

2 Setting the Course

After 6 years of studies, his achievements—a Ph.D. and the teacher’s certificate—let Sommerfeld look confidently to the future. Graduates of the mathematical physics seminar at the University of Königsberg, among whom he now could count himself, normally went on to careers as high school teachers.¹ The teaching certificate qualified him only in the subject matter for this profession, however. Before final qualification, he had yet to complete a probationary year, to demonstrate his practical abilities for a teaching career. But Sommerfeld was in no hurry to move ahead with this. For now, he still had his military obligation to fulfill. As the graduate of a humanistic high school, he belonged to the privileged class who, as “one-year volunteers,” could opt for an abbreviated term of military service instead of the normal 3-year term.

2.1 Missed Opportunities

First, though, Sommerfeld treated himself to a trip to the south. For an East Prussian from Königsberg, the mountain world of the Alps held a magical attraction. “To the Alps! You know the magic in that word, of course,” he wrote home. The letter bespeaks the impetuous lust for life of a 23-year old, hungry for experience, turning to all the things life offers up for which during his years of study there was too little time. Among these were excursions into the world of nature, as well as the pleasures of music and art. “Went hiking for the first time today, and also for the first time got soaked to the skin,” he wrote on his arrival at Garmisch-Partenkirchen. The Zugspitze showed him “graciously its somewhat dour face, but then, smack! A curtain of fog like the theater at Bayreuth.” That facing the cloud-hung mountains recalled Bayreuth was no coincidence; he linked this trip with a visit to the Wagner Festival. No less than with the Alps and Wagnerian operas, he was fascinated by the Bavarian lifestyle. In “a variety of beer pubs,” he obtained a “heavenly impression” of Munich. Here, everything was “much more relaxed, reasonable; in Berlin, more businesslike, ostentatious.” Thus, he compared Munich and Berlin, where he had spent several days at the start of his journey. Amid all the congenial atmosphere of the Bavarian beer pubs, he did not neglect art and culture. He went to see the ancient sculpture at the Glyptothek and enthused over the paintings of Arnold Böcklin (1827–1901), Anselm Feuerbach (1829–1880), and other nineteenth century masters in the Schack Gallery. “Then I went to one of the Munich attractions you won’t know about, the Würm Baths. Scattered among flower beds is the greatest variety of basins, grottos, and springs of different

¹ Volkmann, *Franz Neumann*, 1896, pp. 59–67; Olesko, *Physics*, 1991.

temperature, fed from the clear water of the Würm. You get sprayed by the giant frogs, swim through the blue grotto, then through a red one, and take showers of all sorts. The whole thing is as lush as a painting by Böcklin.”²

Why not mix business and pleasure, he must have said to himself, for the visit to the Bayreuth Festival, the Alps, and the attractions of Munich were not the only reason for this trip. The annual congress of the German Mathematics Association was to take place in Nürnberg in September 1892. Walther Dyck (1856–1934), professor of higher mathematics and analytical mechanics at the Munich Technical University and organizer of this congress, was preparing an exhibition of mathematical models and instruments that was to include harmonic analyzers. Sommerfeld wished to use his stay in Munich to introduce himself to Dyck to discuss the demonstration of the harmonic analyzer he and Wiechert had constructed.³ “Prof. Dyck not at home,” he wrote his parents, and requested in the same breath that Wiechert be instructed “in the niceties of formal attire.”⁴ Apparently, observing social conventions on such occasions was not a matter of indifference to him.

But the timing of a visit to Dyck at the end of August 1892 was conceivably ill chosen, for shortly before, cholera had broken out in Hamburg, and Dyck was feverishly occupied with averting the threat of cancellation of the Nürnberg Congress. It was feared that large gatherings of people would spread the epidemic uncontrollably. On September 1, Dyck decided regretfully to cancel after all, since Nürnberg “was afraid of 50 mathematicians,” as he wrote a colleague.⁵ For Sommerfeld, this came as a bitter disappointment. He heard about the cancellation when he was in Meran, where each day, “hungry for Cholera news,” he pored over the newspapers. “Not even the lovely setting of Bolzano mitigates the aggravation,” he complained, bemoaning the fact that he would now not have the chance in Nürnberg “to get closer socially” to the luminaries of mathematics.⁶ By chance, he met one of these luminaries, the Tübingen mathematician Alexander von Brill (1842–1935), at his holiday venue. Brill was an enthusiastic mountain trekker and was to preserve a “happy memory of our first meeting in the mountains,” as he wrote Sommerfeld many years later.⁷ At the Nürnberg Congress, Sommerfeld would have been able to deepen his “cordial acquaintance” with Brill and broaden his acquaintance with other leading mathematicians as well. He could have reaped the fruits of his Königsberg efforts with a demonstration of the harmonic analyzer.

“It’s damned bad luck!” he said airing once more his irritation over the cancellation of the Nürnberg Congress; “I’d gladly forego a couple of my 4 Oetzal peaks.” But he didn’t let it spoil his vacation. “Otherwise, everything has gone as I wished, in the most daring sense of the word,” he wrote proudly. “My energetic mountain climbing

2 To his parents, August, 25, 1892.

3 Hashagen, *Walther von Dyck*, 2003, pp. 419–424.

4 To his parents, August 25, 1892.

5 Hashagen, *Walther von Dyck*, 2003, p. 424.

6 To his parents, undated [early September, 1892].

7 From Alexander von Brill, December 5, 1928. DMA, HS 1977-28/A,41.

has won general admiration," he reports a mountain guide having told him; he could "climb on any of the peaks." To be sure, his feet reminded him of the rigors endured crossing snow fields wearing inadequate shoes; he was unsure "whether it was frost-bite, or merely general overexertion." On the way, he befriended an American, with whom he hobbled about, competing over who was the greatest "martyr for this sport." At the same time, he dispelled his parents' anxieties that he was indulging in overly daredevil climbing adventures. He had undertaken "no dangerous, only strenuous" mountain treks, and with the fine weather and his "total immunity to vertigo," even "the so-called dangerous routes" had been "perfectly safe." He felt such a total absence of vertigo that he considered "vertigo either humbug or simply fear."⁸ Ultimately, the tone of his letter reveals also how close his ties to his parents were. "Your loving, anxious letters, dear Mother, have filled me with the wish to be with you. I have to confess that earlier, I was focused almost entirely on the here-and-now, and thought of Königsberg only when I heard something about the cholera."⁹

In the nineteenth century, cholera recurred constantly and was accepted almost fatalistically as an unavoidable epidemic. But the cholera epidemic that broke out in Hamburg in mid-August 1892 went down in history.¹⁰ It broke out with unparalleled ferocity and occasioned fear of the epidemic far beyond the borders of Hamburg, as Sommerfeld's reaction from the South Tyrol attests. The public followed its course as scarcely any previous epidemic. Up to August 20, 115 cases and 36 deaths had been recorded. Two days later, the number of cases had tripled, and 200 had died. Thousands of Hamburg citizens fled the city in panic. At the same time, measures were now finally taken to control the epidemic. Robert Koch (1843–1910) traveled to Hamburg on commission from the Imperial government. Almost a decade earlier, he had discovered the pathogenic cholera agent and now headed a newly established Institute for Infectious Diseases. Koch identified the cause of the epidemic as Hamburg's drinking water. The cholera bacterium, resident in the patient's intestine, found its way through sewage into the Elbe and from there back into the drinking water. On August 26, 995 cases and 317 deaths were recorded. The same day, the Hamburg city authorities responded to Koch's assessment and through a police decree warned against the use of water that had not first been boiled. Already in the first days of September, a decline in recorded infections and deaths was recorded. Purification of Hamburg's drinking water took a while longer to be realized; nonetheless, further outbreaks of cholera occurred neither in Hamburg nor elsewhere in Germany. The preventative measures proved effective, even if here and there (such as in the case of the cancellation of the Nürnberg Congress of the German Mathematics Association, in light of the small number of participants) they might have appeared exaggerated. The conference, along with its exhibition of

8 Here, Sommerfeld employs a pun impossible to render as a pun in English: "Schwindel" means both "dizziness," "vertigo," and "swindle," "humbug."

