The Bauers
Joseph, Franz & Ferdinand

Masters of Botanical Illustration
An Illustrated Biography

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There are moments in life one does not forget. To me such a moment occurred in the afternoon of a summer day in 1974 whilst a visitor at the Natural History Museum in London. Together with Dr. William T. Stearn, principal senior scientific officer in the Department of Botany, great connoisseur of botanical illustration and one of the key figures in the history of science at that time, we had discussed the preliminary version of a joint paper on the typification of several Linnaean names in composites. Realizing that there was still some time left before the gates of the museum closed, my host opened a cupboard and showed me a very large format, bound volume of watercolours. Never before had I seen such exquisite plant illustrations, perfectly true to nature, recording in utmost precision many minute flower details and painted in strikingly vivid colours. Stearn told me that this material originated from Franz and Ferdinand Bauer, two brothers who had worked for the cream of the naturalists of their time, but that little was known about their lives. He added that they would merit an in-depth study and that I would be suited to write such a biography, being both a botanist and a native of Vienna where he believed Franz and Ferdinand had spent their formative years.

This was the beginning of my research into the lives and work of three outstanding personalities, since it turned out that there existed a third brother, Joseph, who also made a career as an artist, although with a quite different profile. It soon became clear that they had left behind a vast oeuvre consisting not only of botanical and zoological illustrations but also of landscapes and of the pictorial documentation of dissections and microscopic preparations. In addition to being an accomplished botanical illustrator, there is evidence that Franz was also an early experimental plant pathologist, who had successfully attempted to cultivate snow algae, unsuccessfully tried to observe sperm cells in deer and studied blood coagulation in man. He was also the first to draw nuclei in plant cells, although, admittedly, he was unaware of the importance of his discovery. Rather unexpectedly Ferdinand, a botanical illustrator of similar accomplishment, turned out to be also a collector of many plant specimens gathered mainly in Australia and, in his late years, in Austria, almost all of them held today in the Naturhistorisches Museum in Vienna. Joseph, so far almost totally unknown, became director of the Gallery of the Reining Prince of Liechtenstein and was found to have been responsible for the first public presentation of the rich collection of fine paintings and sculptures exhibited in the family’s summer residence in the Rossau quarter of Vienna.

In parallel with the increased understanding of the manifold activities of the Bauer brothers it gradually became evident that their various pencil drawings, finished watercolours, oil paintings, manuscripts and their few extant letters were widely scattered. For me this resulted in repeated travels all over Europe. Again there were special moments not to be forgotten; discovering by chance, in the archive of the Real Jardín Botánico in Madrid among the miscellaneous papers of Thaddeus Haenke, the early colour chart of the Bauer brothers explaining the colour code they had used; spending days without end in the Sherardian Library of Oxford University marvelling at Ferdinand’s watercolours documenting plant and animal life in the Levant and correlating them with the specimens kept in the Sibthorpiian Herbarium; rediscovering fourteen massive volumes of plant illustrations in a pristine state of preservation in the Fürstliche Sammlung in Vaduz thought lost during the Second World War and in part painted by Joseph, Franz and Ferdinand in their early years; finding in the Staatsbibliothek Berlin an exceedingly rare Russian journal containing the publication of some of the letters on the earliest heliographs in existence sent to Franz and kept in the archive of the Russian Academy of Sciences in St. Petersburg; locating in the Biblioteka Jagellońska in Cracow, Ferdinand’s swan-song, his last botanical illustrations datable with the help of watermarks and documenting passionflowers with utmost attention to anatomical detail; studying in the Niedersächsische Staats- und Universitätlibriothek in Göttingen those parts of Franz’s estate which had not ended up in the British Museum, where they had been deposited by order of Queen Victoria, but in the hands of her uncle Ernest Augustus, King of Hanover.

Over the decades it became evident that the Bauer brothers had travelled widely. Joseph had worked for seven years in Rome, Franz had taken part in a conventional grand tour accompanying Joseph Franz Edler von Jacquin, the son of his then employer, criss-crossing Central Europe. Later he settled down as a resident botanical illustrator near the Royal Garden at Kew, living on an annuity from Sir Joseph Banks, President of the Royal Society, and leading for the following fifty years a sedentary life in what was then a village on the River Thames way out of London. Ferdinand joined John Sibthorpe on his first voyage of exploration in the Ottoman Empire and later became, together with the naturalist Robert
Brown and the gardener Peter Good, one of the ‘botanical gentlemen’ taking part in the first circumnavigation of Australia headed by Captain Matthew Flinders. Those were adventurous undertakings—with moments of triumph, like climbing Mount Parnassus as one of the earliest tourists in adventurous undertakings—with moments of triumph, like the daredevil voyage on the leaky Investigator from Timor along the southern coast of Australia to Port Jackson, Sydney with a contagious disease on board. In Kew, Franz went on journeys of a different kind. With the help of microscopes, primitive by modern standards, he ventured into worlds then largely unknown, examining urinary sediments, legs of insects and the germination of pollen cells.

While Kew, London, Rome and Vienna were places known to me for decades, Feldsberg (now Valtice in the Czech Republic), the home town of the Bauer brothers and place of their formative years, became the destination of several excursions only much later. No doubt it turned out to be helpful that I was already familiar with many classical sites in Greece and Turkey, notably Athens and Istanbul, documented by Ferdinand in several views, some with outstanding precision. By contrast I had no chance to see with my own eyes most of Ferdinand's numerous collecting sites on the southern, eastern and northern coast of Australia and, in particular, on Norfolk Island in the Pacific, where he had spent no less than seven months. At the same time it became clear that Franz underwent a metamorphosis late in life from illustrator to scientist in his own right, publishing a few papers as the sole author and independently from his employers. Elected Fellow of the highly prestigious Royal Society, he became known as the Nestor of Kew, continuing his extended researches into old age.

So far several books on the Bauer brothers have been published, albeit all focused either on only one of them or on only a single aspect of their lives and work. My book The Flora Graeca Story, Oxford, 1999 deals exclusively with Ferdinand's travels in the Levant together with Sibthorp and the subsequent publication of the botanical results. David Mabberley's Ferdinand Bauer: The nature of discovery, London, 1999 is the first short biography of Ferdinand, just like my Franz Bauer. The painted record of nature, Vienna, 2008 (also available in a German version) is a first short biography of Franz. By contrast, Marlene Norst's Ferdinand Bauer. The Australian Natural History Drawings, London, 1989 deals only with Ferdinand's work on the Investigator voyage. My book A Garden for Eternity. The Codex Liechtenstein, Berne, 2003 (also available in a German version) analyses the early work of the Bauer brothers, whereas Rudi Pallais Der Kapitän und der Künstler, Cologne, 2013 is focused on Flinders, Ferdinand and the ill-fated voyage to Australia. As clearly evident from the title Joyce Stewart & William T. Stearn's book The orchid paintings of Franz Bauer, London, 1993 deals only with this part of Franz's oeuvre. Sandro Fusina's Bauer, Bauer & Co., Lodi, 2002 (in Italian, privately published and with extremely few copies in public libraries) concentrates on the watercolours by Ferdinand kept in the Natural History Museum, London and is heavily biased towards his work on the flora and fauna of Australia. Now the time seems to have come for a first synthesis.

Needless to say, this is not the definitive biography of the three brothers, but only a summary of what is currently known. It has been impossible to follow up all ramifications and connections between the lives and work of Franz and Ferdinand with the circles of naturalists, physicians and gardeners who acted as their employers, commissioners or colleagues and sometimes also as the suppliers of the botanical and zoological materials they were documenting in a most sophisticated way. By contrast Joseph moved largely in a different environment – among artists, art dealers and connoisseurs of art – in Rome and in Vienna.

Looking back on the last four decades of my life I continue to feel the pleasure of having been able to see almost the complete oeuvre of the Bauer brothers with my own eyes, which even in this digital age continues to offer a special meaning to me. Among the highlights were the superb wreath of roses, almost completely covered by butterflies, painted by Franz and discovered by me in the Österreichische Nationalbibliothek in Vienna and his portrait of the tree peony, possibly the first specimen grown outside its native China, kept in the Natural History Museum, London; the illustration of Persian cyclamen from the coast of Cyprus by Ferdinand in the Sherardian Library in Oxford and his portrait of two koalas captured south of Botany Bay in Australia, conserved in the Natural History Museum, London. Unfortunately, I was unable to study the most precious object of Franz's estate: the first heliograph exposed to light in a camera, the icon of the early history of photography, now in a xenon-filled security showcase of the Gernsheim collection of the University of Austin, Texas.

For good reason Ferdinand has been praised as the Leonardo of natural history illustration. However, nobody found words as appreciative as Johann Wolfgang von Goethe did, when he wrote in his essay Über Blumen-Mahlerei with enthusiasm on the coloured copper engravings published in In the genus Pinus based on watercolours by Ferdinand and Franz 'Accomplished in his [their] art and applying it ingeniously to his [their] purposes, Ferdinand [and Franz] Bauer present[s] the different species of the genus...
Pinus and the manifold transformations of their branches, twigs, needles, leaves, buds, blossoms, fruit, involucre, and seeds to our greatest satisfaction ... For this reason one is enchanted at the sight of these leaves, nature is evident, art is hidden, the precision is great, the execution mild, the presence determined and satisfying, and we must consider ourselves lucky to be able to repeatedly lay this exemplary work from the treasures of the Grand Ducal library [in Weimar] before us or our friends."

Over the last decades and thanks to the digital revolution the exceptionally fine works of Ferdinand have become very popular for a simple reason, in particular in Australia: the Natural History Museum, London made Ferdinand's finished watercolours on the flora and fauna of Australia available on the internet, and the Sherardian Library in Oxford followed with Ferdinand's finished watercolours on the flora, fauna and topography of the Levant. For several of these watercolours this effectively meant first publication, in particular for the Levantine animals and landscapes, but also for some of the Australian works. On the other hand, the greater part of Franz's rich and equally superb botanical representations and the preliminary works by Ferdinand, continue to be accessible only to the small circle of the initiated with a few published exceptions. Meanwhile, very many publications of their time which include printed illustrations based on works by Franz and Ferdinand have also been made available via the internet by the Biodiversity Heritage Library.

In contrast to Richard Dawkins's Unweaving the rainbow, a dictum popular among analytically inclined biologists, my text aims at the opposite - at weaving the rainbow, attempting in a sense a ‘triple biography’, a great synthesis on the lives and achievements of three outstanding men who dedicated themselves exclusively to the sciences and arts.

ACKNOWLEDGEMENTS

These Bauerian studies brought me into contact with many colleagues, created lasting friendships and resulted in several co-authored publications. David Mabberley (Sydney) shared his immense knowledge of the Investigator voyage and the subsequent publication of the botanical results, as well as the life and work of Brown with me, and helped to open many doors at Oxford. Victoria Ibáñez (Madrid) became my co-author when making the early colour chart of the Bauer brothers and their ingenious working methods widely known. Anne-Marie Catteral (Oxford) was invariably helpful when I was working for several months in the Sherardian Library, just like the staff of the Botany Library at the Natural History Museum, London notably Malcolm Beasley, Andrea Hart, Judith Magee and Armando Mendez, and the staff of the Department of Manuscripts at Niedersächsische Staats- und Universitätsbibliothek. Gina Douglas (London) traced Ferdinand's unpublished letters from Australia in the archive of the Linnean Society, Christa Riedl-Dorn (Vienna) made the extensive collection of colour-coded pencil drawings by Franz and Ferdinand, kept in the archive of the Naturhistorisches Museum, accessible to me, and S. Lindemann (Potsdam) kindly communicated his unpublished transcripts of the Itzenplitz correspondence. Thanks to the platform 'Virtual Herbaria' and Ernst Vitek (Vienna) it was easy to trace herbarium specimens collected by Ferdinand deposited in several herbaria, while Milada Rigasová (Mikulov) helped to organize photocopies of the earliest works of Joseph and Franz then still kept in the defunct convent of the brothers of St. John of God in Feldsberg. Hans Kräftner (Vienna) arranged for the study of archival material kept in the Fürstliche Sammlungen and pointed out the importance of Joseph Bauer, effectively one of his predecessors as director of the Gallery of the Liechtenstein family, Cornelia Reiter (Vienna) made the treasures of the Kupferstichkabinett, Akademie der Bildenden Künste, Wien available for the study and provided helpful guidance to literature on Austrian artists resident in Rome. Martin Rodeweld (Berlin) prepared all the maps.

A final word of thanks goes to my home institution, the Botanischer Garten und Botanisches Museum Berlin-Dahlem, Freie Universität Berlin where, in parallel with my official obligations, I could undertake, my extensive, though repeatedly interrupted, studies on the Bauer brothers and their circle over the years.

My wife Eva Lack (Berlin) and James Compton (Salisbury) have kindly read a draft version of the text and commented on it. Having donated so much of their valuable time to my text I feel particularly obliged to them and grateful for their help. Several chapters were also read by Nick Turland, Botanischer Garten and Botanisches Museum Berlin-Dahlem.
PRELIMINARY NOTES

It is highly recommended that the following notes are read. They help explain the structure of the book and the reasons for the unusual high number of notes.

QUOTATIONS AND REFERENCES
All quotations from sources in English are given in their original spelling, irrespective of whether they are taken from unpublished or published sources, i.e. diaries, notes and letters, or from the literature. The orthography, though sometimes odd, is not corrected; nor is the inconsistent use of capital letters. Consequently the traditional addition of ’[sic]’ is only very rarely used. Illegible words are indicated by square brackets thus [. . . ]; any additions to the quotations are given in square brackets.

All quotations from sources in other languages, i.e. Czech, French, German, Italian, Polish and Russian, have been translated by the author, except the letters by Ferdinand sent to his brothers where the translation given in Ferdinand Bauer. The Australian Natural History Drawings (Norst, 1989) is followed; the sources of the quotations are given in the endnotes of the respective chapter.

References are given as endnotes; however, this is done only once in every chapter. As a consequence quotations in the final portions of a chapter often relate to references in the earlier sections of that chapter. In several cases references to the literature are given in a summary at the beginning of the endnotes, such as ‘if not otherwise indicated, this chapter is based on Lack (2000a, 2008b)’. In the endnotes ’OXF’ is used as an abbreviation for the Sherardian Library, one of the Bodleian Libraries of Oxford University.

DATES AND LOCALITIES
In any book of travels, it is important to know precisely the localities visited and the dates of arrival and departure. These dates are always given. Localities are indicated as spelled in the original documents, not in quotes; their current names are added, always in square brackets on their first appearance in the text; later they are not repeated. In contrast, only contemporary names are used for major modern cities and islands frequently referred to. For Ferdinand’s travels in the Ottoman Empire the toponyms used in The Flora Graeca Story (Lack, 1999c) are followed; for Ferdinand’s circumnavigation of the globe in the Investigator, the toponyms used in Nature’s Investigator: The diary of Robert Brown in Australia 1801–1805 (Vallance, Moore & Groves, 2001) are adhered to. Special attention is given to the political geography of the time. As a consequence modern denominations like Germany or Italy are avoided. In the same vein, the toponym Feldsberg is used consistently for this small town, which until 1920 belonged to the Archduchy of Austria below the River Enns, and only later became part of Czechoslovakia and now the Czech Republic.

