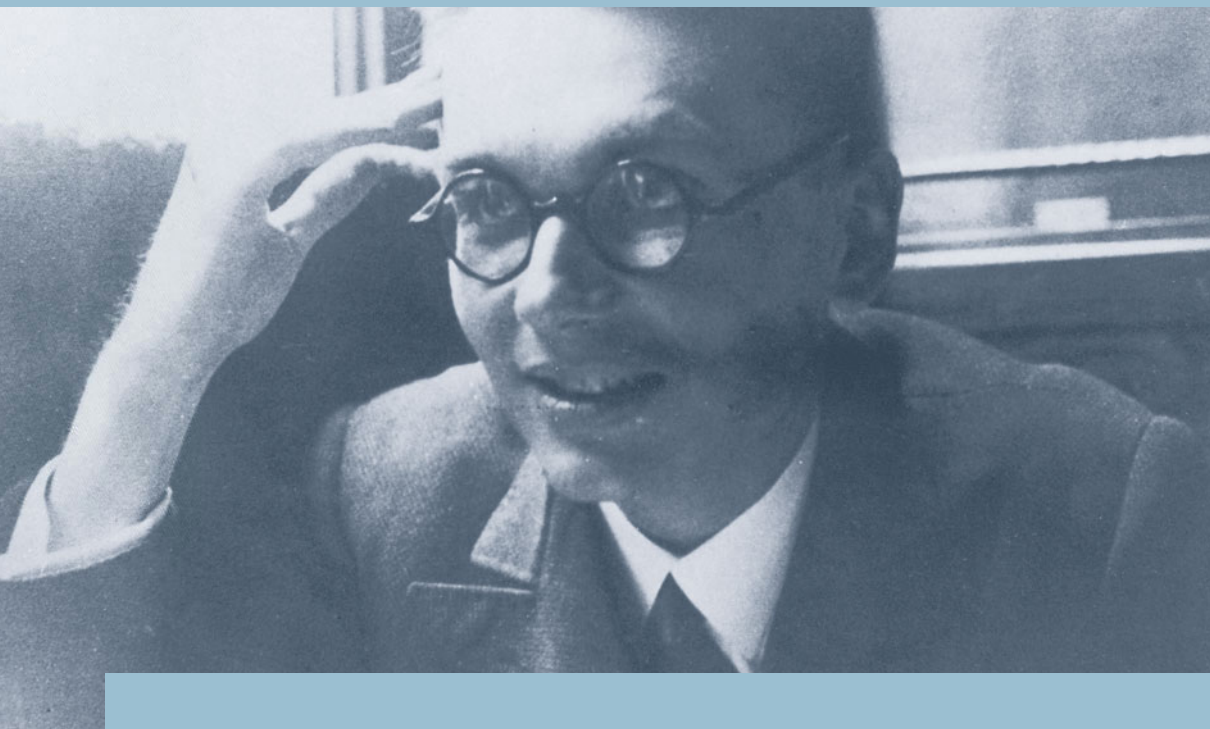


Springer Biographies



Kurt Gödel

The Genius of Metamathematics

WILLIAM D. BREWER

 Springer

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Kurt Gödel

The Genius of Metamathematics

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Preface

Yet Another Gödel Biography!?

Kurt (Friedrich) Gödel, one of the most remarkable scholars of the twentieth century, was virtually unknown to the general public during his lifetime (1906–1978), although he enjoyed considerable renown among mathematicians, especially those interested in mathematical logic and fundamentals of mathematics, and among philosophers of science, computer scientists, and theoretical physicists. That situation changed the year after his death with the publication of Douglas Hofstadter’s first book¹, the famous *Gödel, Escher, Bach—An Eternal Golden Braid* (*GEB*). It was neither Hofstadter’s intention to write a biography of Gödel nor of J. S. Bach, nor of M. C. Escher, but rather to explain his ideas about *strange loops*, his term for self-referential cyclic processes, and to demonstrate them using examples from Bach’s music, Escher’s paintings and drawings, and Gödel’s exposition of the incompleteness theorems, which underlies the latter’s scientific reputation to a large extent. Hofstadter also later wrote a biographical article on Gödel for *Time* magazine,² which included him among the “100 most influential persons of the 20th Century”.

After another 25 years, Gödel had become something of a cult figure, in particular in the years 2006–2008, near the 100th anniversary of his birth and the 30th year after his death, when newspapers and magazines devoted space to articles on his life and works (often with the general theme “Genius &

Madness...”), and objects such as T-shirts and baseball caps bearing his signature or stylized images of his face were offered for sale. That “Gödel craze” has in the meantime subsided for the most part, although the recent publication of some popular biographies is reviving it to some extent (see Tieszen 2017 (Item 43 in Appendix B) and Budiansky 2021 (Item 48 in Appendix B)).