9 To his parents, undated [early September, 1892].

10 Evans, *Tod*, 1990.

mathematical models and instruments, was rescheduled and held a year later in Munich.¹¹ This was no consolation for Sommerfeld; in 1893, as a 1-year volunteer, he was fulfilling his military service and therefore could not take part in it.

On his return to Königsberg from his vacation in the Alps, he learned that Adolf Hurwitz, whose lectures on function theory and elliptical functions he had attended, had invited him to be his assistant at the Federal Technical University (ETH) in Zürich, where Hurwitz had been appointed successor to Ferdinand Georg Frobenius (1849–1917). Sommerfeld's mother had informed Hurwitz, however, that following his return from his trip, her son needed to begin military service. As soon as he learned this, Sommerfeld wrote Hurwitz, "When she wrote her letter, my mother assumed my year of service could not be postponed." As he had learned from the military authorities, a postponement would certainly have been possible. "I telephoned you at once, but to my great disappointment, it was too late." He would have "snapped up the offer," for his "love of scientific work was too great for him to pass over unconsidered any connection with scholarship." So nothing was left for him "but to curse those days I had spent too long on my trip, and to ask you to keep me in mind in the event of a future vacancy. I would of course be especially grateful for a position immediately upon completion of my year of service, that is, October, '93. I hope it not indiscrete of me to trouble you for an indication whether you might be able to offer me any prospects for that time-frame?"¹²

2.2 Military Service

The notification of a renewed offer for which he had hoped did not materialize, but the fact that he was even considered as a candidate for the position of assistant strengthened Sommerfeld's resolve to pursue an academic career. Following service as a 1-year volunteer at Königsberg, he would have been able to complete his probationary teaching year and thereby complete the final qualifying stage for a secure career as a high school teacher. But now his heart was set on something loftier. He wanted to complete the habilitation in order to become a university professor. Should this prove impossible with Hurwitz at the ETH in Zürich, then at some other university. Perhaps he was already now dreaming of pursuing mathematics under the wing of Felix Klein, who was in these years transforming Göttingen into a world center of mathematics. Klein must already have become an idol for Sommerfeld when he attended Hilbert's lectures, for since 1886 Hilbert and Klein had been engaged in an intense correspondence. It would be surprising had Hilbert not raved to his Königsberg students about Klein, whom he soon followed to Göttingen.¹³

For the time being as a soldier, though, Sommerfeld was in no position to realize his dreams of a career. On October 1, 1892, he reported for duty with the 43rd

11 Hashagen, *Walther von Dyck*, 2003, pp. 419–436; Dyck, *Katalog*, 1892, Foreword.

12 To Adolf Hurwitz, September, 1892. SUB, Mathematiker-Archiv 79, 260. Also in ASWB I.

13 Frei, *Briefwechsel*, 1985.



Fig. 5: After completing his education, Sommerfeld fulfilled his military obligation as a “one-year volunteer” in an infantry regiment at Königsberg. He took little pleasure in the often tedious daily round of the soldier, however. He had “never felt [himself] to be strong militarily,” he wrote a colleague at the outbreak of World War I (see Chap. 7) (Courtesy: Deutsches Museum, Munich, Archive).

Infantry Regiment.¹⁴ This regiment was stationed at Königsberg, and in fact the barracks were located at Steindamm very close to Sommerfeld’s parents’ home. One-year volunteers were allowed to choose their unit and the location where they would fulfill their year’s service. They were also not required to live at the barracks, so that Sommerfeld could fulfill his service while living at home. The privileges granted 1-year volunteers required a military-friendly orientation within the educational community.¹⁵ With his essay on the “Fellowship among Volunteer Medics in War,” Sommerfeld had already clearly reflected this attitude. “And just at this time, when the people are making the greatest efforts at keeping the Fatherland defense-ready, we will place special value on remaining faithful in this regard,” he had written in *Burschenschaftliche Blätter*.¹⁶

¹⁴ Bescheinigung, DMA, NL 89, 016, Mappe 1.7.

¹⁵ Mertens, *Bildungsprivileg*, 1990.

¹⁶ Sommerfeld, *Genossenschaft*, 1890, p. 220.

Physically, too, military service was no very great challenge for Sommerfeld, who was an Alpine-tested mountain trekker. “Today, just the brief note that despite the heat I have not expired, and despite the dust, have not silted up,” he wrote in mid-summer of 1893 reporting a maneuver from Masuria home to Königsberg. “One day, though, it was a little crazy; I can take it though.” There was no enthusiasm for military routine, however. “Listening to the soldiers’ songs being belted out makes my eardrums burst,” he wrote on one occasion. Another time, he poked fun at a General who “was displaying his brilliance to the officers,” through whose speech he “had slept on a pile of straw.” The letters from the maneuver show that he could hold his own even under nasty circumstances and knew how to make the best of any situation. “Beautiful countryside, good fellowship, good food,” he wrote on a postcard. “The hard work is doing me much good.” Nor did he allow the stresses and strains to detract from his appreciation of the beauty of the Masurian lakes. “My present quarters are fabulous, our situation on Lake Kosno, fabulous” he wrote at the end of a strenuous day’s march. “Imagine a large lake, 5 kilometers long, 2 wide. Its shoreline, now wooded, now pasture, winding right and left until it disappears behind a green backdrop. Water, of a beautiful clarity, whipped by the wind to white waves, and beautifully colored by the blue of the sky.”¹⁷

2.3 Mineralogical Interlude

Even before he had concluded his military service, Sommerfeld heard through a friend of the family that the mineralogist Theodor Liebisch (1852–1922), appointed some years earlier at Göttingen from Königsberg, was seeking an assistant. “I spoke of you to Adelheid,” the friend confided, “and suggested that you would likely go to Göttingen.” Adelheid was the wife of the mineralogist in question. Another professor’s wife, who was to hear nothing about the situation however, was Lisbeth Lindemann (1861–1936), the wife of Sommerfeld’s doctoral advisor, who was appointed at Munich the same year. The professors’ wives presumably did not wish to be liable to the charge of indiscretion; thus, the situation was treated as a matter of secrecy. “At present, Lisbeth knows nothing,” the family friend added by way of explanation. She described the crux of the matter thus: “Adelheid asked me whether you might wish to accept the position of assistant to her husband; I said I didn’t want to mention it to you before I knew for sure it would still be available in October, and what Professor Liebisch thought of the matter. Just today, I received a letter from the Professor saying he would be very happy if you would be in touch with him, since he had heard only good things about you. First of all, then, we need to know whether you are at all inclined to accept this position. Adelheid thinks you could learn much from it.”¹⁸

17 Letters to his mother, end of July to beginning of September, 1893.

18 From Margarete Erdmann, July 7, 1893.

The observation “that you would likely go to Göttingen” indicates that even without the offer of a position as assistant to Liebisch, Sommerfeld would not have continued his career as a high school teacher in the Prussian educational system. Since 1886, Klein had been working to turn Göttingen into a Mecca of mathematics. In collaboration with the equally legendary Friedrich Althoff (1839–1908), who was setting the course for a new high school policy at the Prussian Ministry of Culture, Klein’s significant influence extended far beyond Göttingen, where appointments to mathematical teaching positions and other consequential matters in his field were concerned. Even in the area of science policy, Prussia played a major role in the German Empire, and in Klein, Althoff had a fellow warrior and confidant, who shared his aspirations, and spared no efforts to realize them. Faced with limited resources, Althoff wanted to erect beacons of German science by concentrating scientific talent in universities where local tradition had raised one field of study or another to particular prominence. The archaeological sciences, for instance, would flourish at the University of Berlin. At Göttingen, where such important mathematicians as Carl Friedrich Gauß (1777–1855), Gustav Lejeune Dirichlet (1805–1859), and Bernhard Riemann (1826–1866) had worked, mathematics would shine above all.¹⁹ The natural sciences, in which Göttingen was also traditionally strong, would of course benefit from this glory too. One has only to think of the physicist Georg Christoph Lichtenberg (1742–1799) or the chemist Friedrich Wöhler (1800–1882). In the “Althoff System,”²⁰ even well-established professors became chessmen in a university policy calculus, which—depending on the particular chess move—aroused embitterment or admiration. Klein’s position was at all events substantially enhanced by his association with Althoff.