NAMES OF INSTITUTIONS
The names of institutions are neither abbreviated nor translated. Natural History Museum always refers to the institution in London, Naturhistorisches Museum always to the institution in Vienna. For the repository of the various illustrations and collections see Appendix 1.

SCIENTIFIC NAMES
Every attempt has been made to provide modern scientific names for the plants, animals and minerals referred to in the legends and the text, sometimes added in square brackets inserted in a quotation. In order to determine correct scientific names a plethora of reference works, monographs, revisions and Floras has been consulted, which are not always quoted. For Ferdinand’s travels with Sibthorp Flora Graeca. The annotated re-issue (Strid & Strid 2009, 2010, 2012, 2013) turned out to be extremely helpful; for Ferdinand’s circumnavigation of the globe the Catalogue of the holdings of the Natural History Museum (London) of the Australian botanical drawings of Ferdinand Bauer (Mabberley & Moore, 1999) was largely followed. No attempt is made to list the taxonomic novelties based on the collections by Ferdinand nor the illustrations based on the works of Franz or Ferdinand, which formed components of the protologues of names new to science.

BIOGRAPHICAL INFORMATION
Whereas biographical information on the core figures of the story is always given in full, this is not the case for the more peripheral persons. For these, standard biographical references have been consulted, among them Australian Dictionary of Biography, Dizionario Biographico degli Italiani, Oxford Dictionary of National
Biography, Neue Deutsche Biographie, Österreichisches Biographisches Lexikon, and many others. For the considerable number of Fellows of the Royal Society dealt with in this book, biographical information found in the archives of the Royal Society and available at www.royalsociety.org/library/collections/biographical-records turned out to be extremely helpful; it is never cited. As a rule errors relating to the Bauer brothers encountered in the literature are not discussed in any detail.

**BIBLIOGRAPHICAL INFORMATION**

Bibliographical information, in particular publication dates, is exclusively based on the standard bibliography for botany, the second edition of Taxonomic literature with its supplements. For the Philosophical Transactions of the Royal Society and the Transactions of the Horticultural Society the dates of publication are taken from the title pages of the respective volumes, while for the Transactions of the Linnean Society those given in a standard work (Raphael, 1970) are used.

**DRAMATIS PERSONAE**

This list gives the dates of the more important persons mentioned in this book, who were in contact with the three principals – Joseph, Franz and Ferdinand Bauer. There is a focus on their patrons and employers, their commissioners and their travel companions. For all others reference should be made to standard biographical sources. As a rule, information given in this list is not repeated in the text.

**THE BAUERS**

Baker–Bauer, Elizabeth fl. c. 1800–1841
Bauer, Maria Anna Dorothea 1750–1768
Bauer, Ferdinand 1760–1826
Bauer, Franz 1758–1840
Bauer, Johann 1754–1833
Bauer, Joseph 1756–1831
Bauer, Lucas 1708–1762
Bauer, Therese 1730–1790

**THEIR PATRONS AND EMPLOYERS**

Banks, Sir Joseph, 1st Baronet 1743–1820
Boccius, Norbert, OH 1729–1806
Dietrichstein-Leslie-Proskau, Maria Christina Princess 1735–1788
Dundas, Henry, 1st Viscount Melville, First Lord of the Admiralty 1742–1811
Grenville, Thomas, First Lord of the Admiralty 1755–1846
Grey, Charles, 2nd Earl Grey, First Lord of the Admiralty 1764–1845
Jacquin, Nicolaus Joseph Baron 1727–1817
Jervis, John, 1st Earl St Vincent, First Lord of the Admiralty 1735–1823
Liechtenstein, Aloys I Joseph, 9th Reigning Prince 1759–1805
Liechtenstein, Franz Joseph I, 8th Reigning Prince 1726–1781
Liechtenstein, Johann I Joseph, 10th Reigning Prince 1760–1836
Liechtenstein, Joseph Wenzel, 7th Reigning Prince 1696–1772
Middleton, Charles, 1st Baron Barham, First Lord of the Admiralty 1726–1813
Phipps, Henry, 1st Earl of Mulrave, First Lord of the Admiralty 1755–1831
Sibthorp, John 1758–1796
Yorke, Charles Philip, First Lord of the Admiralty 1764–1834

**THEIR COMMISSIONERS**

Brown, Robert 1773–1858
Granville, August Bozzi 1783–1872
Hawkins, John 1761–1841
Home, Sir Everard, 1st Baronet 1756–1832
Hooker, Sir William Jackson 1785–1865
Lambert, Aylmer Bourke 1761–1842
Smith, Sir James Edward 1759–1828
Thomson, James 1777–1850

**THEIR TRAVEL COMPANIONS**

Allen, John 1755–
Asaros, Asafuros fl. 1786–1787
Brown, Robert 1773–1858
Flinders, Matthew 1774–1814
Ganzarowitz, Joseph d. 1787
Good, Peter d. 1802
Gruber, Leonhard 1740–1810/1811
Hawkins, John 1761–1841
Imrie, Ninian d. 1820
Jacquin, Joseph Franz Baron 1766–1839
Westall, William 1781–1850
INTRODUCTION

The Oxford English Dictionary defines a biography as ‘an account of someone’s life by someone else’. A scientific biography may be regarded as a biography based on methods and principles of science, i.e. an account containing a maximum of hard evidence and a minimum of speculation and hypotheses. In this context hard evidence clearly consists of two different elements: primary sources provided by the subject of the biography itself, like diaries, letters and other written documents, and secondary sources provided by others on the subject of the biography, again as a rule, in written form. There is a straightforward correlation: the more sources there are available, the more detailed and colourful a scientific biography can be. The oversupply of sources on an acting political figure like, for example, Napoleon makes it very easy to write his biography, while it is quite impossible to produce a biography of an analphabetic peasant who has left behind no written record and may at best have been mentioned in passing by his literate contemporaries.

Clearly, the Bauer brothers did not belong to the analphabetic sector of society in the second half of the eighteenth century, but to the literate artists or, to be more precise, to the literate draughtsmen. However, their social rank should not be overestimated. In their youth Joseph, Franz and Ferdinand were regarded as belonging to the artisans rather than to the artists, with Franz’s and Ferdinand’s commissioner in Vienna, Nikolaus Joseph Edler von Jacquin, henceforth Jacquin, recording in retrospect the arrangements for their successor in the job – ‘whenever he works, he has lunch and one guilder for the day’ (see Chapter 3). Back from Rome Joseph entered the service of the Reining Prince of Liechtenstein as a badly paid servant, but only years later he was advanced in the hierarchy to court painter (see Chapter 12). Indeed, the Bauer brothers grew up in a clearly stratified society and their place was within the layer of those serving the upper strata of the system. After all, their commissioners like Jacquin, Sibthorp, Banks and Home were established figures of society and rich compared to Franz and Ferdinand, not to mention the almost indescribable wealth of the Liechtenstein family in Vienna who were to employ Joseph for life.

As botanical, or rather natural history illustrators, Franz and Ferdinand served their superiors by documenting what was requested by them. Only later in their lives did they become somewhat more independent and were able to select their study objects more freely, with Franz enjoying a particularly generous arrangement with Banks. Clearly, all three did not belong to that class of gentlemen, but to the upper tiers of the working classes. At the same time their lives tell the story of three young men, who made their way from their native little town of Feldsberg to capital cities like Vienna or London, both centres of art and science. Joseph and Ferdinand managed to establish themselves in the system: late in life Joseph possessed stocks, Ferdinand owned a house with garden in Hietzing, then already an elegant suburb of Vienna near Schönbrunn, the preferred summer residence of the Habsburgs. Franz on the contrary was financially less successful; and it is not clear whether the auction of his estate brought sufficient money to pay off his debts. Considering that the Bauer brothers are not known to have attended school or received a formal education, the total balance of their achievements is remarkable indeed.

When contemplating a biography of Joseph, Franz and Ferdinand Bauer every potential author is faced with a striking discrepancy: the primary information for such a work consists of a negligible number of written documents by the Bauer brothers themselves, particularly when considering that all three reached old age. This paucity of written evidence is in contrast with an extraordinary rich oeuvre of pencil drawings, watercolours and a few paintings in oil. Regrettably, many of these do not carry an annotation, signature or date in the hand of the Bauer brothers, a complete nightmare for every researcher studying this material. In addition, the secondary information on the Bauer brothers is widely scattered among the writings of their contemporaries, such as diaries or buried in unpublished letters and miscellaneous notes. Furthermore only the travels by Franz and Ferdinand are recorded in any detail. In the case of Franz a series of letters exists by Joseph Franz Edler von Jacquin, henceforth Jacquin the son, to members of his family, which record their joint movements in the years 1788-1789. In the case of Ferdinand the incomplete diary and miscellaneous letters by his superior Sibthorp survived their joint tour through the Levant in 1786-1787. By contrast more ample sources exist for Ferdinand’s share in the voyage on the Investigator: the official report by Flinders, which appeared in print in London in 1814, the recently published diaries by Brown and Good, which, however, mention Ferdinand only in a few cases and in passing, plus several letters, including a few by Ferdinand to his brothers in Kew and Vienna. These well-documented months are in contrast with many years of an extremely meagre record. A good example is the first surviving letter written by Ferdinand dating from 1793,
when he was thirty-three years old and had completed already more than 1,300 plant and animal illustrations for Sibthorp alone. This totally unbalanced situation is in itself hardly encouraging to a biographer and inevitably results in a more detailed account of the years en route compared with the much longer periods in the studio.

There are further difficulties: Franz and Ferdinand have produced an unusually narrowly specialised oeuvre. While they documented anything living from conifer cones to red snow, from beetles to kangaroos, and from ergot to ferns on several thousand sheets of paper, they omitted completely many fields to which other draughtsmen and painters dedicate themselves with devotion, namely the presentation of humans and of anthropogenic objects. Where a human being appears in Ferdinand’s work, it serves best as a comparison of measurement and is never meticulously elaborated; as a result his landscapes are almost always deserted. This narrow focus on living nature void of man and artefacts has brought Franz and Ferdinand the highest esteem from botanists and zoologists, but it has largely prevented their appreciation by the general public. There is a simple reason: what matters to the general public are as a rule images of humans and artefacts, even landscapes need a human touch, like a deliberately cut tree or a human figure at the distance. In this respect the work of Joseph is much more conventional, depicting for example in Rome exactly what every artist would record, human figures, antiquities and other artefacts.

Every student of a drawing or watercolour representing a plant or an animal is confronted with a whole series of basic questions, six of them being of particular relevance.

The first of these concerns what may be called the authenticity of the work: has the given botanical or zoological illustration indeed been based on a specimen or is it simply a copy of a pre-existing illustration? In contrast with established museum tradition many botanical and zoological illustrations prepared by Franz and Ferdinand have been rightly praised for their high严格按照，but regrettably we have no record of how they actually worked and how they communicated with their commissioners. Did the latter adhere to the principle of four-eyed sight, i.e. did they consistently and persistently control Franz’s and Ferdinand’s work, or did they simply rely on their superior expertise in recording objects of nature? Apart from their early work the latter seems the case, which was definitely the exception in natural history illustration at that time. Being so focused on truth-to-nature, is it just a coincidence that Franz owned the first photographs ever, the famous heliographs produced by Nicéphore Niépce, and that his last acquisition in life was a daguerreotype showing the Pont Neuf in Paris dated 1840, the year of his death?

A fourth question when addressing a botanical or zoological illustration is the identity of the organism represented, indicated almost never by Franz or Ferdinand in writing. Considering the immense diversity of plant, fungal, algal, and animal life, specialists are needed to examine a given illustration in order to determine the identity of the respective organism and to attribute a scientific name to it. In accordance with established museum tradition many botanical and zoological illustrations prepared by Franz and Ferdinand were later annotated with scientific names by specialists, unfortunately largely without disclosing their
When available, offer at best a dating of a given drawing or watercolour: datable watermarks, cultivated in specialist gardens. A sixth concern is the precise way very many plants from all five continents were already kept in captivity in zoos, and in a similar way very many plants from all five continents were already cultivated in specialist gardens. A sixth concern is the precise dating of a published print based on a particular drawing or watercolour may offer a terminus post quem. Circumstantial evidence, like information taken from diaries or travelogues written by others, may be helpful in dating individual sheets.

For a variety of reasons, the terms ‘botanical artist’ and ‘painter of plants’ are avoided in this text. They imply, at least indirectly, a degree of artistic freedom and independence which simply did not exist, whereas in the real world many aspects of the work were highly standardised. Instead the term ‘botanical illustrator’ is consistently used, stressing the technical and analytical aspects of the job and the interrelationship with a commissioner. As a matter of fact it is the comprehensive documentation of botanical and zoological characters which count in science and nothing else.

The interpretation of the largely undated, unsigned, and un-annotated watercolours is further complicated by the fact that the more or less finished watercolours are often based on preliminary pencil drawings, which, however, are often kept in another place. Some pencil drawings of the early work of the Bauer brothers are conserved in the Naturhistorisches Museum in Vienna, while the finished works are in the Fürstliche Sammlungen in Vaduz. In the same way very many pencil drawings by Ferdinand ended up also in the Naturhistorisches Museum with the finished watercolours being conserved in the Natural History Museum, London. Only in the case of Ferdinand’s work on the plants and animals of the Levant did both pencil drawings and watercolours remain together at Oxford. Most notably Ferdinand’s preliminary pencil drawings often carry at least some cryptic annotations, like ‘Cybrus’ [Cyprus] or ‘XII’ [Head of Spencer Gulf, South Australia], not found in the finished watercolours. Unfortunately, not a single one of these preliminary pencil drawings kept in Oxford and Vienna has ever been made available on the internet, making detailed comparisons and the allocation of collecting sites difficult.

This brief introduction exemplifies the complexities of bringing the extensive, almost completely undated oeuvre into some sort of a coherent, let alone chronological sequence.

Every biographer tries to describe and analyse the personality of his subject. In the case of the Bauer brothers we possess almost zero personal evidence. For Joseph we have a single and brief note in a leaving certificate issued by the Vereinigte K. K. Akademie der Künste [United Imperial Royal Academy of Arts] in Vienna, describing the young man as ‘always. . . very well behaved, quiet, peaceable, virtuous’ (see Chapter 3). Sibthorp reports on Ferdinand from Naples ‘his good Temper & honest Countenance endeared Him me much’ (see Chapter 5) and later Ferdinand is described by Banks as ‘indefatigable’ in his work. Franz’s and Ferdinand’s productions were highly appreciated by sophisticated minds like Brown who was full of praise for both of them (see Chapter 20) and the same is true for Home, who had collaborated over fifteen years with Franz (see Chapter 15).

