

Rediscovery of the Elements

Paracelsus



Figure 1. This statue of Paracelsus stands at 29 Paracelsusstraße, Beratzhausen, Germany (N 49° 05.74; E 11° 48.39), in front of the town library which was a granary shed during his time. Paracelsus wrote *Paragranum* in this village in 1530. Paracelsus holds the sword procured during his days as an army surgeon, which he kept with him by his side for the rest of his life, even during sleep. Reputedly in the hollow pommel of the sword he stashed a supply of laudanum.

Figure 2. Locations where the authors have found vestiges of Paracelsus in the form of monuments, museums, and plaques. In addition, there are about 30 villages or cities in this area which Paracelsus visited, but where nothing beyond eponymous streets can now be found (not marked in this figure). In his wanderings Paracelsus is documented to have traveled much more extensively than the area indicated in this map, virtually throughout all of Europe and even to Constantinople and perhaps northern Africa. (Note 1)

James L. Marshall, *Beta Eta 1971*
Virginia R. Marshall, *Beta Eta 2003*
Department of Chemistry, University of
North Texas, Denton TX 76203-5070,
jimm@unt.edu

Philippus Aureolus Theophrastus Paracelsus Bombastus von Hohenheim (1493–1541) was given his Christian name “Philipp Theophrastus” by his parents. He adopted “Aureolus” (meaning golden, or shining) at an early age. His family’s name was “von Hohenheim,” sometimes including “Bombast” from nobility two generations before. Later in his career (after 1529) he assumed “Paracelsus,” meaning “better than Celsus,” the legendary Roman physician.

Introduction. One of the most fascinating and enigmatic personalities in the history of chemistry is Paracelsus (Figure 1). He was a

contemporary of both Agricola (1493–1546) and Martin Luther (1483–1546), living during a time of revolutionary change in European culture.¹ Like Agricola, he was a humanist and strove for knowledge, but he shared the fiery and obsessed temperament of Luther. Throughout his life he was a wanderer, gaining medical and chemical information from “scholars, physicians, surgeons, barbers, women, black artists, clergymen, nobles, commoners, both educated and ignorant.”² Instead of accepting by blind faith the teachings of the classical physicians, he conducted experiments on his own, carefully documenting the effect of agents on his patients.³ In contrast to ancient pharmaceutical concoctions of cow dung, snake fat, and feathers, he used purified inorganic compounds, each of which was targeted for a specific disease. He won admirers as he effected his “magical” cures, but also created jealous enemies through his successes and his belligerent attitude.

In the field of medicine Paracelsus’ greatest contribution was recognizing that the human body, being a chemical entity, should be treated with chemical agents to combat diseases. This was created the tradition of iatro-chemistry (medicine-chemistry), which lasted for another century.⁴ He is perhaps best known for his dis-



Figure 3. Paracelsus was born in a house near the Teufelbrücke (Devil's Bridge, N 47° 10.04; E 08° 46.05), crossing the Sihl River 1.3 km northwest of Egg, Switzerland, about 30 km southeast of Zürich. A plaque devoted to Paracelsus can be seen on the stone to the right. Further to the right (out of view) is the Krone, a restaurant reputedly on the site of the original home.



Figure 5. This is the Piazza Sacratì ("Sacred Plaza"), whose buildings five hundred years ago housed the original university of Ferrara. In the center, the church (Chiesa di San Domenico, N 44° 50.31; E 11° 37.02), founded in the 13th century, served as the base for the "faculty of medicine and the fine arts." This faculty expanded into the annex (30 meters further, just beyond the trees) where Leoniceno and Manardo instructed Paracelsus. Plaques commemorate both the church and the annex, and they specifically mention these famous teachers.

covery of mercury compounds as a cure for syphilis—still used into the twentieth century—and the use of opium ("laudanum," which he named) to alleviate pain.⁵

In the area of mining and inorganic chemistry, Paracelsus recognized bismuth, antimony, zinc, and arsenic, and perhaps was the first to prepare arsenic in its elemental form.⁶ Paracelsus' asserted that elements were not the

Aristotelian agents of fire, water, earth, and air. Instead he proposed three chemical substances that combined in various proportions to constitute all materials—mercury, sulfur, and salt.⁷ This list may sound primitive to modern chemists, but it must be remembered that this was 2½ centuries before Lavoisier's *Traité*.

Rediscovering Paracelsus. As an adult, Paracelsus never lived in his own "home" and



Figure 4. When Paracelsus was nine, his family moved to this home (center, with the flag) on the main street (18 Hauptplatz, N 46° 36.85; E 13° 50.80) in Villach, Austria. The building now serves as a bank. On the reverse side, in the courtyard, are relief portraits of Paracelsus and his father. The historical city museum (Stadtmuseum), with extensive displays devoted to Paracelsus and regional mining, lies 200 meters to the southwest on 38 Widmangasse (N 46° 36.78; E 13° 50.67).

one might think it would be difficult to find traces of his travels after almost five hundred years. Nevertheless, there are several sites where monuments, plaques, or museums (Figure 2) have been erected by citizenry proud to claim a piece of his legacy (Note 1).

