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17. W. Gibbs, "Note on the Electrolytic Determination of Metals as Amalgams", *Amer. Chem. J.*, **1892**, *13*, 570-571.

18. C. Luckow, *Chem. Zeit.* **1885**, *9*, 338; cited in E. Hintz, *Z. Anal. Chem.*, **1886**, *25*, 113-114.

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"BETWEEN TWO STOOLS": KOPP, KOLBE AND THE HISTORY OF CHEMISTRY

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Hermann Kolbe

Hermann Kopp (1817-1892) and Hermann Kolbe (1818-1884) were two outstanding German chemists during the period in which German chemistry rose to a position of prominence in Europe (1). Although I know of only five surviving letters from Kopp to Kolbe and only one letter draft from Kolbe to Kopp - a document which we reproduce below - they must have been well acquainted for four decades. They may have first gotten to know each other when Kolbe was working as a newly minted Ph.D. with Robert Bunsen (1811-1899) at Marburg, and Kopp was Privatdozent and then Ausserordentlicher Professor at nearby Giessen, during the years 1842-1845. After Kolbe became Bunsen's successor in 1851 (Bunsen having been called to Heidelberg), he maintained relations with all of the Giessen chemists and visited them not infrequently. Upon Justus Liebig's transfer to Munich in 1852, Kopp and Heinrich Will became Liebig's joint successors; the following year they divided up their duties, Will taking experimental chemistry and the directorship of the laboratory, with Kopp becoming professor of theoretical chemistry. In 1863 Kopp was called to Heidelberg, becoming a colleague of Bunsen; he remained there for the rest of his life.

Kopp's life work was investigating the relationships between physical and chemical properties of chemical compounds; he has rightly been regarded as one of the founders of the discipline of physical chemistry. But he was also active in a literary sense right from the beginning of his career - indeed, his first love as a student had been philology. His classic four-volume *Geschichte der Chemie* was complete by his 30th birthday. The first edition was quickly sold out, and he began immediately to work on revisions for a second edition; he died 45 years later, the revision still incomplete. When Liebig left Giessen, new literary duties were added - principal editor of Liebig's *Annalen der Chemie*, and, with Will, managing editor of the annual *Jahresbericht der Chemie*. He continued these duties even after his transfer to Heidelberg.

Shortly after his arrival in Heidelberg he was asked by the Bavarian Academy of Sciences to write a history of modern chemistry in Germany, as part of a project to commission two dozen disciplinary histories in a series entitled *Geschichte der Wissenschaften in Deutschland*. The initiator of this project was Leopold von Ranke (1795-1886), one of the founders of modern critical historiography, whose goal was to write history "wie es eigentlich gewesen ist", that is, without thematic, didactic, or rhetorical coloration. Kopp had been strongly influenced by this German objectivist historiographical movement as early as the 1840s (2).

The result of this contract emerged in the early 1870s as *Die Entwickelung der Chemie in der neueren Zeit.* (3). Kopp did not, however, succeed in making this a history of German chemistry, despite (as he wrote Liebig in January 1871) numerous attempts to follow Ranke's national program (4). In his preface, dated April 1873, he took the offensive; he averred that science, being international by nature, can only be written from an internationalist perspective (5). The work was indeed aggressively international. The first two-thirds of the long crucial final chapter, covering the development of theories of molecular constitution during the most recent period (1840-1860), scarcely mentioned a German name - until he introduced the development of structure theory by August Kekulé (6). In effect, Kopp found Ranke's critical historiography