Enveloped in their sublime world of recording the multifaceted manifestations of life, Franz and Ferdinand became totally obsessed by their work. Otherwise they remain largely enigmatic personalities. We have not the slightest knowledge of their sexual lives, the only thing we know for certain is the fact that Franz and Ferdinand, like their less eminent elder brother Joseph, remained single. The epilogue of Mabberley’s biography of Ferdinand quite appropriately ends by noting ‘Combined with this talent we have other traits of a plain-speaking man, who was perhaps angular and gauche in his dealings with the rich or more intellectual people who were his employers. And there is an earthy robustness with a canny financial flair too: [Ferdinand] Bauer may have been gifted, brilliant and obsessed with his work, but he was not a saint’. On a similar line is the statement in the epilogue in my biography of Franz ‘Bauer had seen much, penetrated deeply into the unknown and produced a permanent record of extraordinary precision, comparable only to that of his circumnavigating brother. In a sense he had been single-minded, an anonymous obituary noting ‘Few men, perhaps, devoted their existence so entirely to an uninterrupted observation of natural objects, and enriched science with so many discoveries; and still fewer have been so indifferent to all ordinary considerations; for [Franz] Bauer regarded his talents merely as a stepping-stone to that tranquility and happiness, which ought to be the ultimate object of all science and all acquirements.’

This triple biography tries to unravel the lives of three largely unknown personalities, to analyse their vast oeuvre, of both superb quality as well as striking diversity, and to set it into the context of their times.
A New Map of the Whole
According to the latest and most exact Observations

In this map is inserted a View of the General & Coasting Trade Winds, Monsoons, or Shifting Trade-winds. Note that Arrows among the Lines show the Course of those General & Coasting Winds, and Arrows in void Spaces show the Course of Shifting Trade-winds, and the Abbreviation Sep. &c.

This map shows the Times of the Year when such Winds Blow.
CHAPTER 1

The incompletely known world

TIME IS A STRANGE THING. Every historian would agree, and even more so every historian of science and technology. The reason for this is very simple: a period of time without information freely available in the internet, communication without e-mail, orientation without global positioning system is extremely difficult to imagine in the early twenty-first century. But all these technical commodities of modern everyday life were not only totally unknown but completely undreamt of facilities in 1750, when our story begins. Therefore it seems reasonable to briefly reflect the general circumstances in which the lives of the Bauer brothers unfolded.

As already pointed out, the eighteenth century was a period characterized by a clearly stratified society with the upper classes refraining largely from contact with the lower ranks. The strata differed markedly not only in wealth, manner, dress, language and habits but also in access to information, the latter available only to the literate elite and largely stored away in libraries and archives kept and maintained in the centres of power or of learning. Access to these facilities was strictly controlled by the system and could easily be limited even further when found suitable or necessary. In short, the modern concept of a basically free flow of information accessible to everyone simply did not exist.

Conventional communication was either by word of mouth or in the form of letters written by hand, entrusted to a messenger travelling to the recipient of the information. This kind of transfer was not only slow, in particular when involving people on the other side of the globe, but also largely unreliable, resulting in what was subsequently stored in archives and later became available to the historian, only being those letters which had happened to reach their destination or had not been discarded. As a consequence the individual letters were often numbered in order by their writers to enable the recipients to quickly spot a letter lost in transit. Fragmentary transfer of information was therefore the rule, not the exception and as a consequence gaps in our story are easy to understand.

Compasses were of course long known and so was simple orientation on the basis of the movements of the sun. Otherwise only rather primitive maps existed, printed, available to the literate elite only and to be interpreted by the initiated. Navigation at high seas was still in its infancy and specialist knowledge was necessary to make the calculations based on the movements of sun, moon and the stars with no reliable clock yet available. In short any traveller was at that time utterly ignorant about his precise geographic position.

All this went hand in hand with a very incomplete knowledge of the world’s topography.

When re-examining the world maps available in 1750 it quickly becomes evident that, although the contours of four continents were roughly known, only the most fragmentary and incorrect information existed on the western and northern coasts of Australia (Fig. 1.2.), very little on New Zealand and Japan, nothing on the...
islands in the Pacific – neither Hawaii, nor Tahiti, nor New Caledonia had yet been discovered by Europeans. Australia's eastern and southern coastlines remained unknown and so were the high southern latitudes, with absolutely no concept existing on what is now known as Antarctica. The regions in the interior of Africa, Asia and the Americas (Fig. 1.1.) still remained largely unknown. Even maps documenting the topography of Europe were far from reliable, not only, for Russia or the Balkan Peninsula but also for the much better known islands in the Mediterranean Sea. Mount Blanc, the highest elevation in the Alps, had not yet been climbed, let alone Mount Elburs, Europe's highest mountain.

The incomplete knowledge of the world's topography went in parallel with the even more fragmentary knowledge of the diversity of the world's fauna and flora, the latter understood here as comprising plants, fungi and algae. What was known around 1750 by the cognoscenti, and summarized in a most admirable fashion by Linnaeus in his great works, was just the tip of the iceberg. By then not a single animal and only two plant species were known from the continent of Australia, and only the vaguest notion of plant and animal diversity in Africa, Asia, and the Americas existed without the slightest idea of the actual numbers of plant and animal families and genera. In addition, forms of life observable only with the help of a microscope were largely ignored and so was much of animal, plant, fungal and algal life in freshwater and in the high seas. The notion of life in the deep sea did not even exist as a hypothesis. More was known about Europe's fauna and flora, but again huge gaps of knowledge existed, both spatially and temporally. Not only did substantial white areas exist on the botanical and zoological maps of Europe, there were also seasons of the year when only few studies of animal and plant diversity had taken place, all this resulting again in a meagre and totally unbalanced state of knowledge.

Any analysis and description of animal and plant diversity is linked to specimens, which had to be permanently preserved in order to be available for re-examination at a later day. In the eighteenth century this was easier said than done. Herbarium specimens, loose or glued on paper, were difficult to defend against insects without the help of potent insecticides or deep freeze, both unavailable then, and the same problems applied to insect specimens. Skeletons of vertebrates were safer and therefore more popular, but the skins and feathers pertaining to them were again prone to attack by insects. Specimens preserved in liquid posed other problems, among them availability of sufficient quantities of concentrated alcohol, evaporation, fragility of the container, incomplete mode of preservation, the latter difficulties also applying to all forms of anatomical preparations. In addition, in 1750 relatively few public depositories existed for animal and plant specimens in Europe. Most of them ended up in private collections, with places like the British Museum or the Kunstkammer of the Imperial Academy of Sciences in Saint Petersburg being among the rare exceptions.

When looking back on the fragmentary zoological and botanical knowledge in the eighteenth century one must not forget that fundamental principles of biological thought simply did not exist – neither the all-embracing concept of evolution nor the no less all-embracing concept of genetics, neither the idea of plant and animal geography nor the fundamentals of comparative anatomy, embryology and cytology. Basic phenomena like sex, reproduction, photosynthesis, respiration, muscle contraction, blood coagulation were not yet or only very incompletely understood. Disasters like mass infections of wheat by rusts or contagious disease in humans were still largely seen as a punishment by God. Only the few initiated, mainly naturalists and physicians, would regard them as natural phenomena open to study and analysis - while others, for example in the field of pharmacology, continued to rely on dogma and tradition, rejecting the concept of experiment which is now regarded as the cornerstone of the natural sciences as well as medicine. This is one of the reasons why the interpretation of the medicinal plants mentioned in the writing of Dioscorides, a Greek physician, pharmacologist and botanist who had lived in the first century, continued to be regarded as relevant by many. Put simply, in the first half of the eighteenth century the enlightenment had not yet penetrated deeply into society.

In addition to what has just been said about the general availability of information in the twenty-first century, the efficiency of present-day communication and the ease of geographical orientation, one more aspect necessitates our special attention – the modern omnipresence of digital images. They have become so dominant in our lives, and are today so easily and quickly made, stored and transmitted, even by children, that many have stopped reflecting on what an image really is. For the younger generation the time before the existence of the digital image is remote past, although the digital
camera, an apparatus to encode digital images and store them for later reproduction, became commercially available only in the early 1980s. Before that period conventional photography existed, which basically meant that light was induced in a simple camera with a lens to produce a latent image on a carrier, which in a second step had to be transformed into a permanent image. This had been a revolutionary invention, going back to the pioneer works of Nicéphore Niépce and Louis Daguerre, who had changed the world in a similar way to how the invention of digital images did about 140 years later. Most importantly, both a digital camera and a conventional camera are recording devices everyone could learn to use quickly and easily.

Even more remote for many is the time when photography in whatever form had not yet been invented, i.e. the period when an image could only be produced by the hand of a specialist. The specialist does not rely on an apparatus but solely on his eyes, brain and hands as well as the drawing and painting equipment. Basically, with the help of the specialist’s eyes, the subject to be documented creates a latent image in the brain, which, by emitting electrical impulses, makes the muscles contract to move the hand, which draws a line on the carrier of the image with the help of a pencil or applies liquid paint to it with a brush. While a digital camera or a conventional camera is basically nothing more than an optical as well as an electronic/chemical device to record an image, a drawing or painting made by hand is a direct expression of a person’s personality, i.e. of his or her brain, without the intermediary of an apparatus. Personalities differ, and so do images produced by them, either with the help of an apparatus or without. However, under all circumstances and in all cases these images are forms of self-expression, like writing, singing or dancing.

It seems sensible to reflect briefly about the more general circumstances of preparing a drawing, watercolour or painting in oil in the mid-eighteenth century, which differ markedly from the situation in the early twenty-first century. Every artist would confirm that light is the precondition of his or her work. Yet, only daylight or candlelight was available when our story starts, which severely restricted the numbers of hours available for work and resulted in a totally different time regime. In addition, candlelight possessed a different colour temperature that had to be taken into account when preparing a watercolour. Secondly, the number of drawing aids was still rather limited – the camera obscura, mirrors, magnifying glasses and also spectacles had been known for centuries, and simple microscopes existed, but taking precise measurements with their help was still impossible. Thirdly, a sheet of plain glass in a light box continued to be an important item when it came to take tracings, which enabled the more efficient production of copies, or duplicates, of a pre-existing image, no other devices being then available. Fourthly, no rubber erasers existed and bread was used instead to delete pencil lines. Fifthly, paper had to be used with economy. This applies to thin drawing paper as well as to solid watercolour paper, the latter too heavy and expensive to be taken along on expeditions and only to be used in the studio, with plain-air painting becoming fashionable only much later. Sixthly, the spectrum of pigments available for watercolours or paintings in oil was markedly smaller than the enormous range of hues available in the twenty-first century. In addition, the time-consuming preparation of pigments was largely the job of the illustrator or artist, another extra burden on his or her time budget, often not properly considered by art historians.

Specialisation in natural history illustration aiming at truth-to-nature on the one hand implies a mixture of training, experience, dedication and focus on the part of the person preparing the drawing or painting, while on the other hand the end product begs its price, which the specialist is entitled to ask for as compensation for his or her labours in the form of money, food or other commodities. However, the market for natural history illustrations was small and remained so because only a tiny fraction of society is focused on the accurate documentation of plant and animal diversity. Although this may seem banal and straightforward, it needs to be stressed that any drawing or painting is a unique item, a unicum, and by itself has a special value.

Replication with the aid of graphical methods, basically the art of copper engraving, in the eighteenth century and in the natural sciences, since lithography had not yet been discovered, is a totally different matter, involving a graphical artist, a printer and, in case of coloured engravings, a colourist, i.e. three different persons who as a rule have never seen the subject originally documented. Needless to say, there is always some loss of quality and precision when a drawing or watercolour true to nature undergoes a graphical process and is replicated, irrespective of the method applied. Also needless to say, the print-run or edition, i.e. the
end result of a graphical process, is never completely homogeneous, in particular when copies coloured by different colourists are compared. More import is the fact that such a reproduced, i.e. printed, image was no longer a unicum and consequently less elitist than the drawing or water-colour.

In the incompletely known world of the mid-eighteenth century images aiming at truth-to-nature and precision were particularly relevant and sought after by naturalists and physicians. This is due to multiple reasons: their objects were often ephemeral – the flower of a poppy will last only shortly, a freshly collected mushroom will soon transform itself into a slimy discoloured mass, within hours a fish will lose its shiny colours, the exanthemata caused by measles or shingles may change within less than a day. Furthermore, often objects were so rare that no one could presume to be able to observe them again soon – it may take a plant in a conservatory many years until it flowers for the first time with no gardener being able to tell when it would do so next time, a rare bird may be observed for the first time and is in need of recording, in a post mortem an unconventional, very rarely occurring malformation of an internal organ may have been found that needed documentation. In many cases the respective objects were relevant to science – recording a potential medicinal plant in a precise image may be a prerequisite for finding it again, just like the documentation of an intestinal worm or of a human foetus developed in the ovary instead of in the uterus may be very useful. In addition, the objects of naturalists and physicians often showed sequential phases of development best recorded in precise serial images – the dynamics of germination, anthesis and fructification, of metamorphosis in amphibians and insects being good examples to the point, not to mention the profound changes some parasitic fungi undergo when passing from one host to another. Finally, with scientific terminology still in its infancy and standards of scientific communication largely missing, an accurate image would be much better suitable for an exchange of opinion than a descriptive text, and this applied to plants, fungi and algae in the same way as it applied to animals. In short, for a wide spectrum of reasons this applied to plants, fungi and algae in the same way as it applied to animals. In short, for a wide spectrum of reasons this applied to plants, fungi and algae in the same way as it applied to animals. In short, for a wide spectrum of reasons this applied to plants, fungi and algae in the same way as it applied to animals.

There is a notable paradox in this approach: in the ideal world the documentation of such objects aiming at truth-to-nature leads to images which are neither datable nor attributable to the hand of an illustrator; they become in a sense de-personalized, neutral and very similar to electronic documentation made by a digital camera or photographic documentation made with the help of a conventional camera.

To the historian of science several collections of such de-personalized images aiming at strictest truth-to-nature are known, owned by naturalists or medical doctors and often brought together over an extended period of time. For good reason some of these have been denominated paper museums, like the Museo assembled by Cassiano dal Pozzo in Rome, which documented his collections including not only antiquities but also natural history objects in precise images, with both the paper museum and the collections now widely dispersed. Along the same lines, is the painted documentation of the plants cultivated over centuries in the Jardin du Roi in Paris and the animals kept in the menagerie in Versailles, kept today in the Bibliothèque Centrale of the Muséum National d’Histoire Naturelle in Paris, with several repeats conserved in the Österreichische Nationalbibliothek in Vienna. Is it surprising that many of these de-personalised, timeless images were left unsigned and undated by the illustrators? Being unaffected by time is a special feature of many of these natural history images focussed on truth-to-nature. For some, this old-fashioned opticality offers a special aura and in a sense mystifies the illustrator, for others it is a constant frustration – how to distinguish the famous iris painted, possibly in Venice, by Albrecht Dürer from the iris documented in the Levant and later painted in Oxford by Ferdinand? How to distinguish the watercolour of a male imago of the stag beetle, *Lucanus cervus*, recorded by Dürer in the J. Paul Getty Museum in Malibu from the watercolour by Franz in the Niedersächsische Staats- und Universitätsbibliothek Göttingen showing the same species? In a sense Dürer c. 1500 stands at the beginning of the era of natural history illustration aiming at truth-to-nature and the Bauer brothers in the 1820 to 1840s at its end, when photography started to become an alternative. Neither Franz nor Ferdinand were ever superseded in their truth-to-nature or replaced by others. It was the approach to preparing images that was to change, in fact in the year before Franz died – from images made by the brain and executed by hand to images made by an apparatus.