Paracelsus was born near the Teufelbrücke ("Devil's Bridge") crossing the Sihl River in Egg, near Einsiedeln, Switzerland (Figure 3). Born Philipp Theophrastus, his father Wilhelm Bombast von Hohenheim was a physician, originally from the Stuttgart area, who migrated to Switzerland and married a local woman, Elsa Ochsner. Today a plaque beside the bridge commemorates his birthplace, and a neighboring restaurant/bar displays various Paracelsus memorabilia, such as old drawings of the reputed likenesses of the original house.

When Paracelsus was nine (1502) his family moved to Villach, Austria, a mining area principally known for its production of lead. Here his father served as a physician to the miners of the community. Paracelsus accompanied his father to hospitals in the area and became acquainted with both physical injuries and occupational poisoning of the miners. From the smelters he learned the techniques and the philosophy of the alchemists—transmutation and the conversion of the impure to the pure.⁸ The house where the family lived is known (Figure 4). Fifteen kilometers to the west, the area of

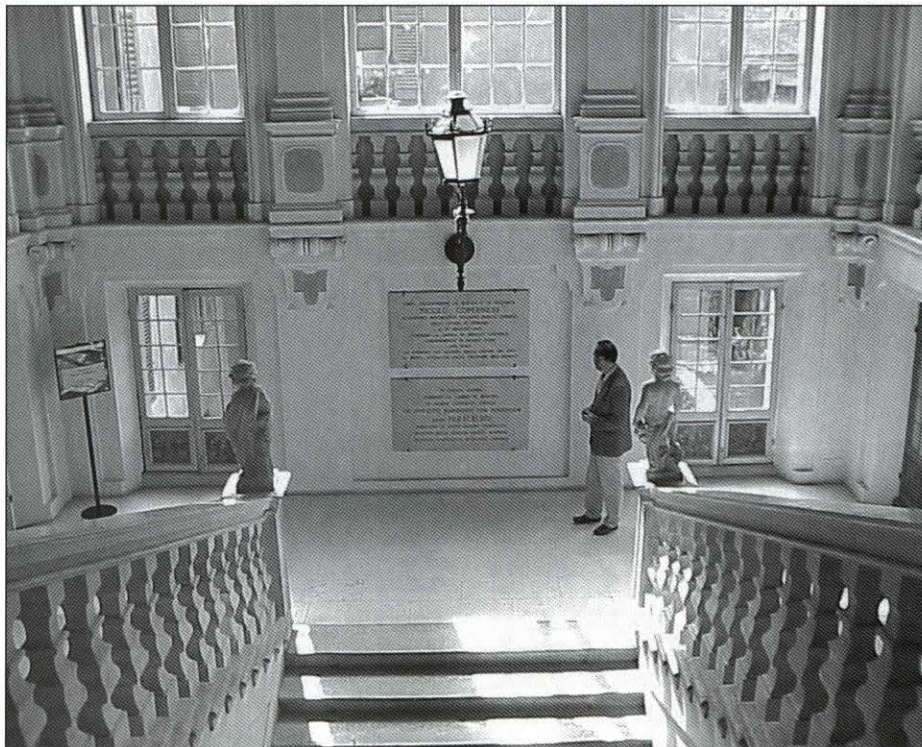


Figure 6. In the main building of the Università degli Ferrara, about 1 kilometer southeast of San Domenico (9 Savonarola, N 44° 49.99; E 11° 37.59), stands Dr. Marco Ingrassio viewing the plaques celebrating the famous graduates of his university, Copernicus and Paracelsus.



Figure 7. Closeup of plaques of Figure 6. Copernicus studied at the same faculty of medicine and fine arts as did Paracelsus. Another plaque celebrating Copernicus, donated by the government of his native Poland, has been mounted nearby (in both Italian and Polish).