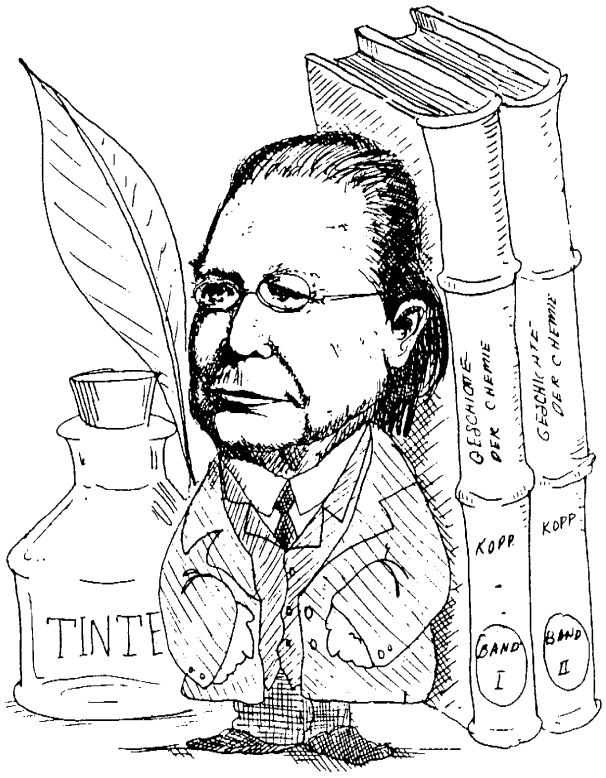
impossible to preserve if one attempted to maintain a national perspective, so the methodological standard necessarily dictated a broader approach to the material. Kopp's stance was all the more remarkable, as the book was written during the emotion-laden Franco-Prussian War, and shortly after the appearance of Adolphe Wurtz's history of chemistry, which was much attacked for its French chauvinism.

Kolbe's career followed a very different path. First at Marburg, then at Leipzig, Kolbe pursued organic chemical theory, developing his own idiosyncratic approach toward the elucidation of molecular constitution (he always avoided the term "structure"). In particular, Kolbe thought the chaining together of atoms was philosophically absurd and could not occur. Rather, implicitly following the dictates of the older radical theories, he thought that the atoms in a molecule were arrayed in a hierarchical manner, where one atom is always more central than its neighbors. He once used a military metaphor to describe this, speaking for instance of methyl as a "commando" unit with a carbon "corporal" and three hydrogen "privates". He even applied this approach to the benzene molecule, in contrast to Kekulé's cyclical chain theory (7).

As odd as it may sound, this approach proved very fruitful in the late 1850s and 1860s, making Kolbe one of the most esteemed masters of his field; but his productivity declined markedly from about 1870, when he devoted himself largely to bitter polemics against all of his purported enemies, foreign and domestic. He became pathologically chauvinistic, Francophobic and antisemitic from the time of the Franco-Prussian War. Increasingly, his ferocious and crude published attacks alienated him from the collegial community. His bombastic denunciation of van't Hoff's stereochemistry (1877) is perhaps best known; but he also regularly blasted the work of Kekulé, Adolf Baeyer, Johannes Wislicenus, Wurtz, and J. B. Dumas (8).

Strains appeared in the relationship between Kopp and Kolbe as early as 1854, when Kopp's physico-chemical studies led him to tilt in the direction of the newer type theory of Charles Gerhardt and Alexander Williamson (9). This theory was further developed by such workers as Wurtz, Kekulé, A. S. Couper, and A. M. Butlerov into the theory of chemical structure, a theory Kolbe violently and vocally opposed as excessively speculative. Kopp, more a physical than an organic chemist, never unequivocally signed on to the movement, but the structuralists felt, with reason, that his sympathies were with them. Kolbe always regarded Kopp's historical work as conscientious, but flawed by his refusal to be "critical" (by which Kolbe really meant tendentious) (10). He also did not have much regard for the emerging field of physical chemistry (11).

