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The Fiscal Logic of Enlightened German Science

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CHAPTER FOURTEEN

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Local fiscal reforms and strategies largely determined the structure of academic knowledge in eighteenth-century Germany. That is my strong claim here. The proposition implies a corollary: to understand the German universities and academies of the eighteenth century, and the sciences they produced, we need to look beyond them to the mines, manufactories, forests, and fields of the waning Holy Roman Empire. In other words, we ought to try looking at eighteenth-century academic institutions from the standpoint of those who founded them, funded them, and organized them; we ought to regard these institutions, that is, as part of a larger fiscal system dedicated to the promotion of state and economy.

Universities and academies founded during the eighteenth century fused the management of state with the management of science (*Wissenschaft*).[1] The University of Göttingen, for example, mobilized knowledge in the service of the Hanoverian government and its fiscal interests. Gerlach Adolph von Münchhausen, first curator of the Georg-August-Universität and minister of the Hanoverian finances, made sure that the new university followed the government's fiscal mission. Farther east, in the Saxon silver town of Freiberg, another high fiscal official, Friedrich Anton von Heynitz, founded the world's first mining academy. The main purpose of these two prominent "scientific" institutions, as understood by those who established and administered them, was largely the same: to enlist academic knowledge in the generation of state revenue. This essay explores the implications of that fiscal logic by comparing the everyday administration of knowledge in Göttingen and Freiberg.

I have chosen Göttingen and Freiberg not only because they represent new models for the creation of knowledge in eighteenth-century Germany but also because they have rarely been considered worth comparing.

Göttingen, probably the most prominent university of the German Enlightenment, has attracted much attention because of the famous professors it housed, fed, and clothed.[2] It has also played a central part in the drama of "the German university," assuming a supporting role somewhere between Wittenberg and Berlin. Freiberg, on the other hand, has become *both* a canonical site for German Romanticism *and* a staging ground for the creation of a German technocratic elite.[3] Needless to say, these narratives generally focus on the great literary and scientific personalities who passed through town. This essay, in contrast, will compare the administrative philosophies and practices that rendered these two places so much alike. In each case, the dreams and demands of powerful fiscal officials gave rise to new kinds of institutions. These new institutions, in turn, generated new types of knowledge.

University

In his 1768 work on German universities, the Göttingen professor Johann David Michaelis explained that the real purpose of a university had little to do with science or scholarship. Could one possibly believe, he asked, that a "mere love of the sciences" would move great lords and their ministers to fund such expensive institutions? Of course not. States founded and supported universities for fiscal reasons (*Cameralnutzen*) with an expectation of profit (*Vortheil*). By attracting wealthy students from at home and abroad, successful universities would draw foreign wealth while keeping domestic money at home. At flourishing universities—those with many wealthy and few poor students—one could expect the average student to spend 300 thalers each year. Multiply that by one thousand "polite" (i.e., propertied) students, Michaelis calculated, and a successful university might add three tons of gold annually to the territory's circulating coin.[4]

Though it may seem crass, Michaelis's account illustrates the kind of administrative philosophy that guided the University of Göttingen through its first several decades. Under the watchful eye of Minister Münchhausen, Göttingen rapidly rose to prominence, and by the second half of the eighteenth century, contemporaries came to regard it as the most successful and fashionable university in central Europe. Naturally enough, later historians tended to locate the cause of Göttingen's success in its famous professors and students.[5] In doing so, however, they neglected what these famous students and professors themselves insisted: namely,

that Göttingen was, more than anything, shaped by the everyday administrative efforts of its first curator, Minister Münchhausen.[6]

From Münchhausen's point of view, universities resembled other state institutions like mines and manufactories. Officials in Hanover—and Münchhausen was the most important of them—regarded Göttingen's famous university as only one part of a larger productive system. Within that system, the university came to share a single goal with other state institutions. In a word, it was expected to serve the interests of state and fisc.