CHAPTER 2

The Bauer brothers:
formative years in Feldsberg

RURAL COUNTRYSIDE

Softly undulating hills alternating with wide plains extend from Vienna northward as far as Brno, the capital of Moravia. It is peaceful, rural countryside, with fertile fields where a variety of crops, mainly wheat, barley and maize, are grown. A land characterized by large vineyards, rich meadows and wetlands along the rivers, and deciduous broad-leaved forests dominated by sessile oak, field maple, European hornbeam and small-leaved lime. To the south, this region is delimited by the Danube, to the east by the River Morava, and to the west by a long chain of hills called Manhartsberg; only northwards is there no natural border. A benign climate favours this country, characterized by long, warm and dry summers alternating with relatively short, cold winters.

Since medieval times the southern part of this area had belonged to the Archduchy of Austria below the River Enns, forming the so-called Quarter below the Manhartsberg, now informally and for good reason called Weinviertel (Wine Quarter). The northern part had for many centuries belonged to the Margraviate of Moravia, forming part of the lands of the Bohemian Crown, while the country to the east of the Morava had belonged to the lands of the Hungarian Crown. However, following the momentous battle of Mohács in 1526 and the resulting political changes, the Archduchy of Austria, the Margraviate of Moravia and the Kingdom of Hungary were ruled by the same family, the Habsburgs. As a consequence the area was divided by administrative lines, one of them meandering west to east and dividing Moravia, with Brno as its capital, from the Archduchy of Austria, with Vienna as its capital. The small, equally meandering River Thaya (Dyje) traverses this region in the same direction, with an unconventional consequence: here and there it flows into the Archduchy of Austria, then into Moravia, then into the Archduchy of Austria again, forming the border between the two territories for a few kilometres before zigzagging into a much larger river, the Morava. Today the northern part of this area belongs to the Czech Republic and the southern part to Austria, while the region east of the Morava is part of Slovakia.

In medieval times several small towns had been founded along the Thaya, from Raabs, Drosendorf, Hardegg and Frain (Vranov nad Dyji) in the west, to Znaim (Znojmo), Laa and Lundenburg (Břeclav) further east. Others lie at some distance from the river, which is known for its repeated inundations in late spring and early summer. Among them, about twelve kilometres apart, are Nikolsburg (Mikulov) and Feldsberg, both now in the Czech Republic, the latter about sixty-five kilometres to the north of Vienna. Feldsberg is the birthplace of the three principal figures of our story and where the most famous of them, Ferdinand, stayed longer than anywhere else in his life. The Feldsberg years were formative to all three brothers and they are dealt...
with here in detail, since the professional orientation of Joseph, Franz and Ferdinand took place there.

The aristocracy and the landed gentry, the owners of often large estates, shaped and determined life in this rural area for centuries. Over generations several of these families had managed to amass considerable wealth, which enabled them to live in grand style, to build large country houses and to collect works of art. On the lower Thaya no other families equaled the Dietrichsteins, who were based in Nikolsburg and then in Moravia, and the Liechtensteins, who were based in Feldsberg and then in the Archduchy of Austria, the latter with a fine summer residence at a distance of seven kilometres in Eisgrub (Lednice) in adjacent Moravia. Both families possessed monumental city residences in Vienna, among them those adjacent to each other on Minoritenplatz, and both belonged to the high echelons of the aristocracy: Princes of the Holy Roman Empire, having fiefs that had no suzerain except the emperor. As a consequence they enjoyed imperial immediacy and special privileges, among them the right to collect taxes and tolls, and to mint coins. The Prince of Dietrichstein and the Prince of Liechtenstein were entitled to sit on the secular bench in the Council of Princes at the Imperial Diet, which met as a rule in Ratisbon. For good reason the Liechtensteins regarded the title of Prince of the Holy Roman Empire to be higher than their older title of Duke of Troppau (Opava) and Jägerndorf (Krnov), two towns in Silesia, which were titles referring to the Kingdom of Bohemia. For generations members of both families have been introduced to the Order of the Golden Fleece, awarded exclusively to Catholic royals and to the inner circle of Catholic high aristocracy. They played a leading role during the counter-reformation in the lands of the Bohemian Crown, which helped them to augment their wealth and extend their large properties even further. The two families owned sumptuous burial chapels – the Dietrichsteins in Nikolsburg, the Liechtensteins in Wranau (Vranov) near Brno.

The rise of the Dietrichsteins had started with Franz Cardinal Dietrichstein (František z Ditrichštejna), Bishop of Olmütz (Olomouc), Baron of the Holy Roman Empire, who crowned Archduke Matthias and later Archduke Ferdinand Kings of Bohemia in Prague. Franz was also the first of his family to receive the hereditary title of Prince of the Holy Roman Empire in 1624 under Emperor Ferdinand II. Upon the death of the great cardinal the title passed to his nephew and remained for generations in the Dietrichstein family.

The rise of the Liechtensteins started with Karl Count Liechtenstein-Nikolsburg zu Feldsberg, created prince in 1608 and thereby becoming Karl 1st Reigning Prince of Liechtenstein (Karel I z Lichtenštejna), who was later made Viceroy of Bohemia under Emperor Ferdinand II. Two generations later, Anton Florian, the 4th Reigning Prince of Liechtenstein, obtained the title of Prince of the Holy Roman Empire in 1719 during the reign of Emperor Karl VI (Charles VI). The earlier acquisition of the small, distant and economically irrelevant territories on the upper Rhine, which received the name of the family and today form the Principality of Liechtenstein, had been the prerequisite for this promotion in rank. However, for the following two centuries the members of the Liechtenstein family remained focused on their vast estates in the Archduchy of Austria and in the lands of the Bohemian Crown, that is in Moravia, Silesia and Bohemia, with the princely administration based in Vienna.

The Dietrichsteins, who also possessed city palaces in Brno and Graz, and the Liechtensteins, who owned an additional city palace in Prague, differed in wealth and family success, the latter outstripping the former. The Dietrichsteins were to die out in the male line in 1864, whereas the Liechtensteins are still continuing to flourish and thanks to Napoleon (see Chapter 12) were later to become sovereigns in their possessions on the upper Rhine. In contrast to the Dietrichsteins they were also able to maintain their city and summer palaces in Vienna (see Chapter 3) and continue to own large properties in the Weinviertel and elsewhere. It is difficult to get a realistic grasp of the richness of the Liechtenstein family at the time when our story begins, but in 1805 – when Aloys I Joseph, 9th Reigning Prince of Liechtenstein, died – an obituary reported “These estates together have 756 places, including 24 towns and 35 market towns, with a population of 302,000 souls. The princely properties include important hammer works, and glass factories, and 164 dairy farms . . . The [annual] proceeds of the aforementioned properties amount to some 1,200,000 guilders”. In brief, the Liechtenstein estates, like those of the Princes of Schwarzenberg (Schwarzenbergové) in Bohemia, effectively formed an entity of remarkable size within the Hereditary Lands of the Habsburgs. This was almost a state within the state, with the Reigning Princes of Liechtenstein sometimes jokingly referred to as the bankers to the imperial family, to whom they, however, remained loyal for centuries.
In the same way as the Dietrichsteins, in particular Franz Cardinal Dietrichstein, had modelled Nikolsburg with its princely residence, parks and gardens according to their personal taste, Feldsberg and Eisgrub were modelled by succeeding generations of the Liechtensteins. They left a lasting mark on both places, which formed part of their Feldsberg estate, one of the many they owned, comprising some three hundred and fifty square kilometres, situated just a few kilometres south of the dense riparian wetlands and ponds of the Thaya valley, with Feldsberg set amongst extensive vineyards. In 1770 Feldsberg consisted of just 243 houses and was still surrounded by a defensive wall. A contemporary account of the local geography reads ‘the town has . . . five markets each year . . . the church is dedicated to the Assumption of the Virgin Mary . . . in addition to the church there are two monasteries in Feldsberg, one Franciscan and one belonging to the Brothers of Mercy . . . On a hilltop . . . is the attractive castle of the prince [of Liechtenstein]. This residence . . . contains a marvellous chapel, lavishly decorated chambers, a magnificent garden, and an impressive riding school built in two storeys, with marbled stalls. The associated domain is extensive . . . The wine of Feldsberg is amongst the best in Austria. The hunting is also excellent, especially for wild boar.

A few kilometres north of Feldsberg and connected by a straight avenue lies the village of Eisgrub, described by the same source as ‘a market with church, a newly built, attractive, splendidly furnished summer-castle, and nearby an equally impressive stable, close to a very large, unusually fine, artistically and tastefully designed garden . . . on the right bank of the Taya [Thaya], from which the water is lifted artificially for the grottoes and fountains of the garden . . . 554 Christian, 13 Jewish houses’. What is here called an ‘impressive stable’ has become known as the ‘Palace for the horses’, a baroque building designed by the first architects of their time, including Johann Bernhard Fischer von Erlach and Domenico Martinelli (see Chapter 3), with construction works continuing for more than two centuries. The stables are documented in copper engravings by Johann Adam Delsenbach, who also represented the garden of the summer residence in Eisgrub, an extensive parterre in baroque style. Whereas this country house, also built in baroque style, was later demolished and substituted by an extensive neo-Gothic building, the significantly older Liechtenstein castle in Feldsberg has survived intact, although it has lost a large part of its furniture (see Chapter 19). Nevertheless, it continues to be a particularly fine residence, mirroring the elevated status of the princely family with an enfilade of richly decorated rooms, among them an exquisite cabinet where Archduke Karl, later Emperor Charles VI, the father of Maria Theresia (Maria Theresa), is reported to have stayed. The cabinet is adorned with a painting of the goddess Flora, her followers, and lengthy flower garlands on the ceiling. An eyewitness who visited Feldsberg in 1782 marvelled at the exquisite rooms, their splendid furniture and the extensive collection of paintings, counting no less than 568 pieces in the galleries. At the same time he estimated the value of the paintings in one of the festive halls alone to approach 30,000 guilders, a considerable sum of money. On the ground floor a fabulous chapel can still be admired, a perfect amalgam of architecture, painting and sculpture, rightly praised as a refined Gesamtkunstwerk of the late baroque period and among the finest in the Archduchy of Austria and adjacent Moravia. Today the altar piece is a copy of the famous painting ‘The adoration of the shepherds’ by Guido Reni, of which two original versions are known – in situ in the Certosa di S. Martino in Naples and in the National Gallery in London, the latter from Feldsberg. Nothing illustrates the luxurious decoration of this chapel better than the fact that even the seating area of the pews is richly worked in intarsia.

In the fine state rooms the over-doors (decorative paintings set over the doors) are more relevant in our context, since they comprise exquisite flower and fruit pieces, painted among others by Franz Werner von Tamm. These show, for example, a composition of different grape cultivars and melons; there are also individual still lives by Tamm and by Philipp Peter Roos (better known by his alias Rosa de Tivoli) presenting mainly animal life-like deer, fowl and horses. Considering the special status of the Liechtenstein family, it is no surprise that Maria Theresa, like her father before, is reported to have visited this fine residence several times, followed later by her sons, the Emperors Joseph II and Leopold II.

For a tiny town such as Feldsberg the parish church, dedicated to the Assumption of the Virgin Mary, was and continues to be hopelessly over-sized, with the two towers reaching the height of thirty-four metres. It took several decades to complete the building, which had been planned on the basis of severe, early baroque models in Rome by Giovanni Jacomo Tencalla. Like at St Peter’s in Rome there is an extremely large horizontal
Feldsberg was the mother convent for the province ‘Zum – effectively pharmaceutical botany – were taught. simple surgery, wound-dressing, nursing and botany the very few places outside universities where anatomy, of the convent in Feldsberg, which at the time was one of (Bratislava) and others followed in quick succession. of Gorizia in Italy and Goricia in Slovenia), Pozsony Graz, Prague, Görz (today a divided town consisting in Feldsberg that the foundation of the convents of Vienna, hospital, a pharmacy and a medicinal garden, the latter been founded as early as 1605, consisted of a church, a and not just nursed and cared for, as in many hospitals of other orders.9 Most significantly treatment was for free and available to all, including non-Catholics. The confraternity was headed by a prior, comprised male nurses and surgeons, all laymen, and included mostly only a single ordained priest. In accordance with the rule of this order, the convent in Feldsberg, which had been founded as early as 1605, consisted of a church, a hospital, a pharmacy and a medicinal garden, the latter two of particular relevance for our story. The complex was built beyond the city walls on the road to Eisgrub, with later additions, and survives largely unchanged. In the beginning the convent may have been very modest and remained so for decades, but it was from Feldsberg that the foundation of the convents of Vienna, Graz, Prague, Götz (today a divided town consisting of Gorizia in Italy and Goricia in Slovenia), Pozsony (Bratislava) and others followed in quick succession. From 1718 onwards a school for male nurses formed part of the convent in Feldsberg, which at the time was one of the very few places outside universities where anatomy, simple surgery, wound-dressing, nursing and botany – effectively pharmaceutical botany – were taught. Feldsberg was the mother convent for the province ‘Zum Heiligen Erzengel Michael’ (To the Holy Archangel Michael), in 1781 divided in two provinces, one covering the Hereditary Lands of the Habsburgs renamed ‘Zum Hl. Karl Borromeus’ (To Holy Charles Borromeus). Each of them was an administrative entity of the order headed by a Father Provincial, who had as his superior the Prior General of the order in Rome. As in other convents, for example in Vienna, there was also a well-stocked library in Feldsberg, including herbaria (collections of pressed and dried plant specimens), which in 1763 had received new rooms within the building. Our story starts with a baptism on 29 December 1750 in the church of the Assumption of the Virgin Mary in Feldsberg. At that time Benedict XIV (Prospero Lorenzo Lamberti), aged seventy-five, was Pope in the sixth year of his pontificate. Franz I Stephan (Francis I Stephen) of Lorraine, aged forty-two, was Emperor of the Holy Roman Empire in the sixth year of his reign, residing in Vienna. His wife Maria Theresa, aged thirty-three, was Queen of Hungary and Queen of Bohemia in the tenth year of her reign. She also held many other titles, such as Archduchess of Austria and Margrave of Moravia. In London George II, King of Great Britain and Ireland and Prince Elector of the Holy Roman Empire, aged sixty-seven, was in his twenty-third year on the throne. In Nikolsburg the key figure was Karl Maximilian, the 6th Reigning Prince of Dietrichstein-Proskau zu Nikolsburg; in Feldsberg his equivalent was Joseph Wenzel, the 7th Reigning Prince of Liechtenstein.10 No doubt Joseph Wenzel was the most brilliant figure in the long history of this family and the quintessence of a prince in the late baroque period. In a letter to one of her sons, the Archduke Ferdinand, Maria Theresa was to call Joseph Wenzel, who had died just three days before ‘my good old friend’, continuing ‘he is one of those figures which you do not find anymore’. And in her letter of condolences to his successor, Franz Joseph I, the 8th Reigning Prince of Liechtenstein, she mentions that Joseph Wenzel had ‘fulfilled with great honour various military and political honours’. This indeed is no exaggeration: in 1735 he had been sent as imperial envoy to Berlin, where he befriended the crown prince Friedrich, later Friedrich IV Margrave of Brandenburg and Friedrich II (Fredrick II) King in Prussia (later of Prussia). From 1738 to 1741 Joseph Wenzel was imperial ambassador in Paris, where he held an entrée publique in grand style, which had to be repeated in Versailles on the explicit wish of Louis XV, King of France.11 However,
when Emperor Charles VI died, Joseph Wenzel was unable to maintain peace between the Bourbons and the Habsburgs and was obliged to return to Vienna. His next position was that of governor general of Lombardy, then commander-in-chief of the imperial army in Italy, winning the battle of Piacenza, followed by commander-in-chief for Hungary. More relevant for the imperial couple, however, was his engagement for the modernization of the imperial artillery, since Maria Theresa was waging a series of wars against Frederick II. In theory this was a feud between the Queen of Bohemia and the Margrave of Brandenburg, but since the two competitors also possessed other crowns and titles and had formed a network of coalitions with other powers, this effectively turned into a global conflict. In 1763 it ended in the peace of Hubertusburg, which for Maria Theresa meant the loss of the greater part of Silesia, but at the same time the consolidation of her political power in Central Europe and the beginning of a period of peace. This was praised by Mathias Claudius in his famous poem, beginning with the verses ‘She made peace! That is my song. She was her people’s happiness and her people’s blessing.’