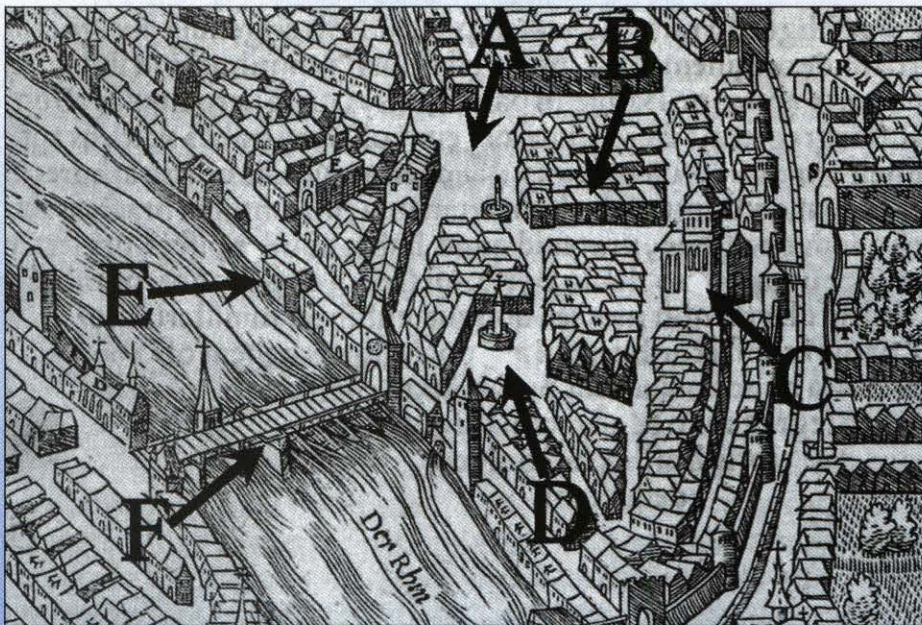


Figure 8. This is a portion of a map of Basel, Switzerland, prepared by Sebastian Munster in 1549. The view is south. Key points are identified, all of which can be still seen in the city. (A) Marktplatz, where Paracelsus burned the ancient medical books in the bonfire of the summer of 1527 (N 47° 33.49; E 07° 35.27). Today the Marktplatz is full of vendors selling flowers, cherries, and asparagus. The Rathaus (city hall) can be seen on the left (east) side of the market place. (B) The publishing house of Erogen, and the modern pharmacy museum, are the same building at 3 Totengässlein (N 47° 33.52; E 07° 35.17). (C) St. Peters church (Peterskirchplatz, N 47° 33.56; E 07° 35.15). Beautifully kept buildings surrounding the church date back to the 1300s. (D) Fischmarkt (fish market), with the totem still existing today (N 47° 33.55; E 07° 35.22), which in Paracelsus' time served fish procured from the Rhine River. (E) The old university at 9, Rheinsprung (N 47° 33.53 E 07° 35.35), where Paracelsus lectured. It serves today as the Institute of Biology. (F) The bridge, once wooden but now concrete, serves as an excellent viewpoint for all of the sites on the south (far) shore.

Bleiberg [German = "lead mountain"] is no longer actively mined; the village, surrounded by mountain slopes with ancient mining scars, is known today principally for its convalescent hotels with thermal baths.

Paracelsus left Villach at the age of 14 (1507) to visit several universities in southern Europe. This was not unusual, for often one would find bands of wandering scholars during the Renaissance. The next clear record of him is in Ferrara, Italy, in 1511, where he studied medicine until 1513. Probably he was attracted to this school because progressive teachers there were promoting experimentation and were beginning to question the ancient teachings of Galen and Avicenna. Two of these teachers were Giovanni Manardo (1462–1536), who opposed the teaching of astrology in medical curriculum, and Nicolao Leoniceo (1428–1524), who wrote critical treatises on errors of Pliny (Figure 5).

Until the Renaissance, the study of medicine depended strictly upon the theories of the ancient physicians, who believed the health of the body depended upon the proper balance of the four humors—black bile (melancholy = sad), yellow bile (choleric = anger), blood (sanguine = cheerful), and phlegm (phlegmatic = calm).⁵ (The philosophical connection of these four humors to the four Aristotelian elements is obvious.) The practice of medicine was also heavily influenced by the idea of God's retribution upon the sinful.⁶ Hence, the art of healing involved superstition and unsubstantiated theories. The physicians, well-versed in these theories, grew to be a wealthy and prestigious class, dressed in their red robes and riding about on their white horses.⁷ Meanwhile, the



Figure 9. The stairs lead up Totengässlein ("Lane of the Dead") to St. Peter's Church. This is the route taken from the Marktplatz to the church by those carrying the dead to be buried at the church graveyard. The Pharmacy Museum is immediately to the left (not in view).

prosperity of the pharmacies was guaranteed by the physicians who prescribed the most preposterous concoctions.

It was against this background of ignorance that the Renaissance was emerging. At the turn of the fifteenth century, an artistic appreciation of the human body melded with a curiosity about anatomy, and in education centers we often find a "School of Medicine and the Fine Arts." Typically, temporary surgery theaters were used: a single table and a few wooden benches. We are reminded by Irving Stone (*The Agony and the Ecstasy*)⁹ that Michelangelo (1475–1564) dissected the dead to understand the musculature of the human body for his statue David.