Three years after Gödel’s passing, Adele, his wife of many years, also died, leaving his papers and correspondence to be archived at the IAS (and later at the Firestone Library) in Princeton. Several mathematicians and historians of science then recognized the need to catalogue and transcribe the items in his legacy, leading to the publication of his *Collected Works*³ in the following years. In addition, biographical memoirs appeared in the publications (later archived on the Internet) of various scholarly institutions and academies to which he had belonged,⁴ and one of his last close associates, Hao Wang, wrote a biography entitled *Reflections on Kurt Gödel*.⁵ The first complete scientific biography, *Logical Dilemmas: The Life and Work of Kurt Gödel*, was later written by John W. Dawson,⁶ mathematician and historian of mathematics, who was one of the editors of the *Collected Works*. John Dawson also published a brief summary of his biography in *Scientific American* in 1999⁷. Dawson’s work set the standard for later biographies, but it has been criticized⁸ because Dawson did not know Gödel personally. Hao Wang, who did have close personal contacts to Gödel, wrote two other accounts of Gödel’s (and his own) intellectual journey from the fundamentals of mathematics to philosophy. The first of them, *From Mathematics to Philosophy*, was published in 1974, years before Gödel’s death, and was in part the result of interactions between Wang and Gödel; Gödel later said that it best summarized his views on philosophy.⁹ Wang’s later book,¹⁰ *A Logical Journey*, was published posthumously in 1997.

Several other biographies and memoirs have been written subsequently, in particular during the period surrounding the anniversaries of Gödel’s birth and death. They in the main emphasized a single aspect of his work (either mathematical logic and set theory, computability, philosophy, or general relativity), and were written from a professional standpoint (by mathematicians, philosophers, computer scientists, or historians of science or philosophy). Two more books, the popular works mentioned above, have also appeared more recently.¹¹

A list of (biographical) publications on the life and work of Kurt Gödel is given at the end of this book as Appendix B. Interested readers who want to explore Gödel’s mathematical, physical, and philosophical works in greater depth should consult the specialized books listed there. Edited editions of his unpublished essays and notebooks have also appeared in 2016, 2019,

and 2020 (Items 16 and 17 in Appendix A). That Appendix summarizes Gödel's own publications, which during his lifetime were not numerous, but nevertheless momentous. Appendix A also includes posthumously published works. [A bibliography of Gödel's published works by John Dawson¹² (1983) appeared in advance of the *Collected Works*].

So why, then, is yet another biographical work on Gödel—this book—of interest? As Gödel's most prominent biographer, John W. Dawson, has pointed out in an article describing the writing of his own Gödel biography¹³, scientific biographers approach their subjects from many different avenues, depending on their personal and professional viewpoints, and new ones can often add to the overall picture of the subject in distinctive ways. This is exemplified by the numerous published biographies of Albert Einstein and Richard P. Feynman, to mention two prominent cases. Furthermore, the availability and accessibility of the earlier Gödel biographies for an informed general audience may be limited and will decrease over time. A new biography within the Springer Biographies series, aimed at the audience of that series and widely available as both print-on-demand and e-book, and written from the point of view of a physicist, thus seems very appropriate at present. We emphasize that this book does *not* pretend to serve as a textbook, nor as a work on mathematical logic; there are many such books in the literature, written by competent experts. It is also not a popularization. Rather, it is a detailed introduction to Kurt Gödel's life and work, covering his mathematical-logical, physical, and philosophical contributions in an informal manner, and meant for a general but informed audience.

It has often been noted that Gödel's life and work can be divided into three distinct periods. The first comprises his childhood and youth, which he spent in the city of his birth, *Brünn/Brno*, during his childhood a provincial capital in the Austro-Hungarian Empire, now the second-largest city in the Czech Republic, located in southern Moravia. He finished secondary school in 1924, at 18 years of age, and soon afterwards went to Vienna to begin his higher education. Vienna remained his principal place of residence for over 15 years, and this constitutes the second period in his life. During his first 6 years in Vienna, he completed his undergraduate and graduate studies, obtaining his doctorate in mathematics in 1930.