To his reputation as a mathematician could be added the aura of organizer of science. This role came into play, for instance, in the 1892 Göttingen appointment of Heinrich Weber (1842–1913), who had taught at the Albertina in Königsberg from 1875 to 1883, and numbered Hilbert among his students there.²¹ Together with Weber, Klein founded the Göttingen Mathematical Society and reorganized the Göttingen Society of Sciences. Weber must have enhanced the attraction of Göttingen for Sommerfeld still further, even if his principal interest lay in “Felix the great,” as Klein had admiringly been dubbed in mathematical circles. In America during the summer of 1893, Klein represented German mathematics at the World’s Fair in Chicago.²² With its universities exhibition, the Empire of Kaiser Wilhelm used this occasion to place itself in the limelight as a leading cultural nation among world powers. In this regard, Mathematics was a particular asset. With portraits of Dirichlet, Riemann, and other great mathematicians, a bust of Gauß, along with a

19 Rowe, *Felix Klein*, 1989; Tobies, *Development*, 2002.

20 Brocke, *Hochschul- und Wissenschaftspolitik*, 1980.

21 Peter Roquette: Heinrich Weber, David Hilbert, and Königsberg, 1992. <http://www.rzuser.uni-heidelberg.de/~ci3/weber.pdf> (29 January 2013).

22 Parshall/Rowe, *Emergence*, 1994, ch. 7.

display of textbooks, technical journals, and hundreds of dissertations and habilitation theses, Klein demonstrated to the world that in this field, Germany was world class.²³ Even the harmonic analyzer Sommerfeld had so dearly wished to have demonstrated in Nürnberg in 1892 was exhibited in the form of large format photographs (the apparatus itself was exhibited around the same time in Munich, where the exhibition planned for Nürnberg, but cancelled due to the cholera outbreak, was realized). For several weeks following the World's Fair, Klein remained in Chicago to highlight in guest lectures mathematical accomplishments of German provenance. He wrote later to Hilbert that "In Chicago in a series of lectures," he had had "the opportunity to present a kind of particular program."²⁴

The offer of a position as assistant at Göttingen must have come at just the right time for Sommerfeld, then, even if he was to work only at a mineralogical institute. If one pursued this field as a theoretician, there were many bridges from mineralogy to mathematics. Perhaps the offer also awakened memories of the time when Arnold and his father had roamed through the East Prussian countryside searching for mineral specimens. The Association of Physics and Economics of Königsberg, of which Franz Sommerfeld and, since December 1891, Arnold too were members, set a high value on the science of mineralogy; its archive contains a number of reminiscences of his father's passion for minerals and that of other members as well.²⁵

Why not mineralogy, then? Sommerfeld may well have asked himself when he hung up his soldier's uniform in September of 1893 to devote himself once more to his career. Liebisch had lectured on mineralogy as professor at the Albertina from 1884 to 1887 and had pursued his mineralogical research "in a strict mathematical spirit," which put him into a close collegial relationship above all with Lindemann and Volkmann.²⁶ Thus, even at the Göttingen mineralogical institute, Sommerfeld did not have to feel himself entirely cut off from his Königsberg roots. As soon became evident, Adelheid Liebisch was to treat her husband's assistant with almost maternal solicitude. Liebisch himself proved "exponentially more amiable," Sommerfeld wrote his parents shortly after his arrival in Göttingen; he had even "gone with him to pubs" and had helped him search for an apartment. Liebisch showed his new assistant his best side. "He says we'll write a book this winter, we have papers to prepare, we have to go to Vienna to the Natural Scientists's Assembly." Sommerfeld probably sensed that working for this boss, there would be precious little time left over for his continuing interests in mathematics. "He apparently wants total collaboration. Am I going to be able to manage that? I'm very fearful."²⁷

In addition to these initial qualms whether with the job as assistant at the mineralogical institute he had set the right course for his academic career, there was also

23 Hashagen, *Walther von Dyck*, 2003, p. 434.

24 Klein to Hilbert, October 27, 1893, printed in Frei, *Briefwechsel*, 1985, p. 99.

25 Franz Sommerfeld, *Familie der Quarze*, 1900.

26 Schulz, *Theodor Liebisch*, 1922, p. 419.

27 To his parents, October 9, 1893.

a certain amount of homesickness. Through his correspondence at least, he assured his mother, he was going to maintain his contact with home. "In any case, you will hear everything from me that might interest you, both happy and sad. That I'm committed to. For what is the good of scribbling, if only to jot down humbug?" He reassured himself with respect to his work with Liebis. "Mornings from 9:00 to 1:00 I'm at the institute; afternoons, from 4:00 to 8:00. During this time, though, I've been busy with institute-related work only minimally up to now. The only point of concern is whether I will end up in the right field of work." He certainly did not want to devote himself entirely to mineralogy; he was too fond of mathematics for that. On this point, from the very beginning, he left Liebis in no doubt. Liebis tried to make the field of work palatable to him through a compromise proposal: "Liebis thinks I ought to do work in crystallography, which requires mathematical experience; he expects that after one year, I will have completed my habilitation thesis in this branch." As attractive as this proposal was, it couldn't dissipate Sommerfeld's fundamental doubts. "Work like that," he explained to his mother, "would, on the other hand, require significant experimental skill. It would be physics, not mathematics."²⁸

A glance at Liebis's publications shows that Sommerfeld's doubts were entirely justified. In February 1893, the Göttingen Academy published a report by Liebis "On the Spectral Analysis of the Interference Colors of Optically Biaxial Crystals, I," which dealt with microscopic observations of crystal-optic phenomena, not with mathematical analysis. The addition "I" indicated that Liebis intended to deepen this kind of crystal research with subsequent papers.²⁹ Future work at the mineralogical institute, Sommerfeld feared, would leave him little time for his true interests. "Once involved in the activity of observation, not much would come of any thorough, purely mathematical work. Professor Wallach advised me rather against a career such as Professor Liebis has in mind; Liebis-style mineralogy in Germany is not, in his opinion, an item much in demand."³⁰ In the person of the Göttingen chemist Otto Wallach (1847–1931), Sommerfeld found an advisor he quickly came to trust. Wallach was also from Königsberg and was even distantly related to Sommerfeld. His father was the vice president of the East Prussian administration. Wallach family roots on his mother's side are traceable to the time of Frederick the Great, when an ancestor in Königsberg was assigned the reorganization of the Prussian administration. Because they both came from Königsberg, Sommerfeld regarded the nearly 20-year older Wallach as a fatherly friend, to whom he could open his heart. Occasionally, too, he was invited over by Wallach, who led the life of a bachelor. "He has an awful lot to do, and is very diligent," Sommerfeld reported after an evening at Wallach's, at which he was served a "rather dangerous Spanish wine" and no doubt a few internal tidbits from the world of the

²⁸ To his mother, October 13, 1893.

²⁹ Schulz, *Theodor Liebis*, 1922.

³⁰ To his mother, October 13, 1893.