The brilliant German chemist August Wilhelm Hofmann, an exact contemporary of Kolbe and Kopp and a close friend of both, was also a part of these developments. He had spent 20 years as professor at the Royal College of Chemistry in



Hermann Kopp caricaturized as a bookend for the volumes of his famous *Geschichte der Chemie*

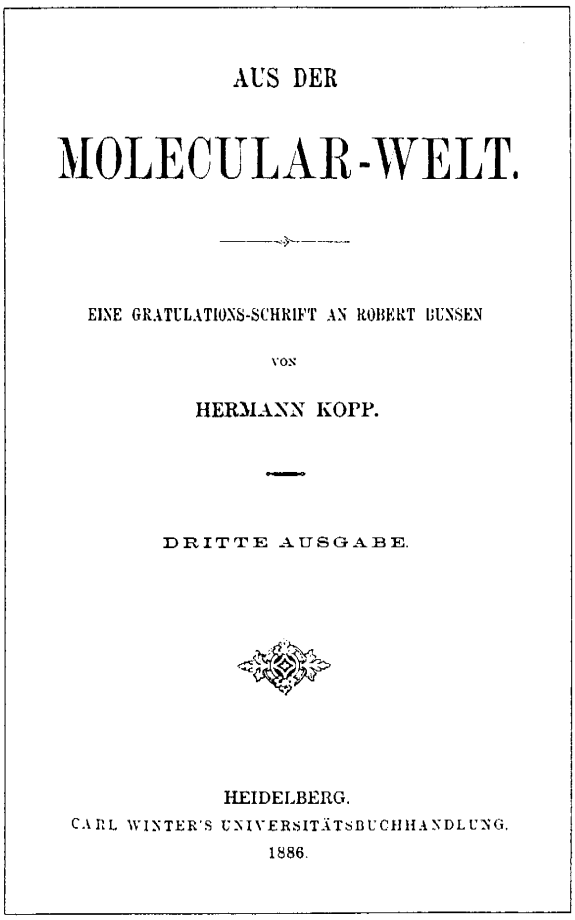
London before following a call in 1865 to the University of Berlin. His most famous research, carried out in 1849 and 1850, formed a principal bulwark of the newer type theory. In 1867, he and four colleagues in Berlin formed the nucleus of a new German Chemical Society. Although a fair number of German chemists outside Prussia resented the implicit imperialism of a group of Prussians appropriating the name "German" (rather than more modestly calling themselves the Chemical Society "of Berlin"), Hofmann's timing was impeccable. Bismarck and his sovereign succeeded in forming the German Empire, centralized in Berlin, by the beginning of 1871, and many analogous pan-German organizations were formed around this time. Within a few years it was hard to argue with the resounding success of the new Society, both in terms of numbers of members and the size of the Society's *Berichte*.

In the fall of 1876, for his own amusement, Kopp wrote a comic fantasy describing a personified world of atoms and molecules, *Aus der Molekularwelt*. It lay in his desk for a few years, until he decided to revise and print it in honor of Bunsen's 71st birthday (31 March 1882) (12). By this time, Bunsen and Kopp had been intimate friends for many years. When Bunsen received a call to the University of Berlin in 1863 - the chair subsequently offered to Hofmann - he declined, but extorted from his administration as a condition of

his remaining not a raise in salary, but rather a promise that Kopp be called from Giessen as a second Ordinarius in chemistry. Their close association in Heidelberg extended from this year until Kopp's death almost 30 years later (13).

Since Bunsen was visiting Naples at the time of his 1882 birthday, Kopp introduced his fantasy by referring to the Naples aquarium, then suggesting that he and Bunsen pay an (imaginary) visit to an "aerarium" where they could watch molecules at play. The piece is filled not only with amusing conceits, but also with a variety of theoretical views of the nature of gases, atoms, valences, and molecular structures.

On 7 March 1882, while this work was in press, Kolbe visited Kopp in Heidelberg on a journey from Leipzig to his customary resort destination of Gersau, on the Lake of Lucerne in Switzerland. Two or three days later, having arrived in Gersau, he began a draft of a letter to Kopp, presumably completing it on the 12th; it was found among Kolbe's papers and is preserved in the library of the Deutsches Museum in Munich (14). I reproduce it here in my translation. My transcription of the original German is given in the notes (23), with all archaisms, and even a few obvious hasty errors typical of a preliminary draft, preserved literatim; cancellations are ignored, and interlineated revisions silently substituted. We cannot say for certain, though it is a reasonable assumption, that a fair copy of the letter was actually made and sent to Kopp, for such does not seem to have survived.