After writing his doctoral thesis in 1929 (the degree was conferred in early 1930), Gödel continued with his important contributions to mathematical logic, with which he was able to obtain the *Habilitation* in 1933, an advanced degree beyond the doctorate, at that time a prerequisite in German-speaking countries for an academic career as a university teacher and researcher. During the decade of the 1930s, he traveled often, spending

all together around 2 years abroad, mostly in the USA, and there mostly at the Institute for Advanced Study (IAS) in Princeton. He also suffered several breakdowns, which necessitated stays in various sanatoria. During this period, the rise of fascism in several European countries changed the political landscape drastically, and after Austria was occupied by Nazi Germany in 1938 (an action known as the ‘*Anschluss*’, the annexation), those political changes began to impinge on Gödel’s life in Vienna. He married his long-term lady friend Adele (Nimbursky) Porkert in 1938, and in early 1940, when World War II had already paralyzed most of Western Europe, the two of them left Austria and entered upon a long and complicated journey to Princeton—via Lithuania, Russia (and the Trans-Siberian Railway), by ship across the Pacific, and continuing by transcontinental railway from San Francisco to New York and then, finally, to Princeton.

Gödel was eagerly awaited in Princeton, where he became a member—initially on an annual basis—of the IAS, somewhat later a permanent member, and finally professor of mathematics at the IAS (this last only in 1953). This marks his third period, which covered almost exactly 38 years, from early 1940 until his passing in January 1978. [Another division of the periods of Gödel’s life counts the first one—his youth and education—to include the years 1906–1929, while the second, the period of active research into mathematical logic and set theory after taking his doctorate, comprises 1930–1943, and the final period, when he was concerned mainly with physics and philosophy, already in Princeton, extends from 1944–1978. See Wang (1987)].

During this third period, his interest and productivity in mathematics diminished, but he made important contributions to theoretical physics (undoubtedly stimulated in some indirect way by his friendship with Albert Einstein, also a professor at the IAS, which continued until Einstein’s death in 1955). His main interest after about 1944, however, was in philosophy, although much of his work in that field remained unpublished during Gödel’s own lifetime (see Appendix A, and also Items 7, 19, and 41 in Appendix B).

While there can be no doubt that Gödel’s publications on mathematical logic, in particular on the completeness [Gödel (1930)] and the incompleteness theorems [Gödel (1931)], were his most important works, for which he would be remembered (at least within mathematical circles) even if he had done no more work in any other area, they will not form the central topic of this book. There have been many attempts to explain them to a more general audience (i.e., everyone who is not a professional logician or metamathematician, or perhaps a philosopher of science)—see e.g. Rosser (1939), Findlay

(1942), Kleene (1952), Mostowski (1952)—but the first generally accessible explication appears to be the article written by Ernest Nagel and James R. Newman¹⁴ and published in *Scientific American*, in June 1956. Gödel himself was impressed by that article and mentioned it in a letter to his mother (cf. Wang 1997). (In his letter dated August 24, 1956, he complains that the magazine sent a photographer, who took about 50 photos, and then picked the very worst one for the article). It was the precursor to a book by the same authors¹⁵ which expanded on the theme, first published in 1958.

Their book has been reprinted several times, long after its authors' passing. For the new edition published in 2001, Douglas Hofstadter wrote an introduction (and edited the text to some extent). In his Introduction—and later in a Foreword to Karl Sigmund's book¹⁶ on the *Wiener Kreis*, he tells the fascinating story of how the book by Nagel and Newman (which he picked up 'by chance' in a bookstore in 1959, at age 14) became the wellspring of his interest in 'strange loops' and in a real sense the origin of his own book, *GEB*. 42 years later, he had come full circle by assisting in the publication of a new edition of Nagel and Newman, making it accessible to a wider audience. The Nagel & Newman book had a similar effect on the young Gregory Chaitin (cf. Chap. 12).

Together with Hofstadter's own books [*GEB* and Hofstadter (2007)], as well as Nagel & Newman (1958) (Item 1 in Appendix B), and also Franzén (2005), Item 26; Hintikka (1999), Item 16; and Smith (2020) and (2021), Items 32 and 49 there—these works provide a rich source of information and explanation on Gödel's famous theorems for readers who are not necessarily professional mathematicians. Readable, brief but authoritative summaries of Gödel's contributions to various fields are given by the articles in the *Gödel Centennial* issue of the *Notices of the American Mathematical Society* (April 2006); see [Davis (2006)] and the website linked there.

In addition, there are various books on other particular aspects of Gödel's work; for example, on *computability*, see the book edited by Copeland, Posy, and Shagrir (2013), Item 39 in Appendix B; or for Gödel's excursion into *relativity theory and cosmology*, cf. 'A World without Time...', by Palle Yourgrau (2005), Item 24 in Appendix B.

In Chaps. 6, 7 and 8 of the present book, the historical and scientific background of Gödel's important early works on metamathematics will be explored in some detail, setting the stage for an appreciation of his contributions. There, his doctoral and *Habilitation* theses, which contain his most significant work on mathematical logic, are also presented in some depth, keeping in mind that readers who wish to penetrate still further into

the details of this work should also consult the more specialized literature mentioned above.