When the University of Göttingen first opened its doors in 1734, Münchhausen understood better than anyone that its success depended on the prosperity, appearance, and reputation of the town.[7] It was not enough to have famous professors. Other things—suitable apartments, walking paths, coffeehouses, pleasure gardens, nice streets, good tailors—were needed to attract wealthy and elegant students. In a backwater town like Göttingen, however, that would not be easy. The royal government, which could do only so much to spruce up the town, needed to ensure that Göttingen and its inhabitants enjoyed some modicum of prosperity. Otherwise, the signs of poverty—abandoned lots, dirty streets, shoddy buildings, beggars—might scare off the elegant students that the university was hoping to attract.[8] Münchhausen and his fellow privy councilors had to approach the university as one part in the great machine of state. They had to be aware of how decisions about individual institutions, such as universities and manufactories, might affect the general welfare.

The decision to establish a new university in Göttingen created immediate problems. The royal government hoped that an infusion of money from wealthy students could make the town flourish. But who would convince them to come in the first place? Since Göttingen's reputation was not good, one would have to advertise the place. The authorities, therefore, commissioned and encouraged a series of works that sang the praises of the idyllic little university town on the Leine River.[9] These quasi-official tributes to Göttingen praised its "excellent location, healthy air, good water, and other advantages,"[10] stressing that the "utmost care" had been taken to ensure the presence of good police.[11] In 1756, Münchhausen, perhaps convinced that the town needed yet another makeover, asked the famous cameralist Johann von Justi—at that time Göttingen's chief police commissioner—to advertise the town.[12]

As Münchhausen strove to burnish Göttingen's image, however, a few troublemakers wrote less flattering things. One of them was the young Danish student Johann Georg Bärens. Unlike the writers who had been

recruited by authorities in Hanover, Bärens did not sugarcoat life in the upstart university town. "The weather in Göttingen," he complained, "is not the best." It was too hot in the summer, too cold in the winter, and seemed to rain all the time. The constant rain made for muddy, slimy walking paths. Moreover, there were no decent gardens, and the town was filled with "desolate abandoned lots." Before the arrival of the university in 1734, things had reportedly been even worse. The town had been "indescribably dirty" and "smoky," since half of the town's houses had no chimneys. People would expel the smoke through their attic windows after it had "thoroughly seasoned both them and their famous sausages." [13]

Nor did Bärens have any special affection for the locals. "The inhabitants," he wrote, "are basically a coarse, rude, unfriendly lot who cannot, even with the greatest effort, be cured of their uncouth manners [*Sitten*]." Local burghers were not only lazy and selfish but obstinate too. "They have no understanding of commerce and don't want to learn about it; anyone who has seen Bremen or Frankfurt is considered a well-traveled merchant." Especially remarkable was their "immense hatred of outsiders." New arrivals had often found it difficult to buy food, since the locals would sooner "give it to the pigs than sell it to outsiders." Nor did the town's inhabitants have any notion about "good order or police." The Göttingen authorities—judges, mayors, syndics, secretaries, and town councilors—were not much better.[14]

Despite his criticisms of Göttingen and his distaste for the local inhabitants, Bärens found two things there that he did like: the university and the local *Camelott* manufactory.[15] Both institutions had risen to prominence under the watchful eye of Kammerpräsident Münchhausen, but the manufactory also owed its success to the efforts of Johann Heinrich Grätzel, who had emigrated to Göttingen from Saxony (*Kursachsen*). Grätzel, wrote Bärens, had relied on "his industriousness, his skill, his understanding, and perhaps also his luck" to build a manufacturing empire in Göttingen. He had invested an immense sum, over 80,000 thalers, in buildings, and his "factory [*Fabrique*]" provided work for at least 500 people.[16] When George II visited Göttingen in 1748, he not only toured the university but also met with Grätzel and visited his manufactory.[17]

By 1750 the university and Grätzel's manufactory constituted the twin pillars of Göttingen's prosperity. Münchhausen, who had patiently promoted both institutions, understood that their continued growth and vigor would be necessary to anchor the welfare of the entire region. University and manufactory became recognized as the twin engines of territorial prosperity. Bärens, for example, even claimed that the university

had been founded *in order to* revive the town.[18] In any case, there can be no doubt that Münchhausen was deeply concerned about the complex interaction between town and university. The sweep of his administrative control meant that the curator had to make decisions on an astounding array of issues every day. He might resolve disputes between competing manufacturers in the morning and turn his attention to cranky professors in the afternoon.