AUS DER

MOLECULAR-WELT.

EINE GRATULATIONS-SCHRIFT AN ROBERT BUNSEN

VON

HERMANN KOPP.

DRITTE AUSGABE.

HEIDELBERG.
CARL WINTER'S UNIVERSITÄTSBUCHHANDLUNG.
1886.

Dear Kopp! Gersau, 12 March 82

Your mysterious intimations to me on Tuesday regarding an upcoming publication by you lead me to conjecture that you have committed a transgression against me. I am all the more curious about its content, since my pen has always defended *you*.

I can image that the sharpness or form of my attacks, or, more properly, defense, against Kekulé does not please you, and that you also do not like my judgment of Baeyer's and Wislicenus' work. But in case you feel called upon to take Kekulé under your protection, I suggest you consider that you would be espousing the cause of a dishonest character, who does not shrink from thievery and falsifying the facts in order to gratify his ambition and satisfy his hatred.

If I understand him rightly, Kekulé is too cowardly to defy me publicly, now that his disgraceful actions have been revealed.

I should be just as sorry to see you try to pull Hofmann's chestnuts out of the fire. As deeply as I despise Kekulé, just as highly do I regard Hofmann, and not only as a chemist but also as a man, *as far as* his boundless vanity - his greatest enemy - does not mislead him. I am personally obliged to Hofmann from an earlier time by bonds of the greatest gratitude, and will never forget what he did for me; (15) but I cannot make myself his slave. Beyond a certain point, gratitude must yield to the duty that I believe I have toward our science.

Since Hofmann, accustomed in England to the highest favor, returned to Germany, he has discovered a rival in me, and withdrawn his earlier friendship; as often as I visited him in Berlin in hopes of a common but independent collaboration in chemistry, he has never reacted to my overtures, never graced me with a visit in Leipzig. He cannot stand it that I, quite contrary to my intentions, successfully compete with him in Germany.

In order to rule among chemists in Germany he founded the Chemical Society in Berlin for himself, and called it, not unintentionally, the 'German' [Chemical Society]. From this position - Hofmann *is* the Chemical Society, the others are his obedient lackeys and contrary Jew-boys - wherever there was an opportunity he has for years mistreated me, since I do not kowtow to him; in consideration of the past, I have held my tongue in these matters as far as possible. If only he had challenged me openly! But he is fond of setting others in motion, and remaining behind the curtains.

Don't take it amiss, if I openly say to you that I fear he has commandeered you as well, and is sending you into the encounter against me. I would be *very* happy were I mistaken in this, just as I should be just as sorry if, in case I am not in error, our good personal relationship of many years should thereby be troubled.

For, as I already told you orally, I am no longer the patient Kolbe, who, in blind faith (16) that others will act for me, allows everything to happen to me. I will decisively and powerfully repel every encroachment, every unjustified and uncalled-for attack, every misrepresentation of the truth in chemistry. I hope I *never* find myself in the position of defending myself against you.

Greet your dear wife and Bunsen, and thank you for the friendly reception at your home on Tuesday. Here the weather is heavenly, a southern climate. I feel like a new man.

Yours,
H. Kolbe

Unfortunately, this letter is representative of Kolbe's unbuttoned style of personal correspondence in his later years. His delusion of a Hofmann-led conspiracy against him suggests symptoms of paranoia; the extreme self-confidence of Kolbe's position, the assertion that Hofmann's enmity had arisen from Kolbe's independence and competition as a chemist, and the implicit threat in the penultimate paragraph, suggest megalomania. In fact, Hofmann had become repelled by Kolbe's language and attacks, essentially breaking his relationship with Kolbe after February 1873. Like Kopp, Hofmann was broad-minded and liberal - even if ambitious and inclined toward vanity, as Kolbe thought - and he found Kolbe's outspoken prejudices increasingly intolerable. The tragedy was that Kolbe had destroyed his own career by these actions. At the time of his call to Leipzig, in 1865, few European chemists could compare to him in productivity and significance of research. Within a few years his reputation had declined markedly. By the time of his death, in 1884, most obituarists felt called upon to comment on these events, and to offer exculpatory considerations - especially Kolbe's ardent love of the science of chemistry, and his fearless outspokenness.