In Chap. 9, we take a closer look at Kurt Gödel's health throughout his life, both mental and physical. This was an important issue for him during most of his life and an aspect that must be considered if we are to understand his personality and career. The next four chapters concern aspects of his life and work in Vienna after 1931, and up to his emigration to the USA, together with Adele in 1940. The final 7 chapters in this book consider Gödel's path in his 'third period', roughly the second half of his life, in Princeton, where he found a refuge that allowed him to work peacefully, apart from the psychiatric problems which plagued him increasingly as he grew older.

A few remarks on notation and nomenclature are in order: References to articles and books in the literature list ('References') at the end of this book are given in the form '[Name (year)]', where 'Name' is that of the author(s) or editor(s). They are sometimes mentioned directly in the text, but in the main are referred to using *backnotes*, denoted by a raised Arabic numeral in the text, and collected at the end of each chapter. These are numbered in sequence, beginning with '1' in each chapter. Those publications which are of biographical character are in addition collected in Appendix B for quick reference. Supplementary information directly pertaining to items in the text is also contained in some of the backnotes, replacing *footnotes* (which are not appropriate for the e-book version). A summary list of Gödel's own works, published and non-published, is provided in Appendix A, as mentioned above. A more complete and detailed listing, with commentary, can be found in the *Collected Works* [Feferman, Dawson et al. (1986–2014)], and in Dawson (1983) and (1984b). A third Appendix (C) contains a summary of publications on the 'Gödel Universe' by a Brazilian group of theoretical physicists.

Finally, one of those ominous 'notes to the reader': Gödel's insightful and innovative works in mathematical logic, set theory, computability, cosmology, and philosophy are nearly all path-breaking and will, as has often been mentioned in his praise, live on in the annals of scholarship and science. They are also of course not always easy to understand, and I have tried to walk the thin line along explanations which, while not claiming to be rigorous, still contain all the essentials—between genuine mathematically and physically precise and complete expositions, on the one hand; and superficial, perhaps misleading simplifications on the other. I may have strayed from that thin line on some occasions, and my advice to readers is to pass over the more dense material lightly, on first reading. Those who want more can return to it after it has 'settled in', or else go to the scholarly literature which is cited

generously in this book. And those who merely want to ‘get the flavor’ of Gödel’s life and works can leave it after the first pass, or simply skip over those ‘dense passages’ altogether. But it’s worth giving them a try!

Notes

1. Hofstadter (1979).
2. Hofstadter (1999).
3. Feferman, Dawson et al. (1986–2014); cf. also Item 5, Appendix B.
4. See ‘Gödel’ on the websites of the FRS (London); IAS (Princeton); NAS (Washington DC); AMS (Providence/RI); Stanford Encyclopedia of Philosophy; cf. also Item 4, Appendix B.
5. Wang (1987).
6. Dawson (1997); see the CRC Edition (2005).
7. Dawson (1999).
8. Schimanovich (2005) (critique of Dawson 1997), pp. 368 ff.
9. Quoted in Wang (1997), p. 7.
10. Wang (1997).
11. Tieszen (2017) and Budiansky (2021).
12. Dawson (1983) and (1984b).
13. Dawson (2006).
14. Nagel & Newman (1956).
15. Nagel & Newman (1958).
16. Sigmund (2015–2017).

Berlin, Germany
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William D. Brewer

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1

Prologue

The city of *Brünn* is located between the two old imperial capitals, Prague and Vienna. It is in fact the only urban area of any size between them, lying about 130 km (ca. 80 mi.) north of Vienna and 185 km to the southeast of Prague. The modern city is known by its Czech name, *Brno*. It is the second-largest city in the Czech Republic, after Prague, and the Czech-Austrian border runs in an east–west direction about halfway between Brünn/Brno¹ and Vienna. Before the collapse of the Habsburg monarchy in 1918 and the subsequent founding of the 1st Czechoslovakian Republic, Brünn was a provincial capital in the Austro-Hungarian Empire (it was the capital of the Province of Moravia).

