. Novartis thus completed the development phase in half the time usually taken in the industry. The US authorities were the first to approve the product, on May 10, 2001, under the trade name Gleevec. Twenty-four hours later, deliveries were already under way to hospitals and pharmacies around the USA. Further trials since then have shown Gleevec to be effective as a treatment for other cancers. Alongside its primary indication for CML, it is now approved in the USA, the EU and many other countries as a treatment for certain types of gastrointestinal stromal tumor (GIST).

In 2002, Novartis launched one of its most comprehensive patient aid programmes: by the end of 2010, more than 37,000 sufferers in some 80 countries had received – free of charge – either Gleevec or Tasigna. Tasigna is a second-generation tyrosine kinase inhibitor which is primarily indicated in cases of resistance or intolerance to Gleevec. Tasigna represents an improvement in structure and efficacy, which is why it was approved in Switzerland for the first time in 2007 and additionally as a first-line treatment for CML in the USA in 2010.
The first infectious disease that humans were able to protect themselves against was smallpox. In 1798, the English country doctor Edward Jenner introduced an inoculation procedure using cowpox lymph and called it “vaccination”, from the Latin vacca, meaning cow. Within a few years, the procedure became widespread practice across numerous countries in Europe. This is the most successful of all vaccinations to date, and as a result, in 1980 the World Health Organization was able to declare that smallpox had been eradicated.

During the last third of the 19th century, bacteriologists and immunologists developed vaccines against a whole range of diseases such as rabies (Louis Pasteur, 1884), cholera (whose pathogen was discovered by Robert Koch in 1883) and typhoid. From 1890 onwards, antitoxins were used to counteract the poisons (toxins) of tetanus and diphtheria. The tuberculosis vaccine, which had been available since 1927, only came into general use in the 1950s and made a significant contribution to the decline of this disease in the industrialized nations. Poliomyelitis, a disease that affected high numbers of children from the 1940s onwards, was also sharply curbed through vaccines developed by Jonas Edward Salk (1956) and Albert Bruce Sabin (1960), and today is only found in a few developing countries.

One particularly insidious infection that, although rare, can be deadly within 24 to 48 hours from first symptom onset is meningococcal disease. The bacterium Neisseria meningitidis causes inflammation of the membranes (meninges) covering the brain and spinal cord. The disease often affects small children. There are nearly half a million cases of meningococcal disease and 50,000 associated deaths every year around the world. Those who survive this particularly aggressive illness often sustain damage to their limbs, suffer serious harm to organs or are left blind or deaf.

In 1992, researchers at US biotech firm Chiron started work on developing a vaccine against meningococcal disease. Since that time, vaccines have been made available for four of the five main meningococcal serogroups (A, C, W and Y but not B): Menjugate (first licensed in 2000) helps protect against meningococcal disease caused by serogroup C, while Menveo (first licensed in 2010) protects against that caused by serogroups A, C, W and Y. Since September 2011, Menveo has been administered to patients in over 40 countries for active immunization against meningococcal infections.

In contrast, for a long time the Chiron research team did not make any progress with a vaccine to protect against meningococcal serogroup B (commonly known as “Men-B”), which accounts for over 70 per cent of all cases of meningococcal disease in some parts of the world. This bacterium mimics a polysaccharide that occurs naturally in the human body and is therefore not identified as an intruder by the immune system.

The breakthrough only came with the genome revolution, when it became possible to decode the Men-B bacterium genome in full, leading to the discovery of new vaccine antigens. Since then, this innovative approach...
to vaccine development, known as “reverse vaccinology”, has been transferred to other pathogens and has proved itself a key tool for the development of vaccines. Even after identifying the correct antigens, however, it still took a full decade of extensive clinical research and evaluation before, in December 2010, Novartis Vaccines and Diagnostics (formed from the takeover of Chiron in 2006) was able to submit its vaccine Bexsero for marketing authorization. Approved by the EU in January 2013, it is the first vaccine to provide broad protection against the devastating Men-B infections – an important milestone on a scientific journey that started 20 years ago.
The merger of Ciba and Sandoz meant Novartis had three extensive locations in Basel: Rosental, Klybeck and St. Johann. After the spin-off of the Agricultural Division in 2000, the Rosental site became the new headquarters of Syngenta. Novartis established the St. Johann site as a location for Research and Development, Marketing and the Executive Committee. This avoided unnecessary travel and duplication and optimized collaboration.