In fact, Bärens's report articulated Hanover's concerns about Göttingen much better than any of the fawning, quasi-official tributes to the town did. Behind closed doors, the privy council had long worried about what to do with Göttingen. During the 1720s, for example, commerce and manufactures seemed completely stagnant, and the town still bore many scars from the Thirty Years' War. In 1724, concerned about the situation in Göttingen, the privy council dispatched an agent to observe things and to offer advice about possible improvements.[19]

Hanover's agent described Göttingen as a fallen town. Once the center of woolens production in Lower Saxony, Göttingen and its cloth makers had been ruined by a combination of many things: the dissolution of the Hanseatic League, the religious troubles, the Thirty Years' War, the two sieges and bombardment of the town, and its eventual conquest.[20] Nor were there many options for reviving Göttingen's productive life. It was not located along a navigable river or a major road. It had no substantial intercourse with neighboring towns. There were no notable merchants or "capitalists" living in the town. In short, Göttingen's sustenance and prosperity depended entirely on its own agriculture, brewing, and manufactures.[21] Ultimately, Hanover's agent proposed that the government concentrate on building up Göttingen's linen and woolen manufactures as the only viable way to make the town prosper.

In the opinion of Hanover's fiscal officials—especially Münchhausen—this was the best possible way to ensure the success of town and university. Put differently, the support of local manufactures *was* an academic policy, and, conversely, university policy *was* mercantile policy. The success of the university depended on manufactories like Grätzel's, and these manufactories in turn could benefit from the money of wealthy foreign students lured to Göttingen. For state officials like Münchhausen, then, university and manufactory were linked symbiotically.

This explicit connection between university and manufactory meant that large-scale production of linens and woolens soon became a model for the academic manufacture of knowledge. Consider, for example, how the Göttingen student Friedrich Böll described Münchhausen's administra-

tion: "You, Mister Curator, are the factory director; the teachers at universities [*Akademien*] are the apprentices; the young people who attend them, and their parents and guardians, are the customers; the sciences taught at those universities are the wares; your king is the lord and owner of his scientific factories [*wissenschaftliche Fabricken*]."[22]

Between 1734 and 1770, Münchhausen worked to create a productive system in Göttingen that included both town and university. What made Göttingen dramatically new and strikingly different from all existing universities was not so much its commitment to neohumanism or its emphasis on law or even its demotion of the theology faculty. Rather, Göttingen's novelty lay in its status as an academic factory. This changed the very nature and function of the sciences produced there.

Mining Academy

The same period that saw the success of Göttingen under Münchhausen also witnessed the establishment of the world's first mining academies, all of them in central Europe.[23] The first and most famous of these academies, founded in the little Saxon mining town of Freiberg, opened its doors in 1765. Historians of the German university rarely look to Freiberg or other "technical academies" for useful comparisons, since they are presumed to be things of a different kind—the one a medieval institution, with its peculiar statutes and organization, dedicated to knowledge production and dissemination; the other a technical school dedicated to applied science. But, as William Clark has shown, German universities underwent dramatic change during the eighteenth century as new administrative regimes encroached on the traditional prerogatives of the faculty.[24] From this perspective, the specialized academy of the eighteenth century may have a lot to tell us about the dreams and ambitions of university administrators in places like Halle and Göttingen. In Freiberg, for example, the new mining academy offered the possibility of an administrative utopia, sheltered from the traditional rights and privileges of recalcitrant university professors. Here, in a place run explicitly by and for the state finances, professors would not interfere with the needs of state building. In short, if Göttingen and Halle constituted the great reform universities of eighteenth-century Germany, then the specialized academies founded during this century—the Collegium Carolinum in Braunschweig, the Cameral Academy in Lautern, the Bergakademie in Freiberg—represented what knowledge *could be* if it was freed from the strictures, statutes, and corporate rights of the German university. That at least is how many high fiscal officials,

those practical cameralists of the German Enlightenment, viewed the issue.[25]

Friedrich Anton von Heynitz, the chief commissar of Saxony's mines and founder of the Freiberg Bergakademie, was one of these cameralist officials. As a high-level fiscal official who established and administered a prominent academic institution, Heynitz was much like Münchhausen. And yet our historiography conveys a different impression, separating Göttingen, which often foreshadows the German research university of the nineteenth century, entirely from the mining academies, which appear as training grounds for the technocratic elite of the nineteenth century.[26] It may be more useful, however, to view Göttingen and Freiberg, university and technical academy, as things of the same kind. In each place, reforming officials like Münchhausen and Heynitz sought to craft academic institutions that could train a new kind of state official, one capable of handling the increasingly complex fiscal responsibilities of governance. If Münchhausen established the University of Göttingen to pump up the flagging economy of a backwater town, then Heynitz saw the Bergakademie as a way to lure foreign investment and wealthy students to the silver mines of the Erz Mountains. But the new mining academy was also intended to train and professionalize those already meant to govern: the local Saxon nobility. In other words, Heynitz wanted to prepare the local elite to direct the state and its finances. This, more than the education of "mining engineers," constituted the original purpose of the mining academy.