The fabled Austro-Hungarian Empire had a number of epithets—it was called the ‘Habsburg monarchy’ after its ruling dynasty; the ‘*Donaumonarchie*’ (‘Danube monarchy’), after the river that flows through its heartland; the ‘*Vielvölkerstaat*’ (‘Nation of many peoples’), given the multiple ethnicities and cultures that were united within its boundaries; and the ‘*k.-und-k.-Reich*’ (from the German adjectives ‘*kaiserlich*’ and ‘*königlich*’, imperial and royal, since its rulers were Emperors of Austria and Kings of Hungary). As Dawson² points out, this latter form was shortened to the less ceremonial ‘k.-k.’ or ‘K.K.’ after the bonds to Hungary were loosened in 1867; the second ‘k’ then stood for the Kingdom of Bohemia. Even shortly before World War I, the Empire stretched from Dubrovnik (now in Croatia) in the south to near Dresden in the north, and from the Lake of Constance in the west almost to



Fig. 1.1 Map of the Austro-Hungarian Empire in 1910, with colored areas showing the predominant language and culture in each region. Brunn/Brno is a red spot in Moravia, indicating its predominantly German-speaking population at the time, surrounded by a blue sea of Czech speakers. *Source* WikiCommons, public domain³

the Black Sea in the east (see the map in Fig. 1.1, showing the extent and the ethnic groups of the Empire in 1910).

Historically, the Austro-Hungarian Empire was the direct descendant of the Holy Roman Empire, which dated back to Charles the First (Charlemagne), crowned ‘Emperor of the Romans’ in 800 A.D. by Pope Leo III in the old St. Peter’s Cathedral in Rome. The initiative for the coronation came from the Pope himself, who had political motives: He wanted to establish a counterweight to the Empress Irene of Constantinople, who was considered to be the heiress to the Byzantine or Eastern Roman Empire, and also to guarantee his own protection by the powerful King of the Franks, which Charlemagne himself considered to be his principal role. Charlemagne made little use of the imperial title, returning to *Aachen/Aix-la-Chapelle*, which served as the capital of his realm. When he died in early 814, he was buried in the cathedral church at Aachen (today, the westernmost city in Germany). His immediate successors retained the title but also made little use of it. The

realm of the Franks at that time encompassed most of modern Germany and France, as well as the northern part of Italy.

Charlemagne's dynasty had come to an end by the early tenth century, and his line was succeeded by Otto I, who founded his own dynasty, becoming King of the Germans in 936 A.D. He was crowned as Holy Roman Emperor by Pope John XII in 962. He revived the title and consolidated the territory of the Empire, which had lost some lands in the intervening period; at the time of his death in 973, it encompassed most of modern Germany, the Netherlands and northeastern France, and most of Italy; and it had expanded eastwards to include Bohemia and Moravia. Its eastern boundary bordered on Hungary, from which the Magyars had attempted to invade the Empire in the middle of the tenth century, until they were repulsed by Otto in 955 A.D.

The Empire, often referred to by its Latin initials, S.I.R. (*Sacrum Imperium Romanum*), was not at all a traditional kingdom. During most of its history, it was composed of a number of semi-independent regions: individual duchies or principalities, whose local rulers swore loyalty to the Emperor. Some of them, the Prince-Electors (German *Kurfürsten*), had the privilege of electing the new Emperor when that became necessary (initially, as 'King of the Romans'; only after being crowned by the Pope could the elected King reign as Holy Roman Emperor⁴). That restriction was however relaxed after the early sixteenth century. The empire did not become a separate nation, but remained for much of its history a sort of superstructure or umbrella organization, uniting a region of independent states (in many ways resembling the modern European Union).

In its early period, the Empire had no real capital; the monarch and his court traveled every few months to a different provincial capital, where they resided in a 'palace' (German *Pfalz*) built for that purpose (more like a long-house than a modern palace). The word *Pfalz* has survived in modern German as the designation of certain geographical regions (e.g., the State of *Rheinland-Pfalz* in the southwest of modern Germany, and the regions *Vorderpfalz* in the west and *Oberpfalz* in the east, in Bavaria); it is usually translated as 'Palatinate' in English. Beginning in the fifteenth century, the suffix *'deutscher Nationen'* ('of German nations') was often added to the name of the Empire, emphasizing the predominance of Germanic languages and cultures within it; that became part of its official title in 1512. A map of the Empire around that time, showing the 'Circles' or groups of member states, is shown in Fig. 1.2.

The center of gravity of the Empire gradually moved southwards and eastwards, and it acquired something like capital cities, where the imperial court



Fig. 1.2 Map of the Holy Roman Empire in 1560, with colored areas showing the 'Circles' or Territories, major regions containing one or more member states with a common ethnic, cultural or political heritage. *Source* Wiki Commons, CC A-SA license⁵

and the emperor resided most of the time. Various dynasties provided the candidates for election as emperor in various periods, beginning with the *Carolingian* period (heirs of Charlemagne), followed by the *Ottonian*, the *Salier*, the *Hohenstaufen*, the *Welf*, the *Luxembourger*, the *Wittelsbacher*, and the *Habsburger* periods. The last two alternated as ruling families during the final 500 years of the Empire, from 1314 until its dissolution in 1806. The Wittelsbacher monarchs traditionally chose Munich as their residence city, while the Habsburger emperors resided in Vienna or Prague (Prague beginning in 1345, for two periods totaling nearly 120 years; Vienna for three periods beginning in 1438 and totaling about 330 years).