Göttingen professors as well.³¹ The better he came to know the chemist, the more he was impressed by him. “Always authentic, hard-working, utterly incisive, engaging, helpful,” was Sommerfeld’s characterization of Wallach. To his assistants he was “the kindest boss,” who in the case of every assignment at the institute explained “how it should be begun, carried out, and completed. Everything works together according to a great plan in order to scour an area of chemistry (the terpenes), and he is the integrating brain. He does not show off his importance. I visit him every two weeks or so for about an hour, and sometimes stay for supper.”³²

When Sommerfeld penned these lines, he had already been assistant at the mineralogical institute for 4 months and may very well have been regretting that he had not followed Wallach’s advice to resign his post. But at the start, Liebisch had shown his assistant only his best side. Two weeks after his assistant’s arrival in Göttingen, Liebisch still seemed “a magnificent man, a whole man” to him. “He stands like a mighty oak in the forest of the other professors, who (according to what I have heard) bend like small willows at the touch of an influential colleague (Klein, for instance) or a ministerial big shot (Althoff).” Particularly “enchanted” were his noon walks with Liebisch, from whom he heard details about academic life in Göttingen that he “would rather not commit to paper.” Liebisch was at pains “to educate him diplomatically in weathering the tricky local complexities of university life and gossip.” These included the ritual of house calls in which prospective lecturers³³ had to introduce themselves to university professors. Next Sunday, he informed his parents, he planned to begin his “visitation tour,” which “here has to be done dressed formally. Any other attire is a cardinal sin, and would mean an end to all hopes of habilitation.” His mother’s admonition to guard against the “temptations” of a strange town he found superfluous. “From the description of my way of life you can see there is no room for pursuit of extravagant pleasures. Besides, the temptations you probably have in mind are out of the question here in any case. Everybody keeps far too close tabs on his neighbor for that.” He found Göttingen “awfully small-townish,” and had “so far not gone out one single evening. Life here proceeds like clockwork. Besides, not many mothers can have sent their sons off to foreign places so confident in their respectability as you have sent me. So, no worries!”³⁴

31 To his mother, October 29, 1893.

32 To his mother, February 17, 1894.

33 Here and throughout this work, “lecturer” translates “Privatdozent,” a German academic rank, pre-professorial, but granted permission to lecture at the university. Privatdozenten are essentially free-lancers: with or without a stipend, they are occasionally employed as assistant professors (as Sommerfeld was for two years). When this term of employment is over, they return to the status of Privatdozent (lecturer). This status requires the “habilitation”—another qualifying ritual peculiar to the German university system. A successful “habilitation” carries with it permission to lecture. See chap. 3.4 for greater detail.

34 To his parents, October 13, 1893.

Two weeks later in the context of this “visitation tour,” sporting a top hat purchased expressly for the purpose, he had already paid his respects to several Göttingen professors, among them the theoretical physicist Woldemar Voigt (1850–1919), vice chancellor of the university, who soon thereafter would offer him an assistantship.³⁵ In other respects as well he gave his mother no grounds for disquiet. He was leading “the healthiest lifestyle in the world,” he assured his parents in far off Königsberg. Munich, with its beer halls, would have offered greater temptations. Here, by contrast, he was acquainted with “the drink ‘beer,’ supposedly so beloved of Germans, in name only.” The noontime stroll with Liebisch had in the meantime become a fixed feature of his daily routine. If it was not raining, these often turned into hours-long promenades. Additionally, heeding his father’s advice, he joined a gymnastics group, which included “several lecturers, some candidates for civil service, and a lieutenant,” meeting for an hour one evening a week at a gym. “I have a lot of fun with that.”³⁶

For Christmas, his parents wished to send him a piano so he could develop his musical talents, too. But the apartment Sommerfeld had rented did not allow for this. “I’d be thrown out at the first notes. The whole house is filled with studiousness; absolute quiet is sacred. So, much as I would like to, I wouldn’t be able to accept the Christmas gift in question.” He did not have to renounce the piano altogether however. He had opportunities to play at the house of his boss, albeit only at times of his absence, for Liebisch had no understanding of “such nonsense.” Sommerfeld also described his lodging in great detail for his parents. “A very large writing desk, a huge floor-to-ceiling bookcase, a small sofa, along with a table, mirror, clothes cabinet, and an iron stove. I suffer with the stove here. Either the room is cold, or the iron rascal cooks one’s brain dry.” All in all, though, he was content with his apartment. For a modest supplement to his rent, the landlady gave him breakfast, with coffee and rolls, and in the evening, bread, butter, sausage, and cheese. “In addition, she makes me—this is the main thing—a nice pot of tea. I’m confident she isn’t overcharging me. No extra charge for polishing my boots, service, etc.; it’s all covered in the 120 Mark [annual] rent.” At lunchtime, he ate at “the Hotel Royal for 1 Mark—with beer and tip, 1.15.” Liebisch had advised him to do so; eating at cheaper places would damage his reputation. This genteel dining style gave him little pleasure, though. “For one sits at a long table chatting, or more often, not chatting.”³⁷

At 120 Marks yearly rent, Sommerfeld had found a relatively economical apartment. His assistant’s salary was 1,200 Marks per annum.³⁸ The normal rent for a small two- to three-room apartment in Göttingen in the 1890s was about 180 Marks. Any prospective lecturer like Sommerfeld who had just climbed the first rung of the academic career ladder and had no other income was far from being able to count

35 To his mother, October 31, 1893.

36 To his parents, October 29, 1893.

37 To his parents, October 29, 1893.

38 To his parents, November 27, 1893.



Fig. 6: Sommerfeld felt his duties as assistant at the mineralogical institute of the University of Göttingen were “killing time mineralogically.” He rested all his hopes on Felix Klein, who offered the prospect of a career as lecturer in mathematics (Courtesy: Deutsches Museum, Munich, Archive).

himself among the middle or upper class. In 1890, a Göttingen police official at the lowest income level, for instance, earned between 1,125 and 1,275 Marks per annum plus a housing supplement of 240 Marks. A bookkeeper might earn between 2,400 and 4,000 Marks.³⁹ So keeping an eye on his daily expenditures was, for Sommerfeld, not exactly a peripheral issue. When conforming to academic etiquette was an added consideration, Sommerfeld’s report of his daily expenses becomes a kind of metric of how much he was prepared to lay out for the sake of his career.

As far as his duties at the mineralogical institute were concerned, Sommerfeld soon experienced them as not so “fearsome” as at first, but rather increasingly with a sense of tedium and a waste of time. He had to assemble “a very tedious catalogue” for a yearbook of mineralogy. In the mineralogical institute, which more resembled a museum, he saw students face to face at a practicum only once a week. “The collections are kept covered and in obscurity, but are otherwise in exemplary order.” Among the more pleasant of his daily tasks was occasionally helping his boss “with more mathematical matters . . . about which he doesn’t know much.” Thus, he had recently been able to show, to Liebisch’s “infinite delight,” that in a publication Voigt “had dug deep into Maxwell,” without acknowledging this source. “Rather often Liebisch has had occasion to ask as we sat cozily by ourselves in the museum: Don’t we have marvelous fun?”⁴⁰

³⁹ Saldern, *Göttingen*, 1999, pp. 16–17.

⁴⁰ To his parents, October 29, 1893.

But it was not long before Sommerfeld came to know a somewhat less agreeable side of his boss. "Liebisch was very surly today," he wrote in early November. "I think his wife came home too late yesterday. So we have not gone for a walk today."⁴¹ Liebisch's moods and the frequently monotonous work at the mineralogical institute soured his days. "As nice as he generally is, he can be equally grouchy on occasion," he complained again a week later about his boss. "He has now had one, or rather four critical days. I have been able to speak with only about the strictest necessities during this time. What has been annoying him? Has he been angry with his wife (she wanted to go walking with us on a weekday on which he hadn't invited her to do so), or with me (the preparation of a catalogue had dragged on somewhat; the work was also tedious, though; I had to sit all day long arranging small slips alphabetically, and shifting them about so much my arm was sore), or was it the onset of a cold?"⁴² His boss's moods occasioned real mental anguish for Sommerfeld. "It's so against my nature to relate to another person other than openly, and yet with him I now have to be cautious," he wrote home again a week later. "Mrs. Liebisch certainly doesn't have it easy. I would very much like to get together with her more often, but it can't happen—precisely this can't happen. It must be my nature that I need a person with whom I can relate completely frankly. Mrs. Liebisch is quite so inclined. Our relationship is as friendly as could be, but we're not permitted to see each other."⁴³