The Ferrara location of the "Facolta di Medicina ed Arti" was a church (Figure 5, Note 2). Because of religious restrictions, one could dissect the human body only during Carnival times when one was released from the usual religious taboos; and one refrained from dissection during the summer months when putrefaction would be a problem. The curriculum of La Facolta di Medicina ed Arti was considered important for a complete education, and we find that another famous graduate of Ferrara—Copernicus—studied there less than a decade before Paracelsus (Figures 6, 7).

After Ferrara, Paracelsus entered his "wandering years" (1516–1524), mainly as an army-surgeon in campaigns in both northern Europe and in later in Italy.² These travels took him virtually over all Europe (see Fig 2). He gained much first-hand knowledge and developed techniques and medicines from practical experience.



Figure 10. Dr. Michael Kessler, expert of medieval history, is curator of the Pharmaziehistorisches Museum. This is the actual building—called "zum Sessel" for centuries—where Froben built his manor and publishing house, and where Paracelsus lived for a short duration in Basel.

ience. In contrast to the traditional physician who shunned direct physical contact with a patient, Paracelsus did not hesitate to take on the role of a barber-surgeon and to perform surgeries on the field. He began to understand that post-operative trauma (such as the customary treatment with boiling oil) killed patients as often as the injury itself. He developed methods for cleaning wounds, allowing Nature to take its course to heal the patient.

Returning in 1524 to Villach with his famous sword (Figure 1), Paracelsus considered a medical practice there, but instead moved on to Salzburg. The house where he lived in Salzburg, next to the communal baths, is marked with a plaque (Figure 14)—ironically within a few paces of where he died seventeen years later. Paracelsus always cared for the common man, and he became involved in the "Peasants' Revolt" (1524–1525). When the revolt was quashed, Paracelsus barely escaped the hangman's noose and fled westward (Note 1).

Paracelsus finally settled in Strasbourg at the age of thirty-five (1526). In this progressive city (Gutenberg developed his printing press techniques here), the status of barber-surgeons was nearly on a par with physicians. Through his multiple skills Paracelsus thrived and his fame spread throughout southern Europe: the most famous episode of his life was about to take place.

Johannes Froben, a successful publisher in Basel, Switzerland, was suffering from an ailment of his leg—probably necrosis arising from diabetes.⁸ His personal physicians suggested amputation, but Froben sought the advice of

Paracelsus, who responded and journeyed to Basel in 1527. Paracelsus decided against drastic action, and through a regimen of more gentle treatment Froben was cured.

Having taken advantage of the new technological revolution in printing, Froben was very wealthy, and through his influence Paracelsus gained the title of City Physician. Although he was not a professor in the university, the new status of Paracelsus allowed him the privilege of giving lectures. This was the opportunity of his life! He now had the ability to rise to professional and social prominence.

At this critical juncture of Paracelsus' career, he elected to use the university podium to promote his controversial views. Instead of teaching methodically in the "proper" language Latin, he blustered in colloquial German, as had Martin Luther. Thundering his stinging criticisms of Galen and Avicenna, he cried, "There is more wisdom in the laces of my shoes than in these old men."⁶ During the 1527 summer solstice festivities (June 24) in the Marktplatz, he tossed copies of the books of the grand masters into the celebratory bonfires. These university books were ancient hand-copied tomes and were expensive! Such a controversial figure could not long survive. His enemies consisted not only of the orthodox university regime, physicians, and apothecaries, but also the church and the aristocracy of the city. It was just a matter of time before Paracelsus was banned from Basel. The final issue was over a fee of 100 guilders Paracelsus claimed from a wealthy patient who offered only six; Paracelsus sued but lost.

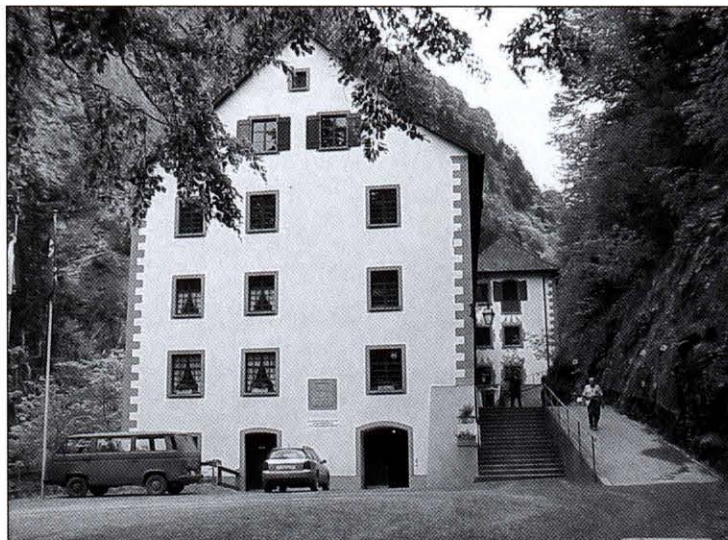


Figure 11. This is the lodge at Bad Pfäfers, Switzerland (N 46° 58.46; E 09° 29.26). One can reach this area by a rigorous uphill hike or by local bus from Bad Ragaz (3.5 km). This building holds excellent exhibits on the history of the thermal baths there, and boasts the best museum dedicated to Paracelsus found anywhere. Maienfeld, famous for the setting of Johanna Spyri's *Heidi*, is directly across the Rhine River from Bad Ragaz, whose baths are mentioned often in the novel.