The political and integrative power of the empire declined gradually throughout the eighteenth century, and in 1806, its Emperor Franz II, threatened by Napoléon's military successes and wishing to prevent him from usurping the title of Holy Roman Emperor, officially dissolved the Empire, having taken the title *Emperor of Austria* in 1804. After Napoléon's defeat, the Empire was reorganized as the Austro-Hungarian ('*k.-und-k.*') Empire by the Congress of Vienna (1814–1815). The new Empire survived for just over 100 years, until its last Emperor, the young Karl I, was forced to abdicate in 1918, following the defeat of the Central Powers in World War I, and its territories were reorganized as individual nations, mainly republics or constitutional monarchies. Many of the inhabitants of those new countries later came to regret the passing of the old Empire, whose relative tolerance and freedom for local ethnic groups had been replaced by still more authoritarian regimes which were anything but tolerant.

But now, with this historical background, let us take a step back and focus on Brünn in the mid-nineteenth century, where our story begins. 1848 was a 'revolutionary year', when nationalist and democratic movements in many parts of Europe rose up against the old regimes, in part with a certain success, and attempted to found republics which would be based on the democratic principles propounded by the Enlightenment a few generations earlier. None of these putative revolutions was entirely successful, although they did achieve local regime changes in some places (notably in France, where the "bourgeois king" *Louis Phillippe* was forced by the February revolution to abdicate, and was replaced by Napoléon III, later Emperor of the *Second Empire*).

In Vienna, there were two uprisings, one in March, which obtained some concessions from the monarchy, and a second in October that forced the emperor (Ferdinand I) to flee the city, which was later bombarded. After its recapture, the leaders of the uprising were executed. A more serious uprising took place in Hungary at the same time. In the end, order was restored, and Ferdinand I abdicated in favor of his nephew, Franz Joseph, who became the longest-reigning Emperor in Austrian history after acceding to the throne in December 1848.

In that eventful year, a son was born in Brünn to the family of Josef Gödel and his wife Aloisia Zedniček: their fourth child, who was named *Josef Bernard Gödel*. Josef Sr. was the son of Carl Gödel, also of Brünn. The family worked in the leather trade, and they were reputed to have lived for some time in Bohemia or Moravia. Josef Bernard had three sisters and two older brothers; later, we shall hear more about the oldest brother, Alois Richard (born 1841), and the middle brother, August Josef (born 1846), as well as his sister Anna (born 1854).

Sometime around 1872/73, Josef Bernhard, now grown, married Aloisia Keimel, presumably in Vienna, where her family lived. Apart from the fact that her first name was the same as Josef's mother's name, her family name 'Keimel' is not uncommon in Germany and the Netherlands, and she or her forebears probably came to Vienna from further west. The young family lived in Brünn, like many other Gödels, including Josef Bernhard's siblings Anna and August. Their first child, Rudolf August Gödel, was born on February 28th, 1874. He was followed by two daughters, Maria and Hermine, and another son, Bertold, born in rapid succession in 1875, 1876, and 1877. (One source however states that Rudolf was born in Vienna (cf. backnote [2], Chap. 1, Endnote [5]).) The precise circumstances of Rudolf's childhood and youth are somewhat mysterious. His family moved to Vienna sometime before 1880, when Rudolf was six; but he remained in Brünn, in the care of his Aunt Anna. Just why this arrangement was made is not clear; Dawson⁶ suggests that it was due to the early death of his father, Josef Bernhard, who died "shortly after" Rudolf's birth. But this contradicts the family tree, where Josef's death year is listed as 1894, when he would have been 46 and Rudolf, at 20, was already grown. Perhaps the care of four young children, so closely spaced in age, was simply too much for their mother Aloisia, and she wanted to be nearer her own family in Vienna. Josef Bernhard's early death is rumored to have been due to suicide. Dawson¹ has made some remarks about the origin of the family name *Gödel*. It is presumably the diminutive form of Göde, Gode or Gote, old German words derived from the Germanic *Gott* (God), and meaning 'Godfather'; thus Godel or Gödel may refer to 'Godmother'.⁷