The greater the distance between him and his moody boss grew, the stronger his empathy for his boss's wife. "She really is a good person," he wrote his mother, who had long been a friend of Adelheid Liebisch. "She is very fond of you, and since she lives an absolutely cloistered life here, speaks only to her 4 children, and sees only her husband, she cherishes fondest memories of her distant friends."⁴⁴ The situation evolved more and more grotesquely: "Alright, here comes a brief and completely frank report of my relationship with Liebisch," he wrote to Königsberg a few weeks later. "Othello is nothing compared to Liebisch. Isn't it ridiculous? Liebisch is jealous, insanely jealous. He locks his wife in, and won't countenance her speaking with any male individual. I have this from the most reliable source. What do you say to the following exchange, which Mrs. Liebisch reported to me? She: 'Dr. Sommerfeld could come to see me on Monday evening, when you have Eskimo (his men's club).' He: 'Then I'll resign from Eskimo.' So there it is! Liebisch is pathologically jealous. There you see the crazy sources of the difficulties one can face in life! I'm sure I don't need to reassure you that he has no grounds for his jealousy; the whole thing is really too ridiculous, too stupid, too crazy."⁴⁵ On the same day, Sommerfeld committed this "Othello" letter to paper, Adelheid Liebisch,

41 To his mother, November 7, 1893.

42 To his mother, November 14, 1893.

43 To his mother, November 19, 1893.

44 To his mother, November 27, 1893.

45 To his mother, December 20, 1893.

the “Desdemona” of this story, also wrote back to Königsberg. She would look out for Arnold’s best interests, she assured his mother.⁴⁶

From the perspective of the raging “Othello,” his wife’s maternal inclinations towards his assistant were not exactly apt to assuage his anger. But besides the jealousy, there were other reasons Liebisch was “thoroughly distrustful and moody to excess,” as Sommerfeld wrote home in a character study of his boss. “He hates Göttingen and all his colleagues. At every opportunity, he disparages the situation at Göttingen, its formality and ceremoniousness. Mind you, there is no one so set on form as he, and no one more easily offended by trivial lapses in form.” Additionally, Liebisch now resented him for showing greater interest in mathematics than in mineralogy. “On this point, I don’t fault him too much. Perhaps I should not have accepted this post merely as a means to the end of attending some lectures in mathematics. That annoys him. But I never made a secret of this.” Now, Liebisch’s initial friendliness had turned to its opposite. “The role I’ve played in this manner at the institute for weeks now has been truly unenviable. I have been miserably annoyed.”⁴⁷

2.4 Stick It Out, or Resign?

After 3 months, there was no longer any talk of strolling with his boss, which before had given Sommerfeld such pleasure. Liebisch avoided direct contact with his assistant as much as possible. “At first, we always walked home together,” Sommerfeld wrote about such details of his daily life. “But recently, the ass has several times gone off alone on trivial pretexts just to avoid having to walk with me. Whenever possible now I avoid subjecting myself to this. I respect myself too much for that. I’ve told him that if he thinks he can find a better assistant, I would gladly step aside, and that it would be against my principles to pocket the 100 M per month if there is nothing more for me to do than just put in my time. Then he gets a blank look, and says absolutely nothing.”⁴⁸

His readiness to resign his assistantship reveals Sommerfeld’s determination no longer to purchase an academic career at the cost of compromises that ran counter to his inner motivation. “Now you will say that I could safely go on working at the institute, all the more so as I have nothing to do for him,” he wrote anticipating the objection his parents might make. “Yes, but scientific work is different from a trade; one has to be enthusiastic and comfortable in it. For me in the institute now, ideas are largely precluded.” He reviewed once more what in the beginning had made daily life at the mineralogical institute bearable for him. “Saturday mornings were always my favorites; students were there to whom I had to explain crystals.

46 Adelheid Liebisch to Sommerfeld’s mother, December 20, 1893.

47 To his mother, December 20, 1893.

48 To his mother, December 20, 1893.

I had fun with that, and learned a great deal in the process. I would like to have had practicum every day." At the conclusion of this densely written, eight-page letter, he tried to come to a sober evaluation of his situation and his boss. "I've berated myself thoroughly in the foregoing. Not without reason; with his moods, he has really offended me. But I also want to be fair. He has his virtues. He is very energetic, and has an iron discipline, as well as a keen intellect and wit. He can also do much for others, so long as they don't touch any of his many crazy spots." But Sommerfeld got a certain satisfaction from learning that Liebisch's previous assistants had not stuck it out for long with him. They had "stayed on average 1 year at most. Apparently no one can get along with him." That in spite of everything he was invited to the Liebisch home for the coming Christmas Day, he attributed to the good offices of his mother's friend. "I'd rather spend it with Wallach, but he will be in Berlin. So I'll probably go to the Liebisch's after all. I have now become quite inured to his sourpuss face. I doubt I'll make it up with him, but I don't care about it either. The other circumstances of my life are very comfortable, after all; basically, I can content myself with having landed on a path not smoothed in advance for me by maternal solicitude and well-meaning friends. So, no worries on my account!"⁴⁹

His parents did not take the report as badly as might have been supposed in light of his threatened resignation of the assistantship. "You're quite right to emphasize the humorous aspect of the situation; that is how I see it too," Sommerfeld wrote to Königsberg on Christmas Eve. He did not spend Christmas Day at the Liebisch home after all, though; instead, he used his day off to visit his brother, who had become a doctor, working at a neurological clinic near Hattenheim am Rhein. Regarding his own career problems, he wrote only that he wished to convey New Year's greetings to Lindemann, "discreetly hinting the question whether he might be able to use me." To preclude any gossip between Königsberg and Göttingen concerning "the aforementioned tragedy," he swore his mother to secrecy. "Likewise if you must write to Mrs. Liebisch. Here too, of course, not a word about jealousy," he asked urgently because he had promised Adelheid Liebisch not to mention it. "But I owed it even more to you to break my promise, than to her to keep it."⁵⁰

Actually, it was clear to Sommerfeld just several weeks after his arrival in Göttingen that he was not in a good situation at the mineralogical institute. But that was not his only worry. During these autumn weeks of 1893, he went through a whirl of shifting emotions. His grandmother was dying.⁵¹ "Ochen" had been a presence his entire childhood and youth in his parents' Königsberg home. "So, I'll see one loved person less at home, and one grave more!" he wrote to Königsberg in response to the news of her death. This sad occasion brought back the memory of his sister's death. "How bleak and hopeless we all felt then! Please be so kind, dear Mother, as to lay a wreath for me on Ochen's grave. Flowers are the only expression

49 Ibid.

50 To his parents, December 24, 1893.

51 To his parents, October 29, 1893.

of love one can show the dead.” In addition, he was concerned about his brother who had, already as a medical student, become addicted to morphine and in his work as a neurologist continuously faced the threat of relapse. The ups and downs of Walter’s condition were the subject of sorrowful remarks in countless letters. He had just “had a very nice letter” from Walter, Arnold wrote his parents in an effort to lighten their woes in this respect at least. “He seems quite happy.” He did not however want to listen to the gloomy ruminations about growing old his mother had associated with the sad news. “I think you will remain my young mother for a long time yet, and we will still often be young and happy together.”⁵²

Homesickness, the tensions of his relations with Liebisich, doubts about the career path he had entered into, and worries about his brother—such were Sommerfeld’s thoughts as the year 1893 reached its conclusion. When he returned from his trip to the Rhein at the end of the Christmas holiday, the “Othello” affair retreated temporarily into the background. “Walter is physically run down, looks rather miserable, has very little appetite,” he reported to his parents in far off Königsberg about his brother’s condition, which, however, he attributed to a recent bout of the flu. He thought there were no grounds “to suspect morphine.” Because of differences with his boss, Walter’s situation was not exactly simple; he would “prefer to be with a different director, which I understand completely.” About Walter, he had “absolutely never had the impression of someone neurologically ill; we spent the days in brotherly affection, discussing all sorts of things perfectly rationally; this would have been impossible for me had he shown any significant signs of illness.” So the Christmas holidays spent together “had been a very pleasant, relaxing time for us both.”⁵³