Figure 12. In this 16th century copper etching, on exhibit at the Paracelsus-Gedankstätte (museum) at Bad Pfäfers, the purported healing powers of guaiac wood are depicted. To the right a house servant chops a log of guaiac which will be burned in the fireplace, whose smoke will pervade the home. To the left the patient afflicted with syphilis is ministered by the physician. Paracelsus discredited this treatment and proved the efficacy of mercurial salts.

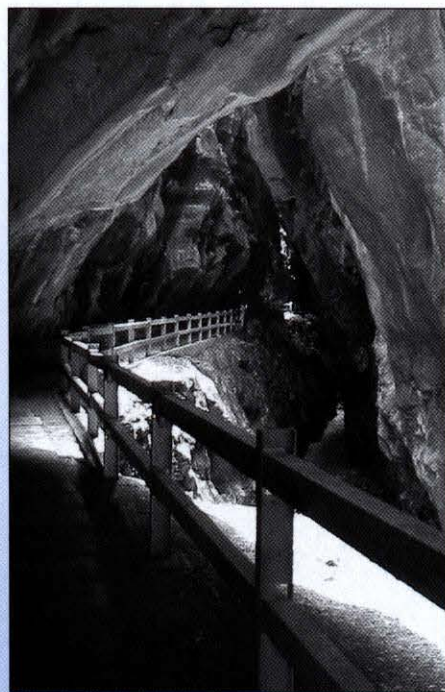


Figure 13. Taminaschlucht (Tamina Gorge) is a fascinating geological cavern through the mountain, carved over the eons by the mineral springs. A 300-meter walk up this trail takes one to the thermal baths, steady at 36 °C. Paracelsus visited these baths in 1535 and wrote a paper describing its medicinal powers.

Those who knew Paracelsus thought he was either a Saint or a Sinner—impressed either by his "miracle" cures or by his quarrelsome ways.⁷ In Basel we can get a personal view of Paracelsus from Oporin (a Greek scholar at

Basel) who was a close companion of Paracelsus and who carefully wrote down his observations of this dichotomous figure. Oporin noted that "noblemen, peasants, and womenfolk adulated him like a second Asclepius" (God of healing), but he was appalled that there were "hardly two hours in a day" when Paracelsus was not drunk.⁸ Oporin noticed that Paracelsus "was a spendthrift, frequently with no money whatsoever," but then miraculously would appear back at the house "with his purse well-filled."¹⁰ Originally fascinated and devoted, Oporin followed him for two years but could take no more of his uncouth ways and abandoned him.

Much in Basel can be seen today relating to this chapter in Paracelsus' life (Figure 8). The old premises of Froben today house the historical pharmacy museum (Pharmaziehistorisches Museum), consisting of several buildings off the steep stone passageway of Totengässlein. The name of the street is derived from the fact that it was used to carry the dead from the Marktplatz to the St. Peter's Church cemetery (Figure 9). The area of Froben's printing presses now holds special art exhibitions of the museum. What was once the chapel of Froben is now a mock-up of a medieval pharmacy, complete with furnaces, retorts, and other implements. The Pharmaziehistorisches Museum (Figure 10) is arguably the best pharmacy museum in Europe (Note 3).¹⁰

The character of old Basel is beautifully preserved in the neighborhood of St. Peter's Church; some of the buildings date back to the 1300s. The Marktplatz is used for the same merchandising purposes today as it has for cen-

turies. The site of the old university, situated on the Rhine River, and where Paracelsus lectured, still exists and is now part of the Biology Department.