Considering the geographical distribution of those names in 1890,⁸ one finds them mainly in the north, near the Baltic Sea, in the former province of Pomerania, between the modern Polish cities of *Szczecin* and *Gdansk* (formerly the German cities *Stettin* and *Danzig*), and also in a region just west of Berlin. Some few incidences are found in Saxony and in southern Poland. In modern times, the incidence of Gödel is highest in the southwest of Germany, in Rheinland-Pfalz. Thus, it seems likely that the family may have originated further to the north, moving southward in steps, with a longer stay in Bohemia or Moravia, now parts of the Czech Republic. In Pomerania, the land has been occupied and fought over by Germanic, Slavic and Nordic peoples for centuries, and the name *Göde* may well be derived from a Slavic or Scandinavian root rather than the Germanic. This is suggested for the given name 'Gode', for example, believed to be derived from Old Norse *góði*, meaning 'good'. Another possibility is the Old Slavic root '*goditi*', 'to be thankful'.⁹ Josef Bernhard's mother's family name, *Zedníček*,

is of Czech origin, and her family probably originated in the Czech-speaking regions of the Austro-Hungarian Empire, i.e., Bohemia or Moravia.

In any case, Rudolf August spent most of his childhood in Brünn, and he apparently was not unhappy with that arrangement. He attended elementary school there, and started in a *Gymnasium* (preparatory school for academic studies) when he was around 10, but did not do well, so that at age 12 he transferred to a trade school which prepared its pupils to work in the textile industry as weavers. This was an apt choice, since Brünn was a center of the textile industry, and young Rudolf apparently took to the trade quickly.

The map in Fig. 1.3, dated 1903, shows the central, older part of Brünn at that time. The street names were mostly German, and many of the buildings from the later nineteenth century—and still older—remain standing today. After the founding of the Czechoslovakian Republic in 1918, whose population was in the main Czech or Slovakian—apart from German-speaking groups in the northwest and the north (*Sudetenland*, *Schlesien*) and in some cities (the *linguistic islands*), as well as some Hungarian (Magyar) speakers in the southeast and Ukrainian (Ruthenian) and Polish speakers in the northeast—its official languages became Czech and Slovak. Accordingly, the German street names in Brünn, now *Brno*, were replaced by Czech names. The old house numbers were often retained and can still be seen on some buildings. The streets mentioned on the map now have the following names¹⁰: *Große Bäckergasse* (Great Baker St.) = *Pekařská*; *Elisabethgasse* = *Opletalova*; *Heinrich-Gomperzgassel/Zwetschkengasse*¹¹ = *Bezručova*; *Spielberggasse* = *Pellicova*; and *Strassengasse/Wawragasse*¹² = *Hybešova*. The buildings indicated are all still standing and in good condition. Of particular interest is the *Spielberggasse*, a small street which runs along the base of a hill, topped by a much older structure (the ‘*Spielberg* Castle’). The castle was later a fortress and a prison, and it is now a museum.

In that street, Rudolf August later built a house for his own family, at *Spielberggasse 8a*. The Gödels’ villa, a charming structure, has many gables and shows some *art nouveau* influence. Today, it houses a private art gallery called ‘*galerie 8a*’. Its present-day appearance is shown in Fig. 2.7.

Rudolf August was by all accounts a practically-minded young man, who was not interested in academic pursuits but showed an aptitude for applied problem solving, logic and organization, of which he made good use in his adult life. We will leave him here, in Brünn at age 12 in the year 1886, having set the stage for his later life, and rejoin him in Chap. 2, around 15 years later as a young adult, still living and working in Brünn.