Well-known cameralist writers were among the most prominent and persistent advocates for the establishment of mining academies even before Freiberg was founded.[27] Johann von Justi, who was busy arresting beggars and plugging the good life in Göttingen, took time out to promote the benefits of mining academies. "That the mining sciences prosper," he wrote, "is not unimportant, and one must therefore provide good instruction in both universities and in special mining academies." He felt that the German lands, given their leading role in the mining sciences, should be the first to establish such institutions.[28] Daniel Gottfried Schreber, another prolific cameralist writer, also began hatching plans for a mining academy and an "academy of oeconomic sciences" in the early 1760s.[29] He envisioned an academy for cameralists, separate from the university, and with five professors of the following subjects: (1) cameral science and economy, (2) mathematics and physics, (3) natural history, (4) mineralogy and chemistry, and (5) manufactures, factories, and commerce. When Schreber was appointed as a professor at the University of Leipzig in 1764, he gave up his plans for a cameral and mining academy. But the plan was not lost

completely, for in the following year Schreber's good friend, Friedrich Anton von Heynitz, established the Bergakademie in Freiberg.

Heynitz came to Saxony in 1763, lured by the promise of a position on the Kammer- und Berggemach, Saxony's highest administrative body for directing mines and mining. Devastated by decades of war and mismanagement, Saxony was in the midst of a fiscal crisis when Heynitz arrived in Dresden. But Prince Friedrich Christian and a close circle of advisers, led by Thomas von Fritsch, had already begun to remake Saxony's administration. Among the first issues to be addressed by Fritsch and his fellow commissioners was the improvement of Saxony's mines.

"Mining," wrote Fritsch, "is undeniably one of the most important, if not the single most important, pillar of this land's welfare; its repair and maintenance, therefore, deserve the most exact reflection and the most thorough consideration." Fritsch urged the preparation of a comprehensive tabular balance sheet that would allow for systematic comparison of all income and expenditure related to mining. Such an overview, he argued, would demonstrate "how important mining is for the land, and how necessary it is to keep a diligent and watchful eye on the same." Fritsch complained, moreover, that the mines had suffered from bad administration. Foreign investors had lost faith in Saxony's mines. Trust had to be reestablished through a mining administration marked by the "strict oversight of the sovereign." "We lose this trust," he explained, "if we appoint bad or dishonest officials."[30]

Considerations like these prompted the new elector, Friedrich Christian, to add a powerful new voice to the Kammer- und Berggemach in Dresden at the end of 1763. Possibly due to Fritsch's urging,[31] the elector appointed Heynitz, an experienced senior mining official from Brunswick-Wolfenbüttel, as fourth mining councilor in the Berggemach.[32] Heynitz took up his new post in February of 1764. Unfortunately, the elector died suddenly during the following week, leaving his brother, Prince Xaver, as regent until the young heir, Frederick August, came of age to rule. Xaver, however, soon fell out with Fritsch and his allies, and Heynitz, who had hoped for real power in the Saxon government, found himself relegated to an advisory position, with little direct access to the regent or the privy council.[33]

In search of greater influence, Heynitz sent Cabinet Minister Einsiedel a memorandum on the proposed reorganization of Saxony's mining administration on 4 April 1765.[34] He wanted more personal control over the electorate's mines and suggested that members of the Oberbergamt in Freiberg, especially Oberberghauptmann von Oppel, be given a voice

in Dresden's Berggemach. Their participation would, in his opinion, be an improvement over the useless *"Medicos"* and *"Chymicos"* in Dresden who directed the central mining administration.[35] Thanks largely to this memorandum, Heynitz was appointed "general commissar of mines" (*Generalbergkommissar*) in June 1765.