It was only a few days, however, before Göttingen’s “Othello” made clear to him how precarious his daily life as an assistant really was. Apparently, Adelheid Liebisich had read her husband passages from her correspondence with Sommerfeld’s mother in order to demonstrate how baseless his jealousy was. This only served to confirm Sommerfeld’s judgment that his boss was “a little crazy.” Around this time, he had already firmly decided to put an end to this grotesquerie as soon as possible. In a New Year’s letter to Lindemann, he had reported “all sorts of Göttingen circumstances” and had asked him “whether he can use me.” In response—he reported to his mother—not Lindemann himself, but his wife had sent him a “Munich beer post-card.” “She writes on it that she has spoken with Dyck about me, and will not give up, etc., etc. God save me from my friends, is all I can say.”⁵⁴

Among the faculty wives, Lisbeth Lindemann’s reputation was hardly such that discretion numbered among her greatest virtues. For this reason, Sommerfeld’s parents feared that gossip about Arnold’s difficulties with Liebisich might now cause a stir also between Göttingen and Munich. “To set your minds at rest, I’ve also sent

52 To his parents, November 4, 1893.

53 To his mother, January 2, 1894.

54 To his mother, January 5, 1894.

off something quite stern,” Sommerfeld wrote his mother in an attempt to relieve her of this fear. “I don’t see any danger here. First of all, she can neither help my problems nor cause me any harm. Second, she talks more than she acts.” So far as the “Othello” affair was concerned, he said he had resolved this for himself. “The jealousy story is by now no longer current. But it had planted a grudge in him, not to be uprooted from his thick skull.”⁵⁵ From her side, Adelheid Liebisch confirmed in a letter to Sommerfeld’s mother that she would not abandon Arnold in his troubles. “But I am truly sorry for him; he is as dear to me as a son, and I have always treated him like my good, honest friend. And so it will be going forward.”⁵⁶

This was no solution for the damaged relationship between boss and assistant, rather the contrary. “For my stern tyrant demands that I put in my full office hours,” Sommerfeld wrote home. “The other professors (Wallach, Voigt, etc.) require their assistants to come in only when there is something for them to do. This Liebisch rule is truly childish.” That he was allowed to attend Klein’s lectures during his work hours was the only concession he was able to wring from Liebisch. “We’re amazed that you have trained ‘Theodore’ so well that he permits you to go to the university daily from 11:00 to 1:00,” Sommerfeld described a conversation with the assistant at Voigt’s institute. “He is otherwise so strict with the work hours. And on top of that to allow you to go to Klein! The other assistants have always had problems with him.” That the other assistants regarded this as a sign of his good relationship with Liebisch, he found highly amusing: “Oh simple innocence!” He found it especially annoying that he was compelled to put aside his further mathematical ambitions. “He seems to keep me away from the society of mathematicians by conveniently just at such moments giving me something to do. This is bitter.”⁵⁷

Meanwhile, Sommerfeld had long sought out contact with others who were, like him, just at the start of their academic careers. His housemate, Paul Drude (1863–1906), had brought to his attention the “lecturers’ table” at a pub in the Göttingen town park, which he happily joined. This was “an extremely comfortable, jovial, and stimulating group,” and there was much “shop talk and joking,” he wrote admiringly of this circle.⁵⁸ Working out at the gym once a week came as a welcome break in his routine. Here, for a short while at least, he could forget logging the tedious work hours under the watchful gaze of his surly boss. When he picked up his pen again, his optimism once more gained the upper hand. “I’ve just come home from the gym, or more precisely from the beer pub,” he wrote home on one such evening. “As for the rest, I live a thoroughly merry life.” He had “picked up a new piano at a tablemate’s,” so that now in this respect he was no longer dependent on the infrequent opportunities at the Liebisch house. Now, all that was painfully

55 To his mother, January 20, 1894.

56 Adelheid Liebisch to Sommerfeld’s mother, January 16, 1893.

57 To his mother, January 20, 1894.

58 To his mother, November 19, 1893. Also in ASWB I.

missing was the time to devote himself to mathematics. "When I come home in the evening after a day of peering at crystals, I am usually exhausted; then nothing comes of work."⁵⁹

On "The Kaiser's Birthday," January 27, a holiday in Wilhelmine Germany, Liebisch once more gave him occasion for a comprehensive report home. In the spirit of the holiday, Sommerfeld delivered this latest turn in his relation to his boss in the form of a political news dispatch: "Have you heard about the great national event? The ruler of the mineral empire has reconciled with his most honorable First Minister. He invited him to partake of a bottle of wine on Sunday, the 28th, and promised him the best seat at the highest table in the ground-floor rooms of his villa. The minister thanked him for this supreme manifestation of his most supreme favor, and there was great joy among the people. This supreme grace was manifested just as capriciously as his supreme wrath." He had no idea how to explain this sudden change of attitude. "For the fact that Bismarck has measured a few crystals cannot possibly be reckoned such a special service. He has always upheld the interests of the Empire, and really does not know what new policy his services may have enabled."⁶⁰

But he sent the letter only after his "reconciliation dinner" and had to report yet one more incident that showed Liebisch's surly side. "The Kaiser's Birthday" fell at carnival season, during which it was customary among the Göttingen professors to enact the less serious side of scholarly life. One of the favorite amusements at such carnival parties was acting out "living pictures." Scenes depicted in famous paintings were represented by the guests, which often compelled dignified Göttingen academics to strike quite unaccustomed poses, much to the delight of all participants. At the home of the art historian Robert Vischer (1847–1933), these parties were especially carefully prepared; they were considered local events. "While I was there, the wife of Professor Vischer comes over to Liebisch," Sommerfeld reports, "to ask him to represent Holofernes in one of the pictures, and let his head be cut off. Mrs. Vischer is a lady whose every aspect and gesture typifies formality, from a well-to-do Viennese family, a handsome woman. She made her request to Liebisch graciously, but he declined in a correspondingly witty and pleasant way. Scarcely had she walked away, though, than he showed his boundless annoyance, uttered not a word at the table, left the party without saying goodbye. He considered it an insulting impertinence, and was furious with his wife for not having kept Mrs. Vischer away from him." By way of showing Liebisch as even more of an oddball, he contrasted his behavior with the exuberance generally reigning in Göttingen. At a "Kaiser's Birthday" party at the home of the physical chemist Walter Nernst (1864–1941), he and the other guests had gotten themselves "thoroughly inebriated." "It was divine," Sommerfeld raved of this evening; "unrestrained merriment"

59 To his mother, January 25, 1894.

60 To his mother, January 25, 1894.

had reigned. “We behaved as uninhibitedly as if we were all at home. It was wonderful. Our host, who finally lighted our way out, needed a bit of help to get back up the stairs! And these were all the scientific stars—except for me, who was blooming in secret.”⁶¹

“Carnival magic” at the Vischers’ gave Liebisch renewed occasion for Othello-like emotions and grouching. “Mrs. Liebisch made a bit too merry for her Lord and Master,” Sommerfeld reported to his mother after the party. It had been “an evening of the most unrestrained merriment; the renowned Göttingen stiffness had totally vanished.” The hostess had known how to arrange the various personalities for the “living pictures” so expertly “that one thought one was seeing the originals.” Voigt, for example, acted the part of Albrecht Dürer in his self-portrait; the wife of a Göttingen professor appeared as a praying nun—and “for all these distinguished (and in part very musical) guests, I had to supply appropriate music.” Whoever he had not presented himself to at one of his introductory visits as Liebisch’s assistant now came to know Sommerfeld as a pianist. “I played the following: Meistersinger (Albrecht Dürer), Mendelssohn, Gondolier’s Song (Venetian Lady), Pathétique Sonata (Angel), Magic Flute, Don Giovanni, Military March, etc. It all went very well.” The host then “toasted the Director, Professor Voigt, and the Orchestral Conductor, Dr. Sommerfeld.” “I have apparently entered into a similar relationship with Professor Vischer’s wife as before with Mrs. Lindemann—although the former is much more refined. I’ll probably be invited over for coffee sometime.”⁶²