Joseph Wenzel’s earlier advance financing of artillery production had resulted in a significantly improved situation for the Habsburg forces on the battlefield, which brought him a most unconventional honour: a monument including a bust in bronze by Balthasar Ferdinand Moll, placed in the Imperial Arsenal in Vienna in 1758, when Joseph Wenzel was sixty-two years old. Today this fine fire-gilt statue is exhibited in the Österrchisches Barockmuseum in Vienna. In his later years Joseph Wenzel was chosen to accompany Isabella Princess of Parma, the bride of Archduke Joseph, from Parma to Vienna, and to act as imperial ambassador at Frankfurt, when this very Archduke was to be elected and crowned Emperor of the Holy Roman Empire, subsequently called Joseph II. At the same time Joseph Wenzel was an important Maecenas, connoisseur, bibliophile and collector of art, who was the first to have a catalogue of all his paintings and sculptures printed (see Chapter 3). He seems to have possessed an early *gusto antico*, since he acquired from his friend Eugene Prince of Savoy a most spectacular statue – the ‘Praying Boy’, a bronze from Greek antiquity originally found on the island of Rhodes. Later Joseph Wenzel sold this trophy to Frederick II, who had it placed on the terrace of Sanssouci, his newly built summer residence in Potsdam. Later copied *ad nauseam*, this iconic object was transferred first by Napoleon to Paris and later came back to Berlin, where it is a key piece in the famous Antikensammlung in the Altes Museum today.

**THE BAUER FAMILY**

The baby baptized on 29 December 1750 in Feldsberg and almost certainly born in Joseph Wenzel’s residential town, was Maria Anna Dorothea Bauer, the first child and only daughter of Lucas Bauer, aged forty-two, and Therese Bauer, née Hirsch, aged twenty. We know very little about this couple: Lucas Bauer (spelt Baur in the birth register) had been born on 17 January 1708 in Ehrenbreitstein on the Rhine, then the permanent residence of the Archbishop of Trier and Prince Elector of the Holy Roman Empire. Lucas Bauer had become associated with Joseph Wenzel as his court painter in 1744 at the latest. Therese had been born in Feldsberg on 12 October 1730. Nothing is known of when and where the couple got married, but Joseph Wenzel must have agreed to it, as that was the standard requirement in those feudal times. Subsequently Lucas rose to ‘inspector’ (curator) of the princely gallery in Vienna, but not even a signature or a portrait of him or his wife has been traced. Although it has been stated in writing, it is most unlikely that Lucas was later promoted to director of the Princely Gallery, since the position was then held by Gaetano Fanti, previously court painter of Eugene Prince of Savoy, and after Gaetano’s death in 1759 by his son Vincenzo (see Chapter 4). For certain, the job of an inspector of that gallery was not purely administrative, but involved artistic work on the interior decoration of the many properties of the Liechtenstein family, including maintenance. It seems safe to assume that Lucas knew the palaces of the family in Vienna, Feldsberg, and elsewhere, but nothing seems to be on record about his work.

We are somewhat better informed about Lucas’s altar pieces, probably all in oil – painted for example in 1753 for the chapel in the castle in Eisenberg (Ruda), in 1755 for the church in Hilbethen (Hilvany), in 1756 for the church in Lundenburg, and around 1757 in Hof (Dvorce u Bruntálu), all situated on the estates of Joseph Wenzel. A hand-written inventory of the paintings then kept in the castle of Feldsberg entitled ‘Lucas Bauerische Hofmahlerey’ (Court painting of Lucas Bauer) lists
several of his works, among them for example ‘no. 10 flower piece, no. 11 wild goose . . . no. 60 deer, shot at Lundenburg by his serene highness, no. 149 small flower pot’; of these nothing seems to have survived. It is likely that Lucas led the peripatetic life of a court painter, required of him by the variety of jobs at the properties of his employer, with Feldsberg as his permanent home. In our context three points are relevant. Although employed by Joseph Wenzel, Lucas Bauer did not belong to the inner circle of the princely household, but to its periphery – the upper stratum of the servants, ranging below people such as the chaplain, the chamberlain or the private secretary of the reigning prince. Among other duties Lucas was commissioned to document objects in a life-like way, much as a photographer would do today. It seems very likely that he knew the art works kept in the various residences of his employer, in Vienna, Feldsberg, and elsewhere. In the neatly stratified society of the late baroque period, Lucas Bauer was a simple employee who could be dismissed at any time by the reigning prince, his employer.

Maria Anna Dorothea did not remain an only child. At a time before any kind of birth control was available, six brothers were born in quick succession, almost certainly in Feldsberg. All were baptized in the sumptuous parish church of the small town – Antonius Lucas on 16 April 1753, Joannes Lucas on 27 June 1754, Joseph Antonius on 5 March 1756, Franciscus Andreas on 14 March 1758, Ferdinandi Lucas on 20 January 1760 and Carolus on 10 March 1762. The birth register does not list the domicile of the Bauer family, but local history records give Hauptplatz (main square) 7. In conversation with Henriette Charlotte Countess von Itzenplitz, Franz mentioned many years later that he had been born in Feldsberg castle, which is a possibility, since his father may have had the privilege to live in rooms there. Among the godparents we find the names of employees of the Liechtenstein family. The church of the Assumption of the Virgin Mary, where the Bauer children were baptized, was at the time adorned with a huge painting of the Assumption by Peter Paul Rubens, now one of the more famous pictures of the Fürstliche Sammlungen in Vienna. Thus a work of art by a famous painter hung above the font that witnessed the baptism of three boys who were to continue on their father’s line, with two of them destined for fame.

Infant mortality was high – Anton Lucas died on his seventh day and Carolus on his eighth – but these were the harsh realities of life at that time and were not atypical events. By contrast, the death of their father Lucas in Feldsberg on 28 June 1762, aged fifty-four, just three months after the birth and death of his youngest son, must have come as a shock for the family, in particular for Therese. At that moment her surviving children were still very young – eleven, eight, six, four and two years old – so their future looked grim. Therese, who was probably illiterate because at that time no school is known to have existed in the small town, did not remarry, but concentrated on the education of her five children and was lucky to lose only one of them later in her life. Most importantly for our story, she engaged her children in copying the works of their father, thus sowing seed on an extremely fertile ground in the case of three of her sons. Years later Joseph was to follow his father as court painter in the service of the Liechtensteins, eventually becoming director of the Princely Gallery in Vienna, while the younger two became natural history illustrators of outstanding reputation. For good reason the Bauer brothers have therefore long been seen as an impressive example of the inheritance of remarkable abilities, just like in the family of composer Johann Sebastian Bach.

One has to assume that the Bauer children grew up speaking German, and the few letters sent many decades later by Ferdinand to his brothers Franz and Joseph from his voyage with Flinders and Brown to Australia were written in this language, just like the early letters sent by Franz to Vienna. Considering the fact that Feldsberg lies on the fringe of the German-speaking area, it is almost certain that they heard some Czech; when Joseph died in 1831, his belongings included a Czech dictionary. Since the nearby village of Oberschleinitz had a considerable Croatian population, the Bauer children may also have come into contact with that language. In addition, they must have got to know members of the substantial Jewish communities living in the nearby town of Nikolsburg and the villages of Lundenburg and Eisingruber.

Like everyone else in Feldsberg, the Bauer family was Catholic and probably pious. Maria Anna Dorothea joined the convent of the Sisters of St Elizabeth (Ordo Sorores Hospitalariae Sanctae Elisabethae or OSE) in Vienna, where she died aged eighteen. This may be interpreted as an act of piety, since this order is devoted to the care of the female sick and needy and focused, like the Brothers of Mercy, on running hospitals. Ferdinand’s testament contains expressions of deep religious feelings.
and a letter describing the last days of Franz in Kew near London includes the following statement 'He [Franz] complains rather of his prolonged existence in such a miserable state, but said it was the Will of God – he had lived in His fear all his life, and His name be Blessed and praised' (see Chapter 16).

Franz kept very positive memories of his mother. In an anonymous obituary published in The Athenaeum, the clearly very well informed author (see Chapter 20), writes of Therese as an 'excellent mother', who had initiated Franz and his brothers in the 'ready use of the pencil'. This is corroborated by Franz, who recorded in her letter cited above his only toys, 'old brushes and alpine plants'. An obituary for Ferdinand (see Chapter 20), which integrated information passed on to its author by Franz, is even more detailed: 'in his earliest youth . . . [he] copied plants and birds from the designs of his late parent', the superlative being most notable.

It is easy to imagine what lasting effect the mother's stimulus to copy the drawings and paintings prepared by their recently deceased father aroused in the boys. What kind of works were these? Fortunately the inventory mentioned above gives us some clues, but more relevant is the small art collection in the possession of Therese. When she died in Feldsberg of a stroke on 19 October 1790, aged sixty, her belongings were auctioned – among them were no less than 53 pictures ranging from flower pieces, landscapes to portraits, comprising even two fruit pieces and 'a bird piece, unframed'. This seems to have been the type of material copied and studied by the Bauer brothers in their early youth. In addition, it is likely that they had seen the brilliant over-doors and still lifes in Feldsberg castle, which may well be called an exquisite art gallery. An early source reports, 'An innate talent for painting, apparent in all four brothers [Johann, Joseph, Franz, Ferdinand] from a very early age and in a splendid way, led them all in the same direction, and in the case of Ferdinand and Franz developed into genius'.

It is noteworthy that both younger sons devoted their whole life to the same kind of plant and animal subjects that their father had prepared for Joseph Wenzel. Only Johann is known not to have followed the artistic path.

The five children must have grown up in a rural world shaped by the alternation of the seasons – in particular the varying works in the fields, meadows and the extensive vineyards surrounding the small town, with the vintage being the peak season of the year, exactly as it is today in Feldsberg. At an early date they must have become familiar with the logging in the forests, the sowing of wheat, and fishing dry of the carp ponds. They will have watched the changing of the princely guards wearing uniforms in the blue-red colours of the family, identical to those of the Principality of Liechtenstein's flag today. They will have attended religious manifestations like the procession on Corpus Christi Day and the training of the horses, which formed part of the traditional representation of the Liechtenstein family in Feldsberg until 1793. The Bauer children must have also come in contact with the realities of the feudal system, which meant on the one hand an elevated and privileged status for the princely family, including their courtiers. On the other hand there was socage (unpaid labour) for the common people, wherever and whenever this was felt necessary by their superiors – hard work in the forests, in the fields, in the vineyards.

The members of the reigning family, including Aloys Joseph, the heir presumptive, and his younger brothers Johann Joseph and Philipp, of which the Bauer children may have heard, led a totally different life: there was the arrival in late spring in Feldsberg; the leisure time spent in their exquisite stately homes and luxurious gardens during summer; the hunting season, when the inner circle of the high aristocracy from the Hereditary Lands, including the Kingdom of Hungary, spent several weeks in and around Feldsberg as guests of Joseph Wenzel and later of Franz Joseph I; and the return to their city residence in Vienna, a lifestyle that the Liechtensteins shared with the Dietrichsteins. Both families were regularly accompanied by members of the respective princely courts, including footmen, gentleman's valets, lady's maids, and the princes' tutor. From 1773 to 1783/1784 this well-paid position was held in the case of the Liechtensteins by Angelo Soliman, a multilingual African born in what is now Nigeria, sold as a slave in Messina, who later became a respected figure at the imperial court in Vienna. The Bauer children may have seen him in Feldsberg, but they hardly entered into personal contact. Though similar in several respects, the Liechtenstein and Dietrichstein families differed in one aspect: the former was to employ the elder two Bauer boys for life, while the latter engaged Franz for six years only.

More relevant in our context, the five children must have become familiar with the extremely diverse plant and animal life of the region, ranging from the wetlands
For the rest of his life he was to wear the black habit of the fraternity with scapular and hood, held together by a thin leather belt. And Norbert was to obey the rules of the order and to attend to the sick and needy in the hospital forming part of the respective convent.

Very little is known about his subsequent medical training, but it is recorded that Norbert studied the works of the famous Herman Boerhaave, professor at Leiden University, and of his equally famous pupil Gerard van Swieten. In 1745 the latter had been appointed by Maria Theresa, then pregnant for the seventh time, as her Protomedicus, or Principal Head Physician, overseeing all the physicians-in-ordinary and pharmacists at the imperial court in Vienna. At the same time Swieten had also been made prefect of the Imperial Library under very favourable conditions and was soon to become the great reformer of the faculty of medicine at Vienna University. Swieten, a courtier in a key position and at the same time a highly influential personal advisor of Maria Theresa, who in 1758 created him Freiherr (Baron), acted as Norbert’s medical examiner in Vienna, but we do not know the date of the exam. In the archival documents kept in the Konvent der Barmherzigen Brüder in Vienna, Boccius is listed as examined surgeon as well as ‘D. tor Medic.’ (Doctor of medicine). However, this title is not substantiated by the record conserved in the archives of Vienna University, and he may have actually received his degree from Prague University.