As it turned out, Kolbe had less to worry about Kopp's "transgression" than he assumed. In the *Molekularwelt*, Kopp described valence theory in anthropomorphic terms: carbon atoms are "four-handed," oxygens "two-handed," and so on, with all hands "gripped" by another atom. This is a lovable characteristic of atoms, Kopp commented, like a child who needs to go to sleep with one hand in her mother's, the other thumb in her mouth. One-handed hydrogens link together and dance a "respectable but reckless Laendler;" other, more complex molecules perform chassés, allemandes, line dances, and other figures (17).

A long and important passage compares Kekulé's "democratic" notion of a chain of carbon atoms, where each atom is chemically equally important, with Kolbe's more hierarchical radical-based conception - though Kopp did not mention either chemist's name (18). Kopp obviously tried to be scrupulously tactful and fair here: both views have advantages, they are in fact quite similar in all important respects, and neither can ever hope for absolute validation. But a close reading leaves little doubt where Kopp's preference lay, namely with Kekulé; he even declared the incipient field of stereochemistry to be justified and respectable.

When he came to aromatic compounds, the carbon atoms were dancing "ring around the rosy," that is, in Kekulé's benzene ring, of which Kopp confessed being exceedingly fond. "But in the evening of my life," he added, "I often find it a bitter thought, that I came to this world with the unfortunate characteristic of constantly seeking my place between two stools." So here, too, he confessed that he found the alternative theory of benzene appealing as well, and could not make a definite decision between them (19). Perhaps slyly, he did not name the alternative, but Kolbe's theory was one of the possible options to which he may have been referring. In any case, there is no evidence that Kolbe ever took serious offense or complained about Kopp's *Molekularwelt*.

In his preface, Kopp commented that he had edited the essay before publication, in order to eliminate some "harmless fun" that might have been taken too personally by some (20). There is no reason to doubt that in this masterly fantasy Kopp was indeed trying to be tactful with Kolbe and others who stood aloof from structure theory, by then the reigning orthodoxy among organic chemists, while subtly giving it his support. One of Bunsen's students later conjectured that Kopp was gently trying to teach his friend Bunsen about the modern theories, to which he was so indifferent, by means of this piece; another historian has suggested that Kopp wrote with more diffidence toward the theories than he really felt, since he was writing for the staunch empiricist Bunsen (21). But there is also every indication that in the final analysis Kopp counted himself among the fence-straddlers, as he forthrightly stated. This was not an uncommon attitude among the older generation in the last third of the century: not only Kopp and Bunsen, but also Liebig, Wöhler, and Dumas all fit this pattern after around 1840, as well as Liebig's successor and Kopp's former colleague in Giessen, Heinrich Will. Even Hofmann, closely associated with the new chemistry, was remarkably cautious in theoretical matters throughout his life. The essential difference between Kopp and Bunsen in this regard was that Kopp was fascinated by theories, even if ultimately noncommittal; Bunsen, on the other hand, was indifferent to the point of hostility to all hypothesis and theory in science.