That the professors’ wives were showing such inclinations towards her son, Sommerfeld’s mother appears to have viewed with some distrust. Adelheid Liebisch even confided her marital problems to him. “You’re judging her somewhat incorrectly,” Sommerfeld wrote to dispel his mother’s suspicion. “She’s not to be reproached for speaking to me about her husband. First of all, we are good friends; second, she does it in part in my interests. The first time at any rate, when she broke her silence on the subject, I saw it would be difficult for her to speak of it. Now that I’m aware of the wound, it’s only natural that she pours her heart out to me.” On the occasion of the “carnival magic” at the Vischer home, he had seen the gregarious side of the “scientific stars.” The rapidity with which his reputation as a piano virtuoso spread through the small town is clear from the fact that Klein and his wife, who hadn’t even attended the party, had been well informed of his musical services at the Vischers. Next, he was pleased by an “alimentary visit” to the Vischers, an invitation from Eduard Riecke (1845–1915), professor of experimental physics at the University of Göttingen, and a concert at which Voigt conducted.⁶³ Liebisch’s assistant was well on his way to making a name for himself in Göttingen—if initially only as a sociable pianist and favorite of the professors’ wives.

61 To his mother, January 27, 1894.

62 To his parents, February 10, 1894.

63 To his mother, February 17, 1894.

2.5 Approach to Felix Klein

The best thing about his position at the mineralogical institute was that he was able to pursue his mathematical interests. Sommerfeld had written this to his parents already 4 weeks after his arrival in Göttingen. He attended Klein's lecture, which in this winter semester of 1893/1894 dealt with the difficult area of hyper-geometric functions, and whenever he had the opportunity, the "mathematical reading room," where he could study Klein's previous lectures as well. Although Klein had been characterized for him by Liebisch as an unapproachable authority, it quickly became clear to Sommerfeld that this picture did not match reality. From his first meeting, he found Klein "quite amiable" and not at all unapproachable. In evident high spirits, he wrote his mother, "Isn't fame a terrible thing? When I meet Klein, he says, 'I've known your name for some time: you're the man with the harmonic analyzer.' I'll soon have to travel incognito."⁶⁴ At his first meeting, too, Klein had invited him to participate in the mathematical colloquium.⁶⁵ His growing familiarity with Klein went hand in hand with his alienation from Liebisch. "Among all his colleagues, he hates Klein especially," wrote Sommerfeld about his boss's relationship to Klein. "The expressions, 'mean,' 'false,' 'power-greedy,' are the mildest. He himself told me to attend Klein's lectures; but now he's furious about it. Every day, when I attend the lectures, I believe, he stews. On top of that, I've often praised Klein's lectures, which he's taken quite badly."⁶⁶

The worse his relation to Liebisch became, the more Sommerfeld placed his hopes on advancing his career under Klein's wing. Unfortunately, Klein already had an assistant, he wrote home on his 25th birthday, and he was much further along. "If you feed him strychnine, it's possible that Klein will take me on. Actually, that's not even clearly the case."⁶⁷ But he didn't abandon the goal of an assistantship under Klein and determined "to impress him as soon as possible, and not hide my light under a bushel." He seems to have been successful in this, for in March 1894, Klein did actually offer the prospect of an assistantship. The offer would become actual only in a few months, but Sommerfeld told Liebisch about it immediately, before he might hear it from some third party. "Very nice," Liebisch responded with sarcastic friendliness ... and served him 1 month's notice on the position at his institute. "Of course I said 'Exactly as you wish, Professor,' and felt myself suddenly discarded and driven away! So the joy of the assistantship is over, just like that! Let's hope this doesn't prove a case of the bird in the hand being better than two in the bush!"⁶⁸

For his parents in far off Königsberg, this did not come as good news. Around the same time, there were increasing indications that Walter would not keep his

64 To his parents, October 29, 1893.

65 To his mother, October 31, 1893.

66 To his mother, December 20, 1893.

67 To his mother, December 5, 1893.

68 To his mother, March 4, 1894. Also in ASWB I.

position at the clinic near Hattenheim am Rhein and that he was once more consoling himself over his distaste for his professional life with morphine. Their worries over their sons were a heavy emotional burden for the parents. "I'll do one thing more," Arnold promised his mother. "I'll go tomorrow to see Professor Liebisch's wife, explain the situation with Walter to her, and tell her you are very concerned about the termination of my assistantship." To be sure, he thought their worry over his own future was unfounded, but "the similarity between my case and Walter's is too painful for me, and I want to leave no stone unturned in relieving you of your burden of worry." In the event that Walter did not retain his position, he wanted to have him come to Göttingen, where there was a "very well administered mental institution," in which Walter might perhaps work as a volunteer. A member of the "lecturers' table" was well-acquainted with the director of this facility, so that he hoped by this route to put in a good word for Walter. "In any case, I'd rather assume the worry myself, than think of you being burdened with it."⁶⁹

At bottom, Sommerfeld was glad Liebisch, with his termination of the assistantship, was making his departure from the mineralogical institute so easy for him. In retrospect, he felt it was "fundamentally wrong" for him ever to have accepted this position. "So, the sooner I'm done with it, the better," he wrote his mother. Besides, Liebisch was going to clothe the termination "in terms of a mutual agreement." In light of the fact that none of Liebisch's earlier assistants had lasted long with him, the situation was no embarrassment to him. In Göttingen, it would be well known whom to blame. To preclude any gossip at home, he had already prepared a formula: "Where Königsberg is concerned, I say simply, I did not get along with my boss, or if you prefer, I say, I'm still an assistant, simply merging the former position with the future one."⁷⁰

Sommerfeld's letters to Königsberg do not cast a particularly favorable light on the mineralogist Liebisch. In view of these descriptions, one is astonished to read in an obituary of Liebisch in the *Centralblatt für Mineralogie, Geologie und Paläontologie*, that in the course of the 21 years of his work at Göttingen, Liebisch had "the pleasure of drawing talented students under the spell of his areas of research. Gratefully and with pleasure, he recalled the loyal collaboration of all his Göttingen assistants." Liebisch had "experienced this period as the most fruitful, and thus the happiest of his industrious life."⁷¹ Among the assistants cited, Sommerfeld is named as one of several, but the register might also be read as evidence that in fact no assistant lasted long with Liebisch.⁷²

In the event, the decision about the assistantship with Klein had still not been made in March 1894, but for Sommerfeld, it was only a matter of time. Shortly

69 To his mother, March 15, 1894.

70 To his mother, March 16, 1894.

71 Schulz, *Theodor Liebisch*, 1922, p. 420.

72 The frequent change of assistants at the mineralogical institute is documented in Kuratorialakten der Göttinger Universität, UAG, Kur 1522.

thereafter, Liebisch withdrew his termination, however, so that externally, everything appeared just as it had been. Liebisch explained to the Curator of the University of Göttingen that his assistant “had made the request that he be retained in his post until September 30 of this year, since there has been an unexpected accident in his family that prevents him from devoting himself exclusively, as had been his intention, to preparation for the habilitation in the subject field of mathematics.”⁷³ By the “unexpected accident” Liebisch was no doubt alluding to Sommerfeld’s brother’s morphine addiction. Sommerfeld’s parents in Königsberg were in any case relieved by the reversal of the termination. Sommerfeld himself had mixed feelings. “It is to my great satisfaction that remaining in my position is pleasing to you,” he assured his parents, but deep down, it annoyed him that now the mind-numbing time serving in the mineralogical institute was to continue and that he would be unable to devote his whole energy to mathematics. Wallach too would “inveigh against this properly,” he guessed. His hopes of installing his brother as a volunteer at the nearby Göttingen mental institution were also dashed. Instead, Walter was taken in at another clinic ... as a patient. “It is heart-rending, this mess of a life,” Sommerfeld wrote home. But the word “useless,” which his mother had voiced over the failures of her sons in their first professional positions, he protested as utterly unjustified. “That’s not the case at all! Klein hasn’t found me useless at all, and neither has Liebisch. I’ve proven useless only in the battle against his whims.”⁷⁴