From Basel Paracelsus migrated to Zürich (1527), where a plaque identifies his temporary lodgings (Note 1). Spreading propaganda leaflets, he was threatened to be locked up, and

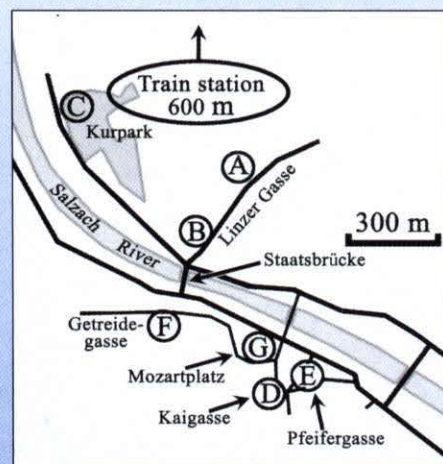


Figure 14. Tourists in Salzburg, Austria, are familiar with (F) Mozart's birthplace at 9 Getreidegasse, and (G) statue at Mozartplatz. Paracelsus' legacy includes: (A) his tomb at St. Sebastian Church, 41 Linzer Gasse (N 47° 48.23; E 13° 02.83); (B) his last home at 3 Linzer Gasse (N 47° 48.11; E 13° 02.71); (C) his statue at Kurpark (N 47° 48.36; E 13° 02.40); (D) where he died, 10 Kaigasse (N 47° 47.86; E 13° 02.93); and (E) his home years earlier in 1523-24 at 11 Pfeifergasse (N 47° 47.88; E 13° 02.99).

he fled to Colmar (1528), then Esslingen (1528) (identified by a plaque, Note 1), then to Nürnberg (1529) (Note 1), where he administered to prisoners afflicted with syphilis, known as the “French disease” (“*morbus gallicus*”).

This was a new malady, apparently imported to Europe from the New World beginning with Columbus’ first voyage. Paracelsus’ clinical diagnosis of the disease, reported in several essays,¹¹ was classic, detailing the stages of the sickness.¹² His treatment, utilizing mercuric salts in prescribed doses, showed that he understood the proper balance of toxic vs. effectual doses of poisonous substances, and he cured (or at least alleviated the symptoms of) several patients.⁸ The use of mercurial salts proved to be the most effective cure of syphilis for centuries, until the modern drugs of the 20th century.

Paracelsus was angering a broad segment of the important citizenry of Nürnberg. The physicians, who were confounded by the disease, were embarrassed by this unorthodox vagabond; and the pharmacists were distressed by Paracelsus’ proclamations that their preparations were worthless. But most importantly, the powerful Fugger family held a monopoly on guaiac wood, a fashionable treatment for the disease (Figure 12), and they were not about to let anyone interfere with their lucrative trade in this exotic West Indies import. After Paracelsus’ initial essay, he was forbidden to write any more. After Paracelsus ignored the ban and printed three essays¹¹ surreptitiously, he was hounded out of town.

Paracelsus moved to the rustic and peaceful Beratzhausen, where he wrote *Paragranum* (1530) (Figure 1). Typical of Paracelsus’ writings, *Paragranum* is a blend of superstitious and rational thought. Listing the four fundamentals of medicine as philosophy, astronomy, alchemy, and ethics, it proceeds to recommend specific chemicals to treat diseases rather than the ancient vile concoctions of the ancients.¹³

The following year Paracelsus moved on to St. Gallen, Switzerland (Note 1). Because of the Reformation, the monastery was vacated, and he was given a kitchen in which to prepare his chemicals. This was a special treat for him, because he ordinarily prepared his medicines on an ordinary hearth beside the simmering soup of an inn’s daily fare. In St. Gallen he wrote *Opus Paramirum* (1531), where he first postulated mercury, sulfur and salt as the basic chemical elements.

After an excursion into Italy, Paracelsus returned to Bad Pfäfers, Switzerland (1535) where he analyzed the mineral water, assessing it for its curative powers. Paracelsus wrote a report on the healing qualities of the baths for Johann Jakob Russinger, the local magistrate. Today Bad Pfäfers boasts a magnificent museum devoted to the history of the baths and to Paracelsus (Figure 11). This museum is the best



Figure 15. This is the Inn of the White Steed (*Wirtshaus zum weissen Ross*) where Paracelsus spent his last three days and made his final testament (*D* of previous figure). In the doorway stands a statue of Paracelsus. The establishment today serves as an Irish bar and restaurant.

available for a scholar of Paracelsus; it includes facsimiles of his books and letters (Figure 12). Tourists can visit not only the museum and the historical baths, but also the mysterious Tamina gorge (Figure 13).

After having endured so many scandalous episodes, Paracelsus was finally reprieved by a brief resurgence of fame. In Pressburg (modern Bratislava, Slovakia) he was honored by a ceremonial dinner by the city magistrate (1537), now commemorated by a plaque (Note 1). He held audiences with Ferdinand I in Vienna (1538); today Vienna remembers Paracelsus with a memorial in the beautiful Donaupark (Note 1). However, by now Paracelsus was aging; he was rambling more, becoming more of a preacher than a physician. Bishop Ernst of Wittelsbach took pity and invited him (1540) back to Salzburg for refuge—the city from he fled years before. Here Paracelsus spent his final year, expiring on September 24, 1541.