It is likely that Kopp's inveterate indecisiveness towards chemical theory, which may ultimately have worked to limit his scientific reputation, contributed positively to his sterling qualities as a historian. His conventionalist philosophy and circumspect attitude toward the controversies of his day, along with the influence of Ranke's critical historiography, helped to produce those conscientious and judicious qualities of his historical work that were and are so greatly admired, in his day as in ours. To see the difference, one only need compare any of Kopp's works to the tendentious historical writings of his contemporaries Hoefer, Wurtz, Kekulé or Kolbe. Kopp sincerely and habitually - and largely successfully - tried to depict "wie es eigentlich gewesen ist;" Hoefer, Wurtz, Kekulé, and Kolbe all had important subtexts. It is only a shame that Kopp's occasionally nearly impenetrable Germanic style has severely limited the number of non-German chemists and historians

who have read his admirable books.

References and Notes

Acknowledgments: The research for this essay was generously supported by the National Endowment for the Humanities. I thank the staff of the Deutsches Museum, and especially Drs. Otto Krätz and Elisabeth Vaupel, for their many kindnesses to me on my visits to Munich, for helpful correspondence, and for permission to publish this letter draft. I also thank Vieweg Verlag, Wiesbaden, for use of their archive of 524 Kolbe letters.

1. There are no satisfactory biographies of either Kopp or Kolbe, though the articles and references in the *Dictionary of Scientific Biography* are useful. On Kopp, see also M. Speter, "'Vater Kopp': Bio-, Biblio- und Psychographisches von und über Hermann Kopp," *Osiris*, **1938**, *5*, 392-460, and E. Thorpe, *Essays in Historical Chemistry*, Macmillan, London, 1911, Chaper 12. I am currently engaged on a full-scale biography of Kolbe.

2. J. Weyer, *Chemiegeschichtsschreibung von Wiegleb (1790) bis Partington (1970)*, Gerstenberg, Hildesheim, 1974, pp. 83-84 and 90-92; W. Strube, "Zur Geschichtsauffassung J. B. Trommsdorffs und H. Kopps," *Wiss. Z. TH Chemie Leune-Merseburg*, **1963**, *5*, 377-378.

3. H. Kopp, *Entwickelung der Chemie in der neueren Zeit*, Oldenbourg, Munich, 1873. The work was published in three parts, beginning in 1871.

4. Kopp to Liebig, 16 January 1871, Bayerische Staatsbibliothek, Liebigiana IIB, cited in Speter, p. 421.

5. Reference 3, pp. viii-ix.

6. "Heranbildung der neueren Lehren über die chemische Constitution der Körper," *ibid.*, pp. 707-839.

7. H. Kolbe, "Ueber einige Abkömmlinge des Cyanamids," *J. Prakt. Chem.*, **1870**, *109*, 288-306, on 292-294.

8. See, for example, H. Kolbe, "Zeichen der Zeit: II," *J. Prakt. Chem.*, **1877**, *124*, 473-477 (on van't Hoff and Wislicenus); "Kritik der Rectoratsrede von Aug. Kekulé," *ibid.*, **1878**, *125*, 139-156; "Die chemische Synthese, ein chemischer Traum," *ibid.*, **1878**, *126*, 432-455 (on Baeyer); and "Meine Betheiligung an der Entwickelung der theoretischen Chemie," *ibid.*, **1881**, *131*, 305-323 etc. (an historical article on himself, Frankland, Kekulé, and all of his enemies).

9. H. Kopp, "Ueber die specifischen Volume flüssiger Verbindungen," *Ann. Chem.*, **1854**, *92*, 1-32, on 24-25, 28-29. Kolbe noted Kopp's apparent conversion in his letter to Eduard Vieweg of 23 October 1854 (in the archive of Vieweg Verlag, Wiesbaden, 311K, Kolbe letter no. 87).

10. Kolbe to Heinrich Vieweg, 15 June 1879 and 6 November 1882, Vieweg archive, Kolbe letters no. 443 and 482.

11. Kolbe to Heinrich Vieweg, no date but ca. January 1882, Vieweg archive, Kolbe letter no. 476.

12. H. Kopp, *Aus der Molekularwelt*, 3rd ed., Winter, Heidelberg, 1886. The preface, which contains a reference to the original date of composition (p. viii), is dated March 1882. The original press run must have been very small, as existing copies I have encountered are from subsequent printings.