2.6 Physics or Mathematics?

At semester’s end, Sommerfeld traveled to Königsberg to serve in a 2-month-long military exercise. As a 1-year volunteer, he could gradually qualify as a reserve officer through such exercises, served during his vacations. In this way, he worked his way up from junior officer to staff sergeant and finally to reserve lieutenant.⁷⁵ During the exercises in April and May of 1894, he lived in his parents’ house and enjoyed the familiar environment of his childhood and student years. “As I departed,” he wrote following his return to Göttingen, “it occurred to me that I really should have thanked you for your affectionate welcome to the parental home; I am no longer a child, accepting thoughtlessly everything good extended to him by his father and mother.”⁷⁶

Although on paper he was still assistant to Liebisch, Sommerfeld experienced his return to Göttingen in June 1894 as the beginning of a new chapter of his life. To begin with, he took a new apartment at the edge of town. It was pleasanter than the

73 Liebisch to the Curator, March 29, 1894.

74 To his mother, April 1, 1894. UAG, Kur 7522.

75 Bescheinigung des Aachener Bezirkskommandos, April 20, 1911. DMA, NL 89, 016, folder 1.7.

76 To his mother, June, 8 1894.

one he had previously occupied. "Very pretty view, and very quiet. It is splendid to work here at the open window with the view of the green trees and mountains."⁷⁷ In addition, he hoped to be able to better pursue his musical interests here. "My landlords have a piano," he gushed; "such a temptation!"⁷⁸

That he nevertheless now had to spend his time at the mineralogical institute, he felt was a pure waste of time. "This drudgery with Liebisch is just too ridiculous. I'm really heart-sore about it. By the way, he is at pains to be pleasant. He has a real collector's mania about wall charts. I've already filled several dozen." When he reported on his "current work," he did not mean work at the mineralogical institute, but the mathematical studies he had undertaken for his habilitation under Klein. But just when he longed deep down to concentrate entirely on mathematics as his true area of work, Woldemar Voigt offered him an assistantship in the institute for theoretical physics. He would have "almost nothing to do," he wrote his mother following his conversation with Voigt, and he would be able to stand for his habilitation in mathematics just the same. "These people have an amazing trust in me. I understand nothing about experimental methodology, and I've told Voigt so. I'm afraid of making a fool of myself." Voigt is "a nice man," but Sommerfeld didn't feel himself scientifically drawn to him. Voigt's previous assistants could have confirmed for him that in the institute for theoretical physics, he would have a pretty free hand in his choice of research subjects. But weighing most heavily in this decision was that he still had received no firm offer from Klein. "What shall I do?"⁷⁹

Two weeks later he informed his parents he had declined the offer because he did not want to be "in an untoward position again" occupying himself with things to which he did not feel drawn. He had discussed the matter with Klein as well. "He virtually advised me to accept the position with Voigt. He imagines me as somewhat more inclined towards physics than I am. Today, however, he seemed to be happy that I will be free next semester."⁸⁰

Thereafter, the daily round at the mineralogical institute became even more unbearable. "Working with Liebisch is dreadful, enough to drive one crazy. The height of tedium, from 9:00 or 10:00 in the morning to 6:00 or 7:00 in the evening." Liebisch was indeed very friendly now, but this was small consolation. "I'd rather he were a little less so, and just didn't waste my time in such an irresponsible manner."⁸¹

Only the evening hours and weekends were left him in this summer of 1894 for his mathematical studies. "Next semester will be a wonderful time, and the mineralogical time killing will seem like a bad dream to me." In this way he expressed his yearning for the assistantship with Klein. Whenever he spoke of a conversation

77 To his mother, June 9, 1894.

78 To his mother, June 15, 1894.

79 To his mother, June 15, 1894.

80 To his parents, June 27, 1894.

81 To his mother, July 4, 1894.

with Klein, he gushed. He had “chatted away . . . 2 fabulous hours” with Klein; Klein was “brilliant, erudite, open, and honest.” He wrote very differently about his boss at the mineralogical institute: “Recently, I almost addressed Liebisch as ‘Sergeant.’ Ha ha!”⁸²

As semester’s end approached, Sommerfeld got a surprise that put him into a state of euphoria and caused him late at night to write a long letter to his mother. “I’ve just come from the anniversary celebration of the Mathematical Society, and feel so upbeat that I want to stay up and write myself to exhaustion. Alright, shall I, or shall I not relate to you what I’ve heard?” Then it spilled out of him. A former assistant of Boltzmann who had just arrived from Munich was surprised that Sommerfeld was not pursuing his habilitation in Königsberg in theoretical physics. “Boltzmann, he says, had been quite taken by my work in electrodynamics. Now here’s the thing! Make sure you’re sitting down for this! Boltzmann had put my name down in 7th or 8th place on the list to replace him!!!” In the summer of 1894, Boltzmann resigned his teaching position at Munich and returned to Austria to assume the professorship in theoretical physics at the University of Vienna. Sommerfeld was so incredulous at the news that he was on the list of candidates to succeed Boltzmann at Munich that he took it at first for a joke. For that reason, he ordered his parents to remain silent. “It’s too crazy. That poor Boltzmann is crazy is really too sad. Sadder, though, is that I’m now in a dilemma as to whether I should switch over to physics.”

In any case, he was momentarily unsure his decision to pursue mathematics was the correct one. “Klein also wanted to see me perhaps habilitate in physics,” he mused. “This is how it goes for anyone working along the borders of a field. Mathematicians think of me as a physicist, and were I to become a physicist, they would no doubt take me for a mathematician.” He wished to convey to Boltzmann that here in Göttingen he was going to “become a mathematician and bid farewell to physics.” If Boltzmann wanted him as an assistant at Vienna, however, “I would go along and become a physicist.” Finally, he gave his imagination free reign once more: “Just think of it: I as successor to the greatest German physicist (after Hertz’s death and Helmholtz’s stroke). It is too silly. Forget it! And I will become a mathematician after all. However, I will let Liebisch know about this latest development via his wife. I’ll play him this trick; it’ll get his goat!”⁸³

Still days later, all he had heard at the anniversary celebration of the Mathematical Society was still running through his head. Some of it also touched on the wife of his doctoral advisor, Lindemann. In Munich, she “was already considered a very loose woman,” he wrote in great amusement; she had made “a conquest” of Boltzmann and persuaded him “to get himself a big mutt, and since then Boltzmann has been running outside every 15 minutes for the creature to do its business. A scream!”⁸⁴

82 To his parents, June 27, 1894.

83 To his mother, July 29, 1894. Also in ASWB I. Heinrich Hertz (1857–1894) died on January 1 of this year; Hermann von Helmholtz (1821–1894) died on September 8.

84 To his parents, August 3, 1894.

When his parents wanted to know whether, with the news about filling Boltzmann's position at Munich, they hadn't been pulling his leg, he responded, "It is a fact that Boltzmann named me among the people to be considered as his successor. It's likewise a fact that of course I was never seriously in contention, and that it amounted to considerable deference on Boltzmann's part to place such value on purely mathematical speculation such as I published in Wiedemann's *Annalen* at that time." He responded with simulated nonchalance to his parents' objection that his position with Liebisch would end the next month in any case, and under those circumstances he would have done better to have accepted the assistantship with Voigt: "Well, choosing a career in teaching at a university is to renounce money from the start." The position with Klein was certain; the only question was, when. "It's a matter of indifference to me whether I start in October of '94, or of '95. One year with Voigt would just be a colossal waste of time. Voigt also expected that I would become a physicist. So the same conflicts would arise as with Liebisch (even if in not quite so stupid a form). So believe me, this is an unavoidable consequence of the direction my life's little ship has now taken."⁸⁵

85 To his parents, August 24, 1894.

Arnold Sommerfeld

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