Today Salzburg remembers Paracelsus by a number of plaques and memorials (Figure 14). City tours are careful to include the memorials of Paracelsus along with those of the famous son of Salzburg, Wolfgang Amadeus Mozart. Although Paracelsus lived north of the river just across the present Staatsbrücke, he frequented the more socially active south Salzburg and “died as he lived, on a bench in the chimney corner of an inn”¹² (Figure 15). A man of strong

Christian faith, his funeral was held at the cemetery of St. Sebastian, where he was interred. After two centuries his bones, as well as the gravestone, were moved inside the church (Figure 15).

The Legacy of Paracelsus. To Paracelsus’ credit are 364 books, with 122 titles of chemical interest.⁴ Most of these books are posthumous, frequently copied from manuscripts gathered by Oporin; several titles are of doubtful origin and perhaps were written by devoted followers. Steeped in the culture of the times, we find his writings alternatively superstitious and modern—at one moment he is discussing the effect of the planets on the body, and the next is brilliantly diagnosing an illness.¹³

Paracelsus was a genius, well before his time. His knew the old beliefs were wrong, but he was restricted in his advance of chemistry because the language of the scientist did not yet exist.³ Paracelsus attempted in vain to understand the “invisible influences” which were ascribed to magic, and he could only describe phenomena in alchemical or astrological terms. However, he had the insight to utilize experimentation in his quest—and thus was involved in the birth of “natural magic,” i.e. science. He urged alchemists to stop searching for the philosopher’s stone and ways to make gold, and instead to find true medicines. As he hungered for answers that were beyond his grasp, he raised the dignity of chemistry by removing it from the alchemist’s forge and by demonstrating its necessity for medicine.

“Believe in the works, not in the words; words are an empty shell, but the works show you the master.”¹⁴

Acknowledgments.

The authors are appreciative of the tireless assistance of Dr. Michael Kessler (Figure 10), curator of the Pharmaziehistorisches Museum of Basel, Switzerland, who provided much information about the life of Paracelsus and his environment, particularly during the pinnacle of his career in Basel. For information about Paracelsus during his medical studies in Ferraro, many thanks are extended to Dr. Marco Ingrosso, director of the Centro di Studi Sociali Paracelsus dell’Università di Ferrara. The authors are indebted to Dr. Alessandra Farinelli, head of the Biblioteca Comunale Ariostea of Ferrara, for much historical information about the city and the medical and fine arts school of half a millennium ago. Finally, special and warm gratitude is extended to Dr. Gerry Dobson, Emeritus Professor of UNT, with whom the authors have spent many evenings over the past 34 years exploring the life and spirit of Paracelsus as well as the history and professional ideals of chemistry.

(continued)

Notes.

Note 1. More detail regarding the sites identified in Figure 2 follows.

1493, Einsiedeln, Switzerland. A monument at the city park (4.5 km south of Paracelsus' birthplace) is inscribed with many of Paracelsus' quotations (Schiedenstrasse, N 47° 07.66; E 08° 45.06). Engravings of Einsiedeln's landscape, dated during the 1500s, may be viewed in the Bad Pfäfers museum (see Figure 11); they include the Teufelbrücke and the reputed home of the Hohenheims with its characteristic "gothic cross" weathervane.

1525, Bad Liebenzell, Germany. Today in the Schwarzwald (Black Forest) a luxuriant thermal bath/hotel complex "Paracelsus Therme" (1 Reuchlinweg; N 48° 46.16; E 08° 43.99) caters to the well-to-do. Two large plaques describe the history of the area and the visit of Paracelsus.

1526, Strasbourg, France. Thirty statues of famous persons associated with the ancient university adorn "la cimaise" (roof ornamental molding) of the Palais Universitaire, including the likes of Kant, Leibniz, Goethe - and on the south wall, Paracelsus (rue de l'Université, N 48° 35.06; E 07° 45.73).

1527, Zürich, Switzerland. The Hotel zum Storchen in Zürich (Am Weinplatz, N 47° 22.28; E 08° 32.52) bears a plaque commemorating the visit of Paracelsus. On the walls inside the lobby and coffee shop are attractive mural paintings portraying the area in 1576 and in 1770.

1528, Esslingen, Germany. The attractive, half-timbered historical home where Paracelsus stayed is remembered by portraits and plaques on the outside walls (corner of Untermetzgerbach and Pliensausstrasse; N 48° 44.40; E 09° 18.32)

1529, Nürnberg, Germany. Although no specific memorial exists for Paracelsus, the Germanisches Nationalmuseum (1 Kartäusergasse, N 49° 26.92; E° 11 04.52) furnished much information about the stay of Paracelsus in Nürnberg, describing how he was involved in the ancient monastery (Kartäuserkloster), located at the precise spot of the museum. These kloster buildings, built of carved red sandstone, have been incorporated into the museum and give the visitor a true feeling of the times of Paracelsus.