After six years as Prior of the convent in Görz, Boccius was transferred to the mother convent of the province in 1763. This was the year when a disastrous fire had destroyed no less than a third of the houses in the small town of Feldsberg. Aged thirty-two, he started to teach human anatomy and natural history in the nursing school and soon dominated education in Feldsberg more or less directly and indirectly all through the second part of the 18th century. Norbert has been described as a very pious brother, regularly praying the rosary, but at the same time an indefatigable man prepared to help the sick at any time of the day or night and a remarkably successful surgeon. Among his patients were the poor of the Feldsberg region, mainly peasants and artisans, but also Joseph Wenzel, who died in 1772 in Vienna, Franz Joseph I and other members of the princely family, probably including the latter’s elder, sickly son Aloys (also Alois or Lois), who succeeded his father in 1781 aged twenty-one; later Boccius was to receive an annuity from Franz Joseph I for his medical services.
It was almost unavoidable that Boccius rose in the hierarchy of his order: in 1766, three years after his arrival in Feldsberg, he was elected the 29th Prior of the convent. After three years in this position and three more years in another function, Norbert was elected 31st Prior in 1772, which a second time meant the responsibility for about forty hospital beds, the pharmacy, the medicinal gardens and all the economic affairs of the convent. Subsequently he was several times confirmed by election in this position.

More importantly, in 1784 Boccius was elected Father Provincial of the province 'Zum Hl. Karl Borromaeus'. The most northern convent of Norbert's province was located in Kukus (Kuks), the most eastern in Lviv, now Ukraine, the most western in Görz, and the most southern in Trieste. As head of a considerable number of hospitals and pharmacies, including medicinal gardens scattered all over Central Europe, for thirteen years (until 1797) he was an important figure in the medical establishment of the period. Six years before the end of his time in office no less than 369 Brothers of Mercy had been counted in the province.

Yet, in our context other aspects of Boccius' life are more relevant. Even before his arrival in Feldsberg he had acquired considerable botanical knowledge and started to collect plants. He had them pressed, dried and glued into three massive large-sized volumes inscribed 'Herbarium vivum,' which are kept today in the library of the Konvent Milosrdných bratří in Brno. The flat specimens, which had lost their three-dimensional structure, were fixed with curved paper strips reminiscent of scrolls in baroque engravings on paper and had the scientific name of the plant, determined by Boccius, indicated.

Preparing such herbaria had an extremely long tradition among physicians and pharmacists, going back to the Renaissance period. Their relevance for the pharmacist is aptly described by Jacquin, the second professor of chemistry and botany at Vienna University and director of the botanical garden in that city (see Chapter 3). Jacquin noted in 1792: 'The physician prescribes the plant, the pharmacist gives it, [but] the latter usually buys it from the herb-dealer and rhizotomist... The pharmacist will not transfer his rights to the herb-dealer, but will wish to know the plants on his own comprehension in order to be able to judge with certainty the authenticity of the plants brought to him by the herb-dealer, or favourable circumstances permitting he [the pharmacist] will grow them on his own [in his garden] or go and collect them.'

Though devoid of collecting localities, Boccius's herbarium acted as a permanent record of the plants he had encountered before 1766, first in Görz and later in Feldsberg. It was a snapshot of the natural vegetation enriched by several not yet fully established crop plants, such as sunflower, Helianthus annuus, pineapple, Ananas comosus, castor-oil plant, Ricinus communis, and ornamentals including African marigold, Tagetes erecta, and Cupid's dart, Catananche caerulea. Even a few pressed animals, such as butterflies and dragonflies, are included in the three tomes.

However, in several cases the plants are not herbarium specimens in the modern sense, often having been manipulated in certain ways. Thus Boccius removed pressed and dried leaves and glued these back in different positions on the stem, and shortened internodes and petioles. Most noteworthy is the treatment of the sunflower: the very large flowerhead was found unsuitable for inclusion in the book-herbarium and not only were the stem leaves removed, their petioles shortened and attached to an unsuitably thin stem, but the flower head was replaced by a brown, round cardboard disc with the radial florets and the apical parts of the involucral bracts stuck around the margin. Clearly Boccius wished to give a convincing representation of this species on a single page of his book-herbarium, which may indicate that he intended to use this 'specimen' in his botanical teaching in Feldsberg. In a similar way he constructed a 'specimen' of pineapple by slicing and drying pieces of the infructescence and gluing them together with the apical rosette leaves on a page of his 'Herbarium vivum'.

The portrait of Boccius kept in the Konvent der Barmherzigen Brüder in Vienna, a canvas in oil, offers further evidence for his botanical interests: he is shown holding a book labelled on the spine 'Genera plantar[um] Lin[n]æi,' one of the more important publications of the Swedish naturalist Linnaeus, with a flowering specimen of a Cyclamen painted above his hand. There are indications that Boccius was also able to record plants as botanical illustrations. His portrait in the Fürstliche Sammlungen has in its lower part an agglomeration of different objects probably intended to illustrate his personality and activities, among them a painter's palette with a number of brushes sticking out of the hole, and a large piece of paper. On the same line is a fern illustration, admittedly of rather inferior quality, forming part of the Codex Liechtenstein (see below) and...
signed ‘APN’, almost certainly standing for Admodus Poccius Norbert (the honourable Norbert Boccius).

In addition to his commitment to the convent’s pharmacy and medicinal garden, about which we know almost nothing apart from its substantial extension, Boccius was also a field botanist, who managed to find the tartar bread plant, a rare crucifer then new to science, in the vineyards near the modern village of Hustan (Kurdějov) near Auspitz (Hustopeče) in Moravia. He sent specimens to Vienna, where the plant got the name *Crabbe tataria*, published in a thesis in 1779 submitted to Vienna University by Alexander Sebeók de Szent-Miklós, which resulted in Boccius being called much later an ‘indefatigable discoverer of Moravian plants.’ The text must have passed through the hands of Jacquin, who had obtained his combined chair at Vienna University thanks to Swieten, whose son had been his school mate at the gymnasium in Antwerp (see Chapter 3).

There is also evidence for Norbert’s interests in horticulture (for example a bill for ‘11 workers to dig the big garden’ or the statement that he ‘grew medicinal herbs for use in the hospital and for teaching’) and in botany (for example a bill for binding the works of Linnaeus). In addition Boccius is reported to have grown the ‘noblest exotic fruit’ in his orchard in Feldsberg, and to have dug the ground ‘in the company of orphaned children’.

In the small world of this tiny town the half-orphaned Bauer children, maybe encouraged by their mother, came into contact with Boccius, but we have no knowledge of how this happened. It seems to have been at an early moment, as a chronicle of the Brothers of Mercy states that Boccius educated the three brothers when they were still children. In any case the meeting was decisive for Joseph, Franz and Ferdinand, since Boccius was able to focus their early inclination to drawing on the documentation of plant and animal life and may have taught them also the art of writing. Clearly he became their tutor and mentor, the first in the line of several more medical men who were later to collaborate with Ferdinand and Franz – although only one of them, Sir Everard Home, a Vice President of the Royal Society, actually practised (see Chapter 15). We may hypothesize that the Bauer boys were influenced by the young surgeon also in other respects: at a very early date they came into contact with the realities of suffering, pain and death, easily experienced in every hospital, and they seem to have remained pious (see above). Many years later Franz would be asked by Home to record in very precise drawings pus, seminal fluid, blood coagulation and a bone tumour of the skull (see Chapter 15). In any case the Bauer boys will have experienced early what it means to work round the clock, in an atmosphere of Christian belief, humility and in caring for the sick. Later Ferdinand was to be described as indefatigable by Banks and Flinders, a character trait also observable in the long-serving prior of the convent in Feldsberg.

Boccius seems to have been a knowledgeable, well-read person, although we neither possess his reading list nor the catalogue of the library of his convent in Feldsberg. Judging from the manuscript catalogue of the Konvent der Barmherzigen Brüder in Vienna for that time, which lists no less than 700 medical books – among them works by Boerhaave, Anton de Haen, Marcello Malpighi and Swieten – Boccius must have had access to the standard medical and pharmaceutical literature of the time. The anonymous eulogy delivered in 1799 states that Norbert knew Jacquin (see Chapter 3), as well as Joseph Gottfried Mikan, the first director of the botanic garden and first professor of chemistry and botany at Prague University (see Chapter 7).

Obviously Boccius intended to create a painted complement to his herbarium – a florilegium consisting of plant illustrations very true to nature and painted in watercolour, similar to two illuminated manuscripts he may have seen in Vienna. The first of these was the *Receuil des plantes* (Selection of plants), formerly in the library of Eugene Prince of Savoy, and therefore also called the Florilegium of Prince Eugene of Savoy, who had been a friend of Joseph Wenzel’s. Later this collection, bound in ten volumes, was acquired by Emperor Charles VI for the Imperial Library, under the care of Swieten since 1745. Through this chain of contacts Boccius may have seen this spectacular collection of most exquisite plant illustrations prepared by the inner circle of botanical painters at the Jardin du Roi in Paris, documenting the plants then cultivated in this famous botanical garden. In a sense they formed a shoot of this most famous florilegium ever prepared – in Vienna. These illustrations were painted in gouache on a particular fine parchment, the individual plant illustrations framed in gold and annotated in gold and red lead, and the volumes provided with indexes. The second florilegium that Boccius probably knew was the *Phytanthologia eikonike* (Illustrated anthology), commissioned by Johann Jakob Well, the owner of a pharmacy in the centre of Vienna and professor of natural history at Vienna University. Painted in watercolour on paper, the individual plant...
illustrations unframed and annotated in black ink, and the volumes provided with indexes, this florilegium was started in 1768, whereas the luxurious florilegium of Prince Eugene had been prepared in the late-seventeenth century. Judging from the information on the painted title pages, the production of the *Phytanthologia eikonike* continued until 1780 and comprised a total of eight volumes, probably kept in Well's pharmacy. They first passed to the monastery of the Order of the Visitation of Holy Mary (Ordo Visitatio Mariae, or OVM) in Vienna and in 1938 to the Nationalbibliothek (now Österreichische Nationalbibliothek), also in that city.

Several aspects of the *Phytanthologia eikonike* are of special interest in our context since they were emulated in the florilegium prepared by Boccius: the plant illustrations are in part based on specimens, in part on printed illustrations, in the latter case often simplified and taken from the works of Well's colleague Jacquin. The eight title pages combine text and image, often a view or a landscape. As will become evident later, Boccius largely followed the earlier example set by the *Phytanthologia eikonike*, but he also took up one element from the *Receuil des plantes* – the frame surrounding each and every one of the plant illustrations of his florilegium. As a member of a mendicant order with a black habit he probably preferred a double frame, both frames in black ink, over the double frame, with one frame covered in gold leaf, appropriate to the kings of France. Another, more important, difference between the two works is that the number of copies of printed plant illustrations is significantly higher in the *Phytanthologia eikonike*, which makes the florilegium commissioned by Boccius so much more relevant to science. In addition, the quality of illustrations in Boccius' florilegium is distinctly superior and approaches that of the *Receuil des plantes*.

It seems helpful to pause for a moment to reflect about the reasons for Well and Boccius to have a florilegium prepared and to consider the advantages and disadvantages of a florilegium compared with those of a herbarium. A florilegium consists of plant images (that is, artefacts very true to nature), prepared by a botanical illustrator instructed by a botanist, whereas a herbarium consists of specimens (that is, plants or parts of plants, collected solely by the botanist). Specimens are always part of nature and are consistently and persistently preferred by scientists. However, specimens – in particular dried botanical ones – are much more vulnerable to the attacks of insects than illustrations on paper, and hardly any protective measures against herbarium beetles were available at the time. This is best evidenced by the deplorable state of preservation of Boccius' *Herbarium vivum*, partly destroyed by insects, in Brno. Botanical specimens are easily ruined, and being brittle they need much more care when it comes to using them in demonstrations, for example when giving botanical lessons, which is exactly what Well and Boccius did. Furthermore, herbarium specimens quickly lose their colours and become totally unattractive for the non-specialist, whereas botanical illustrations keep their colours, at least as long as they are kept dry. Most important, however, is another factor: often a herbarium specimen can be only a tiny fragment of a plant – for example a leaf, a single flower of an inflorescence or a piece of a fruit – whereas the botanical artist is always able to prepare an image of the complete plant, as well as any part of it if necessary. However, the preparation of a herbarium specimen is much cheaper, easier and quicker than the preparation of a plant illustration true to nature prepared by a botanical illustrator.

Such florilegia are always the result of a close collaboration between a botanist and a botanical illustrator, with the botanist choosing the specimen to be recorded and the illustrator documenting it in such a way that it is very true to nature. It is up to the botanist to direct the work, to give instructions on which characters to focus upon, to control the end product and have it corrected. In short, the botanical artist is totally subservient to the authority of the naturalist and enjoys zero freedom in his work. The botanical draughtsman acts, so to speak, as the botanist's hand, hired to produce the images that the botanist desires. In a sense the naturalist serves as the draughtsman's eye, selects the object to be depicted, and takes full responsibility for the latter's productions, before they pass into his possession. For the botanist the desired images are almost scientific objects, not artistic creations, and in his view the botanical illustrator must strictly avoid any painterly style, which is the botanist's constant concern. As a rule naturalists even considered themselves to be the true authors of these images, with the illustrators as necessary, but subordinate, amanuenses. Consequently the name of the botanical illustrator is largely irrelevant for the botanist and sometimes ignored or suppressed, as this was done by Jacquin (see Chapter 3). In agreement with this general line the botanical illustrator almost never added the scientific name of the plant portrayed, which belonged to the realm of the botanist. He also...
rarely noted the date, which makes the establishment of precise chronology in botanical illustration so very difficult: indeed, out of 2748 sheets of the florilegium prepared for Boccius only a single one is dated.

For every botanical illustrator utmost precision combined with acute capacities in observing and comparing as well as concentration are key qualifications (see Chapter 1), in particular when it comes to recording easily confusable medicinal plants. In addition, a docile attitude towards the commissioning and controlling botanist, not particularly widespread among artists, is useful.

For a single image the production process took on average several days and involved multiple expert observations and decisions, sometimes including discussions and clarifications with the botanist who had commissioned the work. As a consequence, the painted record of a single specimen, let alone of all the plants in a garden or conservatory, was exceedingly expensive and could be considered only by the fortunate few.

Boccius may have wished to possess a collection of botanical illustrations similar to those in the hands of Swieten and Well, prepared with the help of the Bauer brothers, whom he was to employ, train and supervise. Nothing is on record about his motivation: Was his florilegium to be used in his pharmaceutical teaching, to which nothing seems to have been added after 1766? Was it meant as a standard of reference for the incoming herbs acquired by the convent’s pharmacy? Or was it simply a labour of love for Boccius? We simply do not know. Maybe this project of long duration served all these ends.

It has been rightly said that the botanist’s ‘way of seeing involved a constant triangulation among image, text and specimen, using books to interpret what they saw in the field’ and that they ‘used images as working tools, to record or work out what exactly they were recording.’ Indeed this may also have applied to Boccius, since botany in its traditional sense ‘was fundamentally a visual discipline, based on the observation and representation of specimens that sometimes were “out there” in the field, other times “in here” in collections [in a herbarium or a botanical garden], and yet other times in the hybrid domesticated space of illustrations, in which . . . the field and the collection were collapsed into a single paper nature that was always and perfectly available.’