Located in northern Basel next to the French border, the St. Johann site had developed remarkably quickly from 1886 onwards, but in a somewhat piecemeal fashion. At the end of the 20th century, it was a rather random collection of buildings with various purposes, styles and states of repair. Major investment was required for the site to meet modern environmental and working standards.

The outsourcing of most production activity away from the city and the expansion of Marketing, Administration and Research and Development brought about a profound change in the needs of employees. Daniel Vasella, Chairman and CEO of Novartis at that time, declared that his goal was to transform the industrial site – which had previously been centered around machines – into a campus that would be attractive for people. Innovation and performance were to be boosted by communication, collaboration and both planned and spontaneous meetings. The new work environment needed to be attractive to job applicants and employees and make them feel at ease. In order to achieve this vision, in 2001 Vasella asked Vittorio Magnago Lampugnani to draw up a master plan for the Campus, which was then approved by the Board of Directors. Over ten years later, more than 7,000 employees work at the Campus. To begin the implementation of the complex project, Novartis enlisted the services of landscape architect Peter Walker, art curator Harald Szeemann, lighting designer Andreas Schulz, graphic designer Alan Fletcher and industrial psychologist Fritz Steele. They were later joined by Günther Vogt, Jacqueline Burckhardt and Andrée Putman. Based on the goals set, this master plan focuses on open spaces “that create a feeling of well-being and stimulate communication”, around which are grouped “buildings whose use is flexible and not predefined”. To avoid uniformity of design, every new building is designed and built by a different architect. The selected structures should be elegant and unobtrusive in style and through their diversity reflect the cultures of the chosen architects. Based on these positive experiences, Novartis is now planning similar campus projects in China and the USA. Between 2003 and 2011, 14 renowned architects or teams of architects constructed buildings at the Novartis Campus in Basel:

- Roger Diener, Basel; Gerold Wiederin, Vienna (Austria); Helmut Federle, Vienna (Austria): Forum 3
- Peter Märkli, Zurich: Visitor Center, Fabrikstrasse 6
- Kazuyo Sejima & Ryue Nishizawa (SANAA), Tokyo: Fabrikstrasse 4
- Marco Serra, Basel: Entrance pavilion Fabrikstrasse 2 and underground car park

1 First sketch of the master plan. February 2001.
2 Fabrikstrasse. 2009.
– Adolf Krischanitz, Vienna (Austria); Berlin (Germany); Zurich: Fabrikstrasse 16
– Vittorio Magnago Lampugnani, Milan (Italy): Fabrikstrasse 12
– Rafael Moneo, Madrid (Spain): Fabrikstrasse 14
– Frank O. Gehry, Los Angeles (USA): Fabrikstrasse 15
– Tadao Ando, Osaka (Japan): Fabrikstrasse 28
– Fumihiko Maki, Tokyo: Square 3
– David Chipperfield, London: Fabrikstrasse 22
– Yoshio Taniguchi, Tokyo: Fabrikstrasse 10
– Eduardo Souto de Moura, Porto (Portugal): Physic Garden 3
– Álvaro Siza, Porto (Portugal): Virchow 6

At the entrance to the Campus there is a park designed by Günther Vogt that links the green area of the existing Voltamatte city park with a relaxation zone along the banks of the river Rhine. There, a public cycle and footpath, the “Rhine Promenade”, is planned to stretch along the Rhine to the Three Countries Bridge in France.

Peter Walker and others shaped the historic Fabrikstrasse, fully 600 metres long, into a tree-lined avenue which has become the backbone of this new urban structure. Lampugnani’s vision is to create a modern version of the rue de Rivoli in Paris, “lined on one side by a row of trees, and on the other by elegant arcades under which cafés, restaurants and shops will open”.

To the west of this main axis, some of the existing high-rise buildings are being retained, and new high-rises are to be added later. The Campus is developing step by step; old buildings are only replaced when they are no longer of any use. Thus in the east towards the Rhine, three further constructions will be completed by 2015: the office building at Fabrikstrasse 18 by Juan Navarro Baldeweg (Madrid, Spain), Asklepios 8 by Herzog & de Meuron and the laboratory at Virchow 16 by Rahul Mehrotra (Mumbai, India; Boston, USA). The office building by the Basel architects Herzog & de Meuron will have a prominent position at the south-east end of the Campus and allow public access to a restaurant from the Rhine Promenade.