1530, Regensburg, Germany. Paracelsus finished the final draft of *Paragranum* in Regensburg, which gives tribute to him by his bust being included in Walhalla (hall eulogizing the famous German dead) on the Danube River (48 Walhallastraße, Donaustauf; N 49° 01.88; E 12° 13.44).



Figure 16. Paracelsus' tombstone (Grabmal) is inside the St. Sebastian Church (A of Figure 14) with relief portrait and Latin inscriptions. Above we are informed that his bones were lifted from the outside grave and interred here in 1752. Below we read: "Here are the effigy and the bones of Philippus Theophrastus Paracelsus, who has won such fame in all the world through his alchemy; until they are again clad in flesh."

1531, St. Gallen, Switzerland. Paracelsus spent 117 days at a house "zur Wahrheit" (32 Gallusstrasse; N 47° 25.35; E 09° 22.53), still beautifully preserved, before departing for Augsburg. The monastery (Kloster St. Gallen, 200 meters northwest) where he practiced in his "alchemical kitchen" has been designated a UNESCO site. The exact location of this laboratory kitchen is not known.

1537 Pressburg (modern Bratislava, Slovakia). The site where Paracelsus visited and was entertained by the local nobles is now the "Primatial Palace" (Primaciálne Námestie; N 48° 08.65; E 17° 06.60), famous because of its Hall of Mirrors peace treaty between France and Austria in 1805. A plaque (in Latin) on the east wall commemorates the visit of Paracelsus.

1538 Wien (Vienna), Austria. The site where Paracelsus had audiences with Ferdinand I was in "Schweizerhof," now part of the huge castle complex (near Josefsplatz, N 48° 12.41; E 16° 21.98). In the Donaupark, north of the Danube River, a memorial and flower garden has been dedicated to Paracelsus (N 48° 14.50; E 16° 24.70). This memorial is 300 meters north of the conspicuous Donauturm (tower restaurant) in the park.

Note 2. F. Jaeger² presents a photograph erroneously ascribing the site of Paracelsus' medical

studies as a building he identifies as "Die Universität zu Ferrara." This building (via delle Scienze 17; N 44° 49.98; E 11° 37.31, 700 m SW of San Domenico) is actually the "Palazzo Paradiso," built in 1391 which indeed housed a major portion of the university but did not absorb the medical school until 1567. The building now serves as the Biblioteca Comunale Ariostea (opened in 1753), a source of much of the information used by the authors. A wooden anatomy theater built in 1731 still exists in Palazzo Paradiso.

Note 3. Wotiz¹⁰ suggested the best pharmacy museums in Europe are the Pharmaziehistorisches Museum in Basel, the Deutsches Museum in München, and the Apoteker Museum in Heidelberg. In the authors' view, the most grandiose museum is in München, the most attractive to the beginning student is in Heidelberg, but the most detailed and scholarly is in Basel.

References.

1. W. Durant, *The Story of Civilization*. Vol. VI. The Reformation., 1957. Simon and Schuster, New York, 875-881.
2. F. Jaeger, *Theophrastus Paracelsus 1493-1541*. 1941. M. Mora, Salzburg.
3. R. Morris, *The Last Sorcerers*, 2003, Joseph Henry Press, Washington, D.C., 26-44.
4. J. R. Partington, *A History of Chemistry*. Vol. 2. 1961. Macmillan, London, 115-151.
5. M. A. H. Altazan, *J. Chem. Educ.*, 1960, 37(11), 594-596.
6. T. Thomson, *The History of Chemistry*. 1975, Arno Press, N.Y., reprint of 1830-31 edition, Colborn and Bentley, London, Vol. I, 140-168.
7. F. Walker, *J. Chem. Educ.*, 1931, 8(5), 885-895.
8. M. Kessler and M. Kluge, *Leben am Totengässlein*, 2004, Baseler Zeitung Medien, Basel.
9. I. Stone, *The Agony and the Ecstasy*, 1961, Doubleday, N.Y.
10. J. H. Wotiz, *Chemtech*, 1982, April, 221-228.
11. Essays from Nürnberg include *Von Holz Guajaco grünlichen Heiling* [On the healing powers of guaiac wood], 1529; Three different essays on *Von der französischen Krankheit* [On the French disease], 1530, combined into *Drei Bücher* just before Paracelsus left Nürnberg.
12. T. L. Davis, *J. Chem. Educ.*, 1928, 5(6), 671-681.
13. N. Goodrick-Clarke, *Paracelsus: Essential Readings*, 1999, North Atlantic Books, Berkeley.
14. *Paragranum*, translated into English in *Paracelsus. Selected Writings*, J. Jacobi, ed., 1979, Princeton University Press, 101.