At any rate, Boccius’s Herbarium vivum got a painted successor, entitled by him *Liber regni vegetabilis retinens plantas ad vivum pictas* (Book of the plant kingdom containing plants painted from life), effectively a collection of painted plant illustrations bound in fourteen large volumes. It formed at the same time a visual archive and a painted encyclopaedia, with a few landscapes, views and painted title pages as well as indexes attached. Since the first twelve volumes were given in 1799 by Boccius to Aloys I Joseph, on the latter’s explicit wish in exchange for a donation to the convent, the thirteenth as a gift to the same recipient and the fourteenth as a gift to his successor Johann I Joseph, this work has become better known as the *Codex Liechtenstein*. This donation – ‘out of Our love for the sick and poor’ as worded in the foundation charter – consisted of five percent interest per annum on a sum of four thousand florins, which remained with the Liechtenstein family in order to finance two beds in the hospital of the convent in Feldsburg permanently.

First kept in the famous library built for Aloys I Joseph in his city residence in Vienna’s elegant Herrengasse, a spectacular neoclassical hall fifty-six metres long divided into three aisles by two rows of Ionic columns, it was moved a century later to the summer palace of the family in the Rossau quarter of Vienna (see Chapter 3). All fourteen volumes are now permanently stored in the Fürstliche Sammlungen in Vaduz (see Chapter 19).

The close relationship between the *Phythanthologia eikonike* and the *Codex Liechtenstein* may best be exemplified by the illustration of the tartar bread plant, which is included in both works: in the first an illustration based on a copper engraving published in Jacquin’s *Icones plantarum rariorum* (Illustrations of rare plants; see Chapter 3); in the second an illustration based on a totally different living specimen. This indicates one of the ties between Well, Boccius and Jacquin, but there are also others: Well, Jacquin and Stoerck (see below) were co-authors of the *Pharmacopoea Austriaca* (Austrian pharmacopoeia). At the time this was the reference work for pharmaceutical drug specifications prepared by the authority of the government in Vienna, required reading for every pharmacist in the Hereditary Lands, a book which Boccius must have seen and consulted in the library of the Feldsburg convent.

Clearly Boccius was the initiator and mastermind of the *Liber regni vegetabilis* project, which – judging from the information on the painted title pages – was started in 1776 at the latest, but probably earlier, sometime after 1770. It ended in 1805, a year before the death of its founder. In a sense it was a mammoth undertaking,
resulting in 2748 sheets of plant illustrations in a format of 
35 × 30 cm, with a considerable proportion showing more 
than one plant species per sheet. Boccius, the botanist, 
must have planned the complete production: he would 
have been the one to select the plants to be illustrated, 
determine the identity of the plants and lay down their 
names, decide the sequence of the watercolours painted 
on single-folded sheets when it came to binding the 
volumes, and also make the necessary arrangements for 
the indexes. Right from the beginning this was an open-
ended project aiming at a pictorial documentation of 
plant diversity, or to be more precise, of what was known 
of plant diversity in the late-eighteenth century in Central 
Europe. We know nothing about the finances of the great 
project; not a single receipt seems to have survived, from 
the Bauer brothers nor their successors; similarly, no bills 
exist from the scribes who were to produce the registers, 
or from any book binders. Boccius may have used his 
annuity from Franz Joseph I to finance this great work, 
but he also may have used funds from the convent for 
his project. The half-orphaned Bauer brothers may have 
been paid by Boccius or may just have received a daily 
warm meal from the convent's kitchen. 

Unfortunately, we do not possess detailed 
information on the precise share of the Bauer brothers 
in the production of the Codex Liechtenstein either; on 
stylistic grounds the first six volumes can be ascribed 
to them in their integrity, just like the bulk of the plant 
illustrations in volumes seven to nine; by contrast the 
volumes ten to thirteen comprise very few watercolours 
by their hand. Taking into consideration their very 
early training to become botanical artists (see above), 
they may have started working for Boccius at the age 
of about fourteen: Joseph may have began working for 
the florilegium in 1771 and must have finished in early 
1781; Franz may have joined his brother in 1773 and 
continued until early in 1788; whereas Ferdinand may 
have started to illustrate plants for Boccius in 1775 and 
broken off early in 1786. Of course all this is highly 
conjectural. In particular, the role of the eldest brother 
(see below) is unclear, and so is the extent of the later 
commissions from Jacquin (see Chapter 3) and those 
from Marie Christine Princess Dietrichstein-Proskau 
(see below). However, this rough estimate demonstrates 
the enormous time budget, effectively about thirty-five 
years of work, which went into the project. 

On the basis of this hypothetical calculation we may 
presume that each brother had to produce about fifty 
bodycolours per year, a heavy burden of work requiring 
concentration, reliability and continuity. In addition, all 
the work described in the following paragraphs seems to 
have been achieved without any assistants.

AN EARLY MASTERPIECE

Nothing is known about the sequence of events 
in Feldsberg leading to the florilegium, but in an 
anonymous obituary of Franz (see Chapter 20) the 
clearly well-informed author reports that an early 
botanical illustration by Franz was published in 1771 as

![Image of plant illustration]

FIG. 2.2. *Pulsatilla pratensis* subsp. *nigricans*. Copper 
engraving based on Franz Bauer. – A. Stoerck, 
Libellus de uso medico Pulsatillae nigricantis, 
Vindobonae, 1771. – London, British Library.
a copper engraving (Fig. 2.2.) in a pharmaceutical text. Its author was Anton Freiherr von Stoerck, professor at the medical faculty of Vienna University, one of the physicians-in-ordinary at the court in Vienna, later Swieten's successor as Protomedicus of the imperial family and third co-author of the Pharmacopoea Austriaca. Stoerck, today regarded as one of the fathers of experimental pharmacology, was well connected: he had accompanied Archduke Joseph to the election and coronation in Frankfurt staged by Joseph Wenzel and had been elected Rektor (Vice Chancellor) of Vienna University. The engraving showed a flowering specimen of a plant Franz must have known well: Pulsatilla pratensis subsp. nigricans, a relative of the pasque flower, common in early spring on the calcareous slopes of the Pollau Mountains near Nikolsburg. The specimen is shown with its characteristic flower nodding already at anthesis and the deep-reaching rootstock, which means that it must have been dug up and put into water so that the fine roots would become visible.

This is a masterpiece of critical observation, representing a plant true to nature: complete, matter-of-fact, without any embellishment or ‘improvement’ by the hand of the botanical illustrator, stretched out like a specimen before being pressed between sheets of paper to become a herbarium specimen. At the same time this representation of a decontextualized and isolated specimen placed on the white background of the page is typical for botanical illustration, devoid of any explanatory information on its provenance and time of collection. Unfortunately, the drawing prepared by Franz that formed the basis of this copper engraving could not be traced and seems to have been lost, which is often the case when a botanical illustration is passed to a graphical artist.

Having a production published at the age of 13 is remarkable, but not a record. In early 1764 Mozart, being eight years old, had his Sonates pour clavencin (K. 6, 7) printed in Paris. However, it was clearly the ambitious father who had made the necessary arrangements for his son, whereas Franz had already lost his father nine years before publication. We may hypothesize that Franz had accompanied Boccius on his botanical collecting tours in the surroundings of Feldsberg, and that Boccius later passed the drawing prepared by his protégé directly or indirectly on to Stoerck.

The second proof of work done by the Bauer brothers for Boccius has nothing to do with botany. It is a large-format drawing showing the rehabilitation house of St Theresa of the Brothers of Mercy in Vienna, annotated ‘Joseph Bauer fecit 1773’: a pen-and-ink drawing on card with monochrome wash, with a graphite pencil outline visible in many places. It was found by the present author in 1993 in the deserted building of the convent in Feldsberg in a store room among broken glass and frames. Prepared in bird’s-eye view when Joseph was seventeen years old, it is likely that this drawing is a copy of an older image. Among the Brothers of Mercy, as in other spiritual orders, there is a tradition of having such views of the brother convents or monasteries exhibited in their corridors. Two similar bird’s-eye views, both then conserved in the convent in Feldsberg and showing (1) the convent of the Brothers of Mercy in Letowitz (Letovice) in Moravia and (2) the Imperial Royal Military House for the Disabled in Pest (Budapest) in Hungary, are signed ’Franc Bauer 1775’ and ’Franc Bauer fecit A. 1775’, respectively, the latter being of particular interest. The border of the inscription is crowned by a double-headed eagle, the old imperial symbol, and military motifs, among them cannons, drums, flags and bayonets. The latter are almost certainly taken in great detail from an anonymous copper engraving, a copy of which is kept in the Fürstliche Sammlungen. It documents the monument erected in 1758 on orders from Maria Theresa in recognition of the outstanding services of Joseph Wenzel for the imperial armed forces. Clearly Franz (then aged seventeen), Boccius, or both, were well informed and must have had access to the copper engraving, the monument itself or the medal produced on the occasion of Joseph Wenzel’s death showing this very scene. Boccius, Franz, or both of them may well have been to Pest in order to visit this military hospital, or alternatively Franz may have copied the view from a pre-existing drawing.

Twenty more large-format bird’s-eye views of convents and rehabilitation houses, without a single exception all from the order’s provinces ‘Zum Hl. Karl Borromaeus’ and ‘Zum Hl. Erzengel Michael’, all undated and unsigned, and found in the Feldsberg convent by the present author in 1993, are so very similar in style that they have been attributed to the Bauer brothers. Typical for them, there is outstanding attention to detail – the buildings with their towers and clocks as well as their gardens with beds, hedges, fences and fountains are depicted, as are the associated...
convent cemeteries. The Bauer brothers may well have seen some of these convents with their own eyes, maybe when accompanying their mentor on his inspecting tours within the order’s province, though hardly all of them – this would have meant extensive travels within the Hereditary Lands and beyond. It seems plausible to assume that all these views, very recently transferred to the Konvent milosrůních bratří in Brno, were prepared in the convent in Feldsberg. This is also the most likely place for the numerous plant illustrations that were produced by the Bauer brothers over the following years, ending in April 1788 at the latest. In the library of the convent they were near to Boccius, the medicinal garden and the botanical books, and probably found sufficient space as well as ideal peace and quiet for the concentrated work that was about to begin.

THE CODEX LIECHTENSTEIN TAKES SHAPE

In agreement with the standard practice of the time it would have been the logical next step for Boccius to induce the Bauer brothers to copy botanical illustrations, and there is ample proof that they did so. The Codex Liechtenstein contains a certain number of very precise copies based on several sources, among them the lavishly illustrated botanical works of Jacquin fresh from the press.

These copies are identical in size to the originals and so very accurate that straightforward copying by sight would have been impossible. Rather, a piece of frosted glass was used with a light source behind. By placing a copper engraving on the glass, then a sheet of paper on top of the engraving, it is easy to take a tracing with the help of a pencil. In a second step, paint (usually gouache) was applied to the copy. Clearly this copying process in two steps was a standard technique among graphical artists, and was extremely practical and efficient. When studying such copies in the Codex Liechtenstein, the graphite lines incompletely covered by paint are occasionally visible.

When copying the coloured copper engravings included in the works of Jacquin, such as his Hortus Botanicus Vindobonensis (Vienna Botanic Garden) or his Florae Austriacae icones (Illustrations of the

**FIG. 2.3. Nettle-leaved speedwell, Veronica urticifolia.**


Austrian flora), sometimes even the volume and plate number were noted by the Bauer brothers in pencil on the margin of the sheet and later only incompletely erased. One of these very precise copies shows nettle-leaved speedwell, Veronica urticifolia (Fig. 2.3.), a species first described by Jacquin in his Hortus Botanicus Vindobonensis. We do not know how Boccius got access to these printed works, but we know for certain that the Florae Austriacae icones were kept in the library of the Liechtenstein family in Vienna, although as a consequence of the Second World War these very volumes are now in the Library of the Botanical Institute of the Russian Academy of Sciences in St Petersburg. Copies of two copper engravings showing scarlet Turk’s cap lily, Lilium chalcedonicum, and the American Lilium superbum (Fig. 2.4.) have also been included in the Codex Liechtenstein. The first is based on a plate in Johann Wilhelm Weinmann’s
Phytanthoza iconographia (Iconography of Flowering Plants), published in Ratisbon from 1737 to 1745, the second on a plate in Christoph Jakob Trew’s Plantae selectae (Selected plants) (Fig. 2.5.), published in Nuremberg in 1751. The latter plate was based on a watercolour by the famous plant illustrator Georg Dionysius Ehret. When the copper engraving showing Lilium superbum was copied, the Bauer brothers could not know that Ferdinand, like Ehret, would later work for several years in Oxford – under the patronage of John Sibthorp, the third Sherardian Professor of Botany, a son of Ehret’s patron Humphrey Sibthorp, the secondSherardian Professor (see Chapter 6).

In contrast to copying a pre-existing image, the preparation of an illustration from nature, more precisely from a living plant, was a much more complex process, and more than two-thirds of the first nine volumes of the Codex Liechtenstein are based on these. We have no reports from eyewitnesses or contemporaries on how work proceeded, apart from general statements such as, that the brothers ‘chose nature as a model which they strove to imitate’ or Ferdinand ‘took to painting from nature, and followed her as his chief guide throughout life’. Fortunately it is possible to reconstruct the sequence of events, in particular since a few preliminary pencil illustrations have survived, all kept in the Naturhistorisches Museum. They refer to several illustrations in the Codex Liechtenstein, and we may hypothesize that a similar procedure was regularly followed. We cannot tell what steps in the production process were the special responsibility of Joseph, Franz and Ferdinand. Probably they worked as a team, since their names are indicated on the title page of the first volume of the Codex Liechtenstein (see below), and we may assume that they were familiar with the various steps involved. However, it has not been possible to
distinguish the three hands in the first nine volumes of the Codex Liechtenstein.

As the first step the plant specimen to be depicted had to be chosen by Boccius. Various factors had to be taken into consideration by him. The plant had to be in the right condition and complete, exhibiting its essential features, particularly flowers, seeds and fruits. Most importantly, the specimen also had to be as ‘typical’ as possible – that is, it had to correspond to the statistical average. We may hypothesize that the Bauer brothers gradually learned how to select suitable (representative) specimens, but no doubt Boccius continued to maintain a tight control over this process, in particular on what species still had to be recorded.

On rather thin, cheap paper the Bauer brothers prepared as a first step a pencil drawing, to which they added light and shade. In 1786 Johann Christian Jacob Friedrich, botanical illustrator in Dresden, wrote in his Anweisung zum Zeichnen und Blumenmaler (Instruction for drawing and flower painting) about hatching: ‘the pencil strokes one uses to give any object its appropriate light and shadow . . . one can make the strokes either heavy or light . . . the heavier and closer together they are, the darker the shadow . . . and the shadow can be made even darker if one uses cross-hatching. . . . The finer and the further apart [the strokes] are, the lighter the effect, until they eventually lose themselves in the light, because eventually the stroke has to be so fine that it becomes barely visible. . . . When drawing flowers one must take particular care with broad leaves, not to let the hatching slant across, or go in a curve. The hatching must rather follow the outer contour [outline] or edge of the leaf and extend as far as its base. So for example when one is drawing a flower with many petals, the hatching must always follow the middle of the flower down to the base of each leaf where it emerges from the base [axis]. And this goes for every leaf, whatever its orientation, position, shape or elevation: the hatching follows its shape down to its base. The hatching must eventually fade out gradually, and not only where there are folds or twists: a stroke must always be allowed to come to an end, so that the shadow of a wide leaf tapers into the slenderest pedicel. We have to assume that the Bauer brothers added light and shade in a similar way to their outline sketches, which were part of the raw material for further work: for example, a pencil drawing showing Barbados lily, Hippeastrum puniceum, and Jacobean lily, Sprekelia formosissima, side by side (Fig. 2.1., p. 18).