13. H. E. Roscoe, "Bunsen Memorial Lecture," *J. Chem. Soc.*, **1900**, *77*, 513-554, on 552, citing a letter from Kopp to Roscoe.

14. Sondersammlungen, Library of the Deutsches Museum, document no. 3633. The date of Kolbe's visit to Kopp and the date the draft was begun may be inferred from the circumstance that in the first line Kolbe wrote "vorgestern," then subsequently crossed it out and wrote "Dienstag." The nearest Tuesday to the date of the letter was 7 March 1882. It appears that he first dated the letter 10 March, later changing it to 12 March. Presuming the date of the visit was indeed Tuesday 7 March, he may have begun the letter on the 10th, initially under-counted the days back to the visit (hence having to change "vorgestern" to "Dienstag"), then finished it two days later and changed the date to the 12th, when the putative fair copy was made and posted.

15. I conjecture this has to do with Kolbe's call to Marburg in 1851. Hofmann was actually the first choice of the Marburg faculty, but he declined. In a letter to Liebig of 18 May 1851, Hofmann cited his personal relationship with Kolbe, whom he knew was next in line for consideration, as a factor in his decision: W. H. Brock, ed., *Justus von Liebig und August Wilhelm Hofmann in ihren Briefen (1841-1873)*, Verlag Chemie, Weinheim, 1984, p. 113.

16. These two words are canceled. I reproduce them here, as I cannot make out the interlineated revision.

17. Reference 12, pp. 2-3, 10-16, 30, 42-45. It is interesting to note how much of the satire *Berichte der Durstigen Chemischen Gesellschaft* (Berlin, 1886) derives from Kopp. Kopp even mentions apes who, counting their prehensile tails, are "five-handed" (p. 6).

18. *Ibid.*, pp. 17-29.

19. *Ibid.*, pp. 33-34.

20. *Ibid.*, p. viii.

21. H. Goldschmidt, "Erinnerungen an Robert Wilhelm Bunsen," *Z. angew. Chem.*, **1911**, *24*, 2137-2140, on 2140; G. Lockemann, *Robert Wilhelm Bunsen*, Wissenschaftliche Verlagsgesellschaft, Stuttgart, 1949, p. 195.

22. The familiar form of address indicates an intimate, and probably old, friendship.

23. The original German transcription is as follows:

Lieber Kopp! Gersau, den 12. März 82

Die mysteriösen Andeutungen, welche Du (22) mir am Dienstag über eine von Dir zu erwartende Publikation machtest, lassen mich ein Vergehen Deiner gegen mich vermuthen. Ich bin auf den Inhalt derselben begierig, um so mehr, als meine Feder *Dich* stets verschont hat.

Ich kann mir denken, dass die Derbheit überhaupt die Form meiner Angriffe oder richtiger Abwehr gegen Kekulé Dir nicht behagt, dass Dir auch meine Beurtheilung von Beyers [sic] und Wislicenus' Arbeit nicht gefällt. Aber ich gebe, falls Du Dich berufen fühlen solltest, Kekulé in Deinen Schutz zu nehmen, Dir zu bedenken, dass Du Dich eines unehrenhaften Charakters annehmen würdest, welcher Fälschung der Thatsachen und Diebstahl nicht scheut, um

seine Ehrsucht zu befriedigen und um seinem Hasse Genüge zu leisten.

Kekulé ist, wenn ich ihn recht kapire, zu feige, um mir jetzt nach dem Aufdecken seines schmählichen Treibens, offen die Spitze zu bieten.

Eben so leid sollte es mir sein, wenn Du für Hofmann die Kastanien aus dem Feuer solltest holen wollen. Wie ich Kekulé tief verachte, so hoch schätze ich Hofmann und zwar nicht bloss als Chemiker sondern auch als Mensch, *so weit* seine unbändige Eitelkeit - sein grösster Feind - ihn nicht missleitet. Ich bin Hofmann aus früherer Zeit persönlich zu grossem Dank verpflichtet, und werde nie vergessen, was er für mich gethan hat (15) aber ich kann mich nicht zu seinem Sklaven machen. Ueber eine gewisse Grenze hinaus muss die Dankbarkeit der Pflicht nachstehen, welche ich gegen unsere Wissenschaft zu haben glaube.