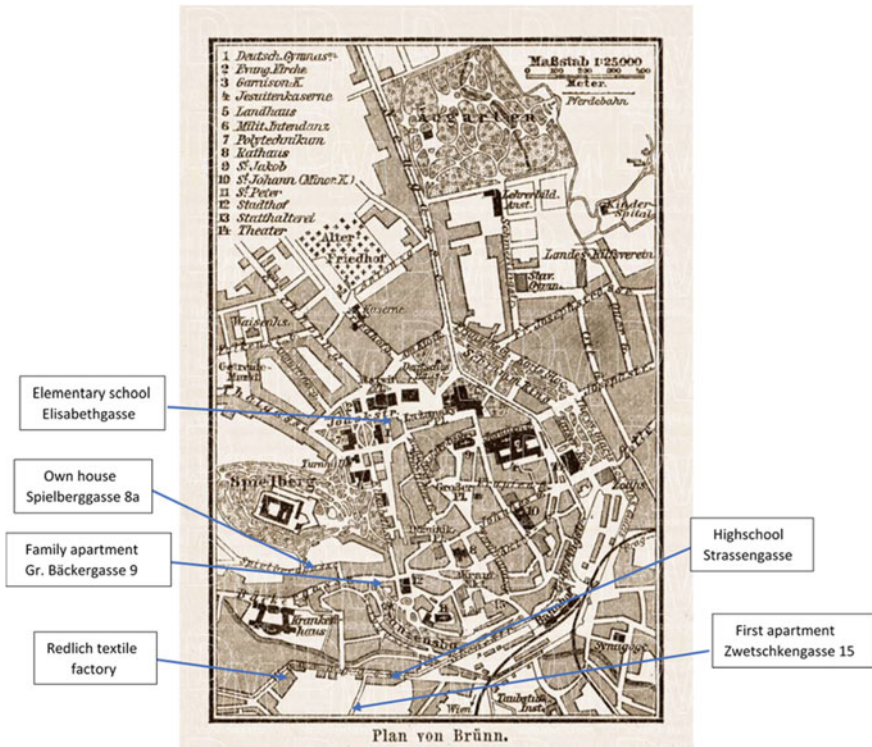


Fig. 1.3 Historic map of Brunn from 1903, showing the central portion of the city. The arrows point to places that were important to Kurt Gödel or his family in the early years of the twentieth century. Source¹³ *discusmedia*

Notes

1. We will use its German name *Brünn* in this book, since that was the city's name during Kurt Gödel's early youth there.

Often, cities and geographical features in Central Europe have both Germanic and Slavic names, and they are frequently used in a rather arbitrary manner in other languages (e.g., the river which runs through Prague is called *Vltava* in Czech, but *die/the Moldau* in German and English).

2. Dawson (1997), CRC Edition (2005), p. 12.
3. Wiki Commons, public domain. Reused from: https://commons.wikimedia.org/wiki/File:Austria_Hungary_ethnic.svg
4. See for example Heer (1967).
5. Wiki Commons, Creative Commons Attribution Share-Alike 3.0 license. Reused from: <https://commons.wikimedia.org/w/index.php?search=map+holy+roman+empire+1560&title=Special:MediaSearch&go=Go&type=image>

6. Dawson, *ibid.*, p. 3.
7. Apparently, ‘Göd’ refers to ‘godfather’ and ‘Godl’ to ‘godmother’ in the Viennese dialect. See Schimanovich & Weibel (1997), Note [16] there.
8. From <https://nvk.genealogy.net/map/1890:Goedel,1890:Göde>, consulted on Jan. 10, 2021.
9. From <https://www.namensforschung.net/dfd/woerterbuch/liste/>, consulted on Jan. 10, 2021.
10. Street names in Brunn: https://encyklopedie.brna.cz/home-mmb/?acc=profil_ulice&load=1418
11. The word ‘*Zwetschken*’ denotes a kind of plum, and the street may have been near an orchard when it was opened in 1844. In 1896, it was renamed for a local philanthropist, Heinrich Gomperz, who coincidentally had the same name as the Viennese philosopher who was one of Kurt Gödel’s teachers in the 1920s. But the name *Zwetschkengasse* was still used on city maps as late as 1910. See the website linked in backnote [10].
12. The older street *Strassengasse* (opened 1782) was renamed ‘*Wawragasse*’ in 1898, after a surgeon of Czech origin in Brunn, Dr. Jindřich Blažej Vávra (1831–1887; German *Wawra*); but the older name was still used on maps up to WW I. It was given its modern name *Hybešova* in 1946.
13. Map: public domain, from *discusmedia*, the 1900 Map Collection; reused from: https://www.discusmedia.com/maps/czech_city_maps/6080/



2

La Belle Époque in Brünn

La Belle Époque—‘the Beautiful Epoch’—refers to the roughly 30 years beginning around 1885 and continuing until the outbreak of World War I in 1914. The term arose in Paris but was soon applied to other places throughout Western Europe. It was a time of relative peace and prosperity, corresponding roughly to the ‘Gilded Age’ in the USA, although it began somewhat later. *Relative*, since there was still great income inequality and poverty; but a solid middle class had arisen in many countries and it had money to spend. Science and technology were producing new achievements almost daily, and the second Industrial Revolution was in full swing, replacing the steam and waterpower that had predominated in the earlier nineteenth century with cleaner and more flexible electrical energy—produced to be sure at central steam- or water-powered plants—and establishing modern communications (telephones, later radiotelegraphy). The arts and music flourished, and towards the end of the nineteenth century a new artistic and architectural style, the ‘New Art’ (*art nouveau*, or, in German, *Jugendstil*) became popular, filling whole quarters in some cities with the romantically ornate houses and furniture that it favored.

Brünn, the capital of the Austro-Hungarian province of Moravia, was particularly prosperous, a center of the textile industry, sometimes known as ‘the Manchester of Moravia’ for that reason. Fortunes were made with its spinning, weaving and dyeing works. Like many other cities in the Austro-Hungarian Empire, it had three dominant ethnic groups: the Germanic, the Slavic, and the Jewish. In many places—typical examples are of course