Nothing is on record about the use of drawing aids such as mirrors or the camera obscura by the Bauer brothers at this stage of their career, but taking the precision and accuracy of the pencils in the Naturhistorisches Museum into account, this would not be surprising (see Chapter 3).

RECORDING AND CODING COLOURS

For every botanical illustrator time is an important factor: the preparation of a pencil drawing even when light and shade are added is considerably less time-consuming than that of a watercolour. In addition, there is another fact: a watercolour can be safely prepared only in the studio, not in a conservatory with its humid atmosphere or in the field under the conditions of an excursion, where it is faced with a broad spectrum of risks. After all, a finished water colour is an extremely vulnerable and fragile structure, irreversibly ruined within seconds. As a consequence, the Bauer brothers set out to solve a problem every botanical illustrator working in the field is faced with – how to record colour. Indeed, this poses a very big problem, since human memory is limited and recalling a particular hue of the rainbow as exactly observed in a given plant is often impossible. In addition, colours are not only very difficult to describe in words, with no two persons agreeing on the name of a given hue, but it is also often difficult for a botanical artist to recreate a colour by preparing and mixing the different pigments a second time. For a botanical artist working in a seasonal climate another problem exists: during the flowering season a great number of plants have to be recorded, but far fewer in the non-flowering season. Whoever has seen the Pollau Mountains in southern Moravia in full flower in May will immediately understand the Bauer brothers’ predicament, even more so when considering their peripatetic tours to make permanent records of plants cultivated in the various gardens and conservatories. Thus a system for recording colours accurately that would also serve as a guide for recording the pigments to be used became necessary.

The Bauer brothers developed a colour code by devising a colour chart (Fig. 2.6.), which correlates the various hues of colour to numbers. These numbers
were noted down by them on the pencil drawings, for example a number in pencil for the scarlet red of the tepals in the Barbados lily (Fig. 2.1) referring to the finished watercolour (Fig. 2.7). Whereas it was rather straightforward to correlate this pencil drawing kept in the Naturhistorisches Museum with the finished body colour in the Codex Liechtenstein conserved in the Fürstliche Sammlungen in Vaduz, locating the colour chart was another matter.

By lucky chance a colour chart was found by the present author in the archive of the Real Jardín Botánico in Madrid, bound into a manuscript (now available as a facsimile with introductory commentary) belonging to the estate of Thaddaeus Haenke. He had been an assistant of Mikan in Prague and was later supported by Jacquin in Vienna (see Chapter 3), where he had arrived in September 1786. He left Vienna in June 1789 for Madrid with the intention of meeting up with the Malaspina expedition, destined to visit the Spanish possessions on the coast of the Pacific Ocean. Hard to believe but true, this piece of paper to which Haenke had made substantial additions on the margins had survived the shipwreck of the Nuestra Señora del Buen Viaje in the mouth of the Río de la Plata in 1789, had been to California, Alaska, Kamchatka and Australia, and after a stop of about two decades in what is now Bolivia ended up in the Spanish capital in 1820. On a piece of badly water-stained paper, almost certainly because of the wreck, we find 140 rectangular squares painted in different colours arranged in seven rows each comprising 20 strips, the whole forming a square, which the present author has called Bauers’ square. A number from 1–140 has been added in black ink to each coloured rectangle, with the reds forming 1–40, the yellows 41–80, the blues 81–120 and the greens and browns 121–140. The handwriting of the numerals is identical in the colour chart in Madrid (Fig. 2.6) and the pencil drawings in Vienna (Fig. 2.1), although the correlation of the colours is not absolutely perfect. It is impossible to determine if the handwriting on this colour chart is that of Joseph, Franz or Ferdinand. However, Ferdinand is the most likely candidate, since only he continued to use this method later in life and developed colour codes of increasing complexity (see Chapters 5 and 10).

Making use of this or a similar colour chart, the Bauer brothers annotated their pencil drawings with the numbers 1–140, again in pencil, resulting in a cloud of numbers surrounding their works. By preparing these colour-coded sketches they achieved a perfect, reliable and permanent record of something quite ephemeral – plant colours. The colour chart is undated; either this chart or a variant of it must have been in use from the early 1770s onwards. The use of a colour code on the pencil drawings of plants seems to have been a speciality of the Bauer brothers, the present author being unaware of any other botanical illustrator making use of this approach. It seems that the Bauer brothers applied this technique consistently during their work for Boccius. All pencil drawings kept in the Naturhistorisches Museum referring to their early work are colour coded.

**Fig. 2.6.** The Bauer brothers’ colour code. Watercolour by Ferdinand (?) Bauer with later additions by Thaddaeus Haenke on the margins. Watercolour, ink. F. 281 r of note book ‘Systema Colorum’ (Div. VI, 3, 2, f. 278-285). – Madrid, Real Jardín Botánico, Archivio.

**Fig. 2.7.** Barbados lily, *Hippeastrum puniceum*. Watercolour by the Bauer brothers, c.1778. Watercolour, ink. Codex Liechtenstein volume 4: f. 74. – Vienna, Fürstliche Sammlungen.
It is not known if the Bauer brothers invented the colour code or simply followed a pre-existing example, such as the concept laid down in Jacob Christian Schaeffer's rare Entwurf einer [sic] allgemeinen Farbenverein (Plan of a universal relationship of colours) or Ignaz Schiffermüller's even rarer Versuch eines Farbensystems (Attempt at a system of colours). Both correlate a system of letters and numbers with the different hues and attempt a standardization of 'the wavering designations of colours' – with plate I of the latter work even using the same sequence of colours as the Bauer brothers did in their colour chart. One of the copper plates illustrating Schiffermüller's treatise shows rectangles painted with different colours annotated by lower case and capital letters. In short, the Bauer brothers may have simply substituted running numbers for those letters. The great surprise is the date and place of publication of the two slim volumes: Schaeffer's in Ratisbon in 1769, Schiffermüller's in Vienna in 1771. The latter was in contact with Jacquin, and the idea could quickly have been passed via Boccius to the Bauer brothers, who, at the time of the publication of Schiffermüller's text, were fifteen, thirteen and eleven years old.

This method of colour-recording has several consequences. Firstly, even after decades, when the memory of a particular colour of a particular plant had long faded, a watercolour very true to nature (for example of Hippeastrum puniceum, Fig. 2.7.) could easily be prepared on the basis of the colour-coded pencil drawing. For this the use of a light-box or a piece of glass was again very likely: by placing the pencil drawing prepared on thin paper onto a piece of glass and above a sheet of the thicker watercolour paper, either a tracing could be made or paint could be applied directly, taking the underlying colour code into account. Secondly, provided the colour chart and the colour-coded pencil drawing are kept, a second copy, effectively a repeat, could be made at any time without the necessity of going back to the first production. As a matter of fact Ferdinand and Franz kept some of these coloured-coded pencil drawings from their very early years. When they died, all of their surviving preliminary pencil drawings for the Codex Liechtenstein ended up in the Naturhistorisches Museum, with the exception of a single one, which passed via Franz to the Natural History Museum and shows an illustration of the stinking granadilla, Passiflora foetida, combined with P. holosericea. Appropriately these coloured-coded pencil drawings were described in a note among Franz's manuscripts in the Niedersächsische Staats- und Universitätsbibliothek in Göttingen (see Chapter 17) as 'a kind of short hand Drawing consisting of very correct Pencil sketches, with the natural colours of the several parts marked on the margin so that at any time finished drawings might be made from them.' One is inclined to add, 'achieving perfect fidelity in colour'.

As a rule these preliminary pencil drawings were annotated by the Bauer brothers in pencil with scientific names provided by Boccius, often in calligraphy. It seems that an alphabetic arrangement following the generic names was intended on the large sheets of thin paper folded over, not a Linnaean sequence. This resulted in a kind of alphabetically arranged Thesaurus of pencil drawings. No indication exists that the pencil drawings, which may well be called intermediates, were ever coloured – the paper would have been too thin and rather unsuitable to accept the paint.

The preparation of a finished coloured plant illustration began by purchasing the watercolour paper and then, unlike today, was continued by preparing the paper with an emulsion to receive paint without letting it seep through. In the earlier volumes of the Codex Liechtenstein the only type of paper used was watermarked 'C & I Honig', an expensive high-quality product imported from the Low Countries. This again points to professional contacts with Jacquin, a native of Leiden, for he too used this solid, rather thick paper for the coloured copper engravings of his own works. The pencil drawings were then copied on this watercolour paper – either, we have to assume, with the help of a light box or by sight – as a sketch, which is virtually always invisible as the drawing would then be covered with a heavy layer of opaque paint.

The next step was to prepare the pigments, a laborious and time-consuming process, which moreover varied from colour to colour. Friedrich (see above) describes the preparation of opaque white as follows: 'Take some Kremsitzer [i.e. from Kremnica, a mining place in present-day Slovakia] white, powder it finely and mix it with water. Then add some gum tragacanth [a gum made of resin from Astragalus species] and a very small gum Arabic [a gum made of hardened sap from Acacia senegal] and dissolve them in water so that they are still workable even when they are dry. You should take care never to apply white straight to the paper because it easily turns black. You should apply another colour underneath it first, and this will hold the white when you apply it wet,
and it will not run. When you are building up a body of colour – that is, when you mix another colour with white – you must apply another colour which has not been mixed with white first . . . ' According to Friedrich the procedure for yellow is different. 'You should always use the gummigutti [gamboge, a resin from Garcinia trees] straight from the block, or else put onto the palette only as much as you are going to use immediately, because the more often you dissolve it the browner it gets,' and for orange 'This must always be powdered very finely and mixed with water, like cinnabar, otherwise it takes on an ugly, burnt appearance. When it is ready you should leave it to stand on the piece of stone on which the pigment is prepared for a while until it has lost any excess moisture; then you should add enough gum Arabic so that it does not run. I ought also to add that if you want to be fully confident when using these two colours, as soon as you dissolve them in water but before you add any gum you should put them into aqua fortis [nitric acid], and also allow to burn them off, and then refresh them with water again until no aqua fortis remains; only then should you add the gum.' Shades of red are no less difficult to produce. Friedrich says that 'Lacquer red' is hard to dissolve and recommends that it is prepared on a piece of glass.

In short, in addition to being botanical illustrators the Bauer brothers had to engage themselves in the work of microchemists in order to prepare their pigments. They used rather opaque colours, which made corrections easier. A quote from Friedrich illustrates the situation of a botanical illustrator when painting and shading a yellow plant part, like the surface of a pumpkin (see below) 'Dark yellow . . . first shade it with aurora yellow, and then with ox gallstone. If you do not have any you can always use dark yellow ochre. High yellow . . . first shade it with dark yellow, and then with dark yellow ochre. Pale yellow . . . first shade it with high yellow, and then with blackish, and then go over the shades with greenish. Aurora yellow, or yellow arsenic . . . first mix them with cinnabar or carmine, and then shade them with ox gallstone . . . Light aurora yellow . . . shade it with the same colours, only paler . . . Pale aurora yellow . . . first simply shade it with ox gallstone, and then crosshatch it with greenish-yellow.' The Bauer brothers probably shaded their paintings in a similar way. They frequently used opaque white when adding lights, as on the surface of a ripe aubergine, Solanum melongena (Fig. 2.8.), and sometimes they applied a thin film of egg tempera or gum arabic to the upper layer of the paint in order to give extra lustre to a particular feature.

Where did the preparation of the finished watercolours take place? For a variety of reasons almost certainly in Feldsberg.

As far as we know the plant illustrations were not done on single sheets of paper but on larger sheets folded over, so that each sheet carries two illustrations, on pages one and three. It was Boccius' aim to arrange the Codex Liechtenstein according to the Linnaean system, so it was always necessary for him to determine the exact position that each watercolour was to occupy. New illustrations would have to be inserted as close as possible to their correct place in the ever-growing collection so as to maintain the correct (that is, Linnaean) sequence. A collection of half-finished singly folded sheets would thus lie awaiting completion. We may assume that Boccius was directing the additions to his great work and that they were under his supervision. Since he is not known to have left Feldsberg, even when he was Father Provincial, this stock of incomplete sheets must have been kept in the convent, which is also the most likely place where the completed sheets were conserved.

When the watercolour was finished and the sheet left to dry, the annotation began. At this point the sheet was probably shown to Boccius, who controlled the accuracy of the finished work and had to decide which scientific names were to be used. This was an immense task: in the late-eighteenth century there were few reference works to guide those assigning scientific plant names, and both pre-Linnaean names and Linnaean binomials were applied by Boccius. He would certainly have made use of Linnaeus's Genera plantarum, which he is shown to hold in his hand in one of his portraits (see above). When one takes into account the state of botany before 1800, it is clear that he did an excellent job, not dealt with here in any detail. This is particularly so for the native vegetation of the Archduchy of Austria and of Moravia, and for plants that had long been known for their practical usefulness or decorative qualities. After all, the work Boccius had initiated was to become a veritable 'Flora universalis' of its time.

The actual addition of the scientific name – always in Indian ink, with the generic name frequently stencilled – was probably done sometimes by the Bauer brothers, sometimes by other members of the convent of the Brothers of Mercy who could write, since several different
In a final step the book block was painted in bright red by the book binder. Clearly the key innovation of the Bauer brothers in this long sequence was the preparation of the colour-coded pencil drawing in the field, that is a colour-coded intermediate, which acted as the template for the preparation of the finished watercolour in the studio.

The arrangement of the illustration on the sheet of paper is another matter, which has nothing to do with the precise documentation of a specimen, but rather with aesthetics – a branch of philosophy dealing with the nature of art, beauty and taste. Pertinent considerations are totally neglected in this book, which is focused on science and its history, rather than on philosophical questions. In addition, zero information is available on the aesthetical considerations to which the Bauer brothers and their contemporaries subscribed. There is only a single fact: they were able to gather stimuli from many sources – from the works they copied, from the botanical illustrations kept in the library of the convent, and from the works of art in the country houses of the Liechtensteins in Feldsberg and Eisgrub with which they were familiar.

The plants illustrated come from different sources, forming a kind of painted encyclopaedia of what was known to Boccius, although surprisingly some plant groups are totally lacking, such as gymnosperms, non-vascular plants (with the exception of a single moss), and fungi. Others, such as the grasses, are hopelessly underrepresented. Furthermore the number of trees and shrubs depicted is rather small. It also should be remembered that less than a third of the illustrations included in the Codex Liechtenstein are straightforward copies based on coloured copper engravings (see above); these are not dealt with here.
Hans Walter Lack

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Prestel

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