Seit Hofmann, in England durch höchste und hohe Gunst verwöhnt, nach Deutschland zurückgekehrt ist, hat er in mir einen Rivalen entdeckt und mir seine frühere Freundschaft entzogen; so oft ich ihn in Berlin besuchte, in der Hoffnung auf ein gemeinschaftliches aber unabhängiges Zusammenwirken in der Chemie, hat *er* auf mein Entgegenkommen nie mehr reagirt, nie mich in Leipzig mit seinem Besuche erfreut. Er kann es nicht vertragen, dass ich, ganz gegen meine Intention, mit ihm in Deutschland erfolgreich concurrire.

Um in Deutschland unter den Chemikern zu herrschen, hat er sich die chemische Gesellschaft in Berlin gegründet, und sie nicht ohne Absicht "die Deutsche" genannt. Von dieser Stelle aus - Hofmann *ist* die chemische Gesellschaft, die andern sind seine gehorsamen Trabanten und widrige Judenjungen - hat er mich da ich mich ihm nicht unterdrücke seit Jahren wo sich Gelegenheit bot misshandelt; ich habe mit Rücksicht auf die Vergangenheit, so weit es anging, dazu geschwiegen. Hätte er nur offenes Visir gezeigt! Aber er liebt es, Andere in Bewegung zu setzen, und sich selbst hinter den Coulissen zu halten.

Nimm es mir nicht übel, wenn ich hier Dir offen sage, dass ich fürchte, er hat auch Dich gekapert, und schickt Dich gegen mich ins Treffen. Ich würde mich *sehr* freuen, wenn ich darin irrte, eben so wie es mir sehr leid sein sollte, wenn, falls ich nicht irre, unser jahrelanges gutes persönliches Verhältniss dadurch getrübt werden sollte.

Denn, wie ich Dir mündlich schon sagte, ich bin nicht mehr der geduldige Kolbe, welcher, im blinden Vertrauen, (16) dass Andre meine Sache führen werden, Alles über sich ergehen lässt. Jeden Uebergriff, jeden unberechtigten und unberufenen Angriff, jede Enstellung der Wahrheit in der Chemie, weise ich mit Entschiedenheit kräftig zurück. - Möchte ich *nie* in die Lage kommen, gegen Dich Abwehr üben zu müssen.

Grüsse Deine liebe Frau und Bunsen, und habt Dank für die freundliche Aufnahme bei Euch am Dienstag. Wir haben hier himmlisches Wetter, südliches Clima. Ich fühle ich [sic] mich ein ganz anderer Mensch.

Der Deinige,
H. Kolbe

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CHEMICAL ARTIFACTS

The Butlerov Museum at the University of Kazan

John H.Wotiz, Southern Illinois University at Carbondale

Kazan, the capital of the Tartar Soviet Republic, is located about 1000 kilometers east of Moscow near the Volga River (1). The University of Kazan was founded in 1804 and remained for a long time Russia's eastern most outpost for science and higher education. Its cultural influence reached into the Volga region, the Urals, Western Siberia, the Caucasus, as well as into Kazakstan and Central Asia. One of its early graduates was Nikolai Lobachevsky (1793-1856), the founder of non-Euclidian geometry. As Rector and Chairman of the Building Committee (1827-1846), he was responsible for the construction of many of the university buildings, including those for chemistry.

The Butlerov Musuem houses artifacts relating to the work and careers of several famous Russian chemists connected with the University of Kazan. Though chemistry was first taught at Kazan in 1805 by German faculty largely imported from the Baltic region (2), it did not achieve an international

Aleksandr Milhailovich Butlerov