At the northern end of Fabrikstrasse, the multipart sculpture by Richard Serra marks the vanishing point from the main entrance in the south and the northern access point from the car park, which is on French soil. Many works by internationally eminent artists enhance the buildings, squares and parks on the site. The roads that cross the length and breadth of the Campus honor significant figures from medical history, bearing the names of individuals whose achievements have played an important role in the fields of activity in which Novartis operates.

The rectangular reconstruction of the site, which covers around 20 hectares, follows the basic orientation of the original factory buildings. At the same time, the grid-like structure of the Campus traces the earliest relics of building activity on the site: thanks to the excavation works that have taken place here, the archaeologists of Basel City were able to conduct a
wide-ranging examination of the remains of a Celtic settlement which was originally discovered here in 1911. They uncovered a large settlement, extending to around 15 hectares, and found evidence of complex forms of collaborative human coexistence for the first time in this region. The likelihood is that 2,100 years ago, on the very site where our Knowledge Campus is located today, another center of innovation was flourishing!
The Prix Galien was established in France in 1970. It is named after Galen, a physician of ancient Greece who is held to be one of the founding fathers of pharmacology. The prize is awarded every year in recognition of therapeutic innovations. A jury consisting of prominent scientists and numerous Nobel Prize winners chooses the best drugs and research projects. The prestigious reputation of the prize spread rapidly beyond the borders of France, with many other countries setting up their own Prix Galien: Belgium and Luxembourg (1982), Germany (1984), the UK (1988), Italy (1989), Spain (1990), Portugal (1991), the Netherlands (1992), Canada (1993), Switzerland (2001) and the USA (2007). This explains why the same product can receive more than one award. The Prix Galien International has also existed since 1996, and is awarded every two years for the most important innovative developments. In scientific circles, the award is considered to be the “Nobel Prize for pharmacology”.

The first ever Prix Galien was awarded in 1970 to CIBA for its antibiotic Rimactane. In 2002 and 2003, Gleevec/Glivec received the Prix Galien a total of 10 times, including the Prix Galien International for therapeutic innovation (2002). Between 1970 and 2013, the Prix Galien was awarded to Novartis 34 times (including once to Chiron).

<table>
<thead>
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<th>Year</th>
<th>Award-winning drugs</th>
<th>Origin</th>
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<td>Parlodel</td>
<td>Sandoz</td>
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<td>1991</td>
<td>Sandostatin</td>
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<td>Simulect</td>
<td>Novartis</td>
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<tr>
<td>2001</td>
<td>Visudyne</td>
<td>Novartis</td>
<td>2</td>
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<tr>
<td>2002</td>
<td>Zometa</td>
<td>Novartis</td>
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<td>2002</td>
<td>2003</td>
<td>Gleevec/Glivec</td>
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<tr>
<td>2004</td>
<td>Menveo</td>
<td>Chiron</td>
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<td>2013</td>
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Sources and Bibliography

**Archive records**

Novartis Company Archive, Geigy record group
GL 1–27 | Management Committee minutes
VR 1, VR 1/1–1/11 | Board minutes

Novartis Company Archive, CIBA record group
Vg 1.01 | Management Committee minutes
Vg 1.02.1 | Internal Reports
VR 1 | Board Minutes

Novartis Company Archive, Sandoz record group
C-101.001 | Management reports and reports to the Board of Directors
C-102.001 | Board Minutes
C-304.001 | Management Minutes
H-433.001–015 | Pharmaceutical specialties: sales, statistics

Novartis Company Archive, Ciba-Geigy record group
KL 1 | Group Management Committee minutes
VR 1 | Board minutes

**Published sources**

*Unsere Arbeit und wir or Geigy company newspaper 1943–1970*
Statement of Account of the Gesellschaft für chemische Industrie in Basel 1885–1944
*CIBA-Blätter 1943–1970*
Report and Statement of Account of Chemische Fabrik vormals Sandoz 1912–1938
*Sandoz Bulletin 1965–1996*
Ciba Annual Report 1992
*Ciba-Geigy Zeitung or Ciba Zeitung 1970–1996*
Novartis Business Overview 1996–2000
*Novartis live or live 1996–2011*
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