The new office did not give Heynitz complete control over Saxony's mining administration. Rather, many of his plans and projects remained subject to the approval of the Berggemach in Dresden.[36] The new position did, however, give Heynitz considerable power over the Oberbergamt in Freiberg, placing him above even the *Oberberghauptmann* there. He thus turned his attention to the Oberbergamt, still animated by the dreams that had originally brought him to Saxony. It was at about this time, in the summer of 1765, that he seems to have embarked on a new approach. If he could not shape Saxony's mining policy from above, in Dresden, then he would reform it from within by taking control over the regional appointment and education of Saxony's mining officials. He would, that is, create a generation of officials in his own image. This strategy, which would eventually lead Heynitz to establish a mining academy in Freiberg, began to take shape in the autumn of 1765.

On 3 September 1765, Heynitz sent a confidential memo to Count Einsiedel.[37] He expressed concern about the poor condition of the Oberbergamt. More particularly, he discussed the poor quality of the mining officials who worked there and the "lack both of those who are now usefully employed and of those who can be recruited to direct affairs." Heynitz felt that the situation in Freiberg was chaotic and unacceptable. Since no one had a view of the whole, the state's mining "household" was in complete disarray. Heynitz proposed to remedy the situation through wholesale reorganization of the mining administration, which, he argued, should be arranged according to the four natural divisions in the great mining household: (1) mining proper, (2) stamping and separation, (3) smelting and assaying, and (4) accounting matters and acquisition of necessary materials (e.g., gunpowder and wood). This form of organization would, in turn, allow officials to specialize. Each "talented subject" could devote himself to one or another branch of the mining household.[38] Heynitz urged Einsiedel to issue a direct "instruction" to the Berggemach about such a reorganization. The new arrangement, he argued, would help to curb abuses and encourage industriousness, allowing for more effective oversight, since each official would be responsible for a discrete aspect of mining.[39]

Heynitz then turned to a specific enumeration and critique of the mining officials in Saxon service. Berghauptmann von Ponikau, at sixty-three,

had "little life left in him." Mining Councilor von Wiehmannshausen was not only old, at almost sixty, but had been hampered by a "gouty foot" (*Podagricus*) for many years. Commissions-Rath Meybach was no better. He was also some sixty years old and, with a smattering of knowledge in "speculative chemistry and hydraulics," was quite worthless for the tough work of direction in a collegium. Mining Councilor Pabst von Ohain showed more promise. He had the requisite knowledge, insight, vigor, and zeal. Unfortunately, complained Heynitz, Ohain did not "seem wholly free of the passions, shows too much politics, never follows the truly straight path, does not allow himself to be led, and shows even less evidence of being able to lead others." All of this led Heynitz to the conclusion that there was a "real shortage of capable people to fill posts as *Berghauptleuten* and mining councilors in Freyberg."[40] Heynitz then proposed a solution to the problem:

> The mining district in Freiberg has established a scholarship fund, from which sons of the state's mining servants [*Bergbedienten*] can get money to learn subterranean surveying and assaying as training for subaltern positions. This fund is of great use, and I have already proposed many times in the Berggemach . . . that people who apply themselves to mechanics and other similar sciences should get something from this fund. But because this fund is not adequate for the *kind of people* who want to learn the mining sciences *in order to direct the budget* [*Haushalt*]—for which reason there are considerably more funds in Hungary, Austria, Bohemia, Sweden, and the Harz—and without which it is not easy to guarantee that anyone will take on this always costly profession [*métier*], I see it as my duty to point out that His Royal Highness might see fit to increase the fund with a contribution from the treasury.[41]

Heynitz was already preparing the way for a mining academy. The existing scholarship fund, which had been in place since 1702, no longer seemed adequate to him. It had been designed to provide narrow technical training for subaltern officials—that is, training for the wrong type of official. His proposal, on the other hand, sought to provide funds for educating a completely different kind of mining official. It aimed, that is, at cultivating cameralists who could oversee, control, and direct the mines.

Heynitz proposed a period of training to last three years. The first two years would be spent in one of Saxony's mining towns, probably Freiberg, with a scholarship of 200 thalers per year. During this time, the candidate

would study under the direct supervision of the *Oberberghauptmann*. In the third year, the scholarship would increase to 400 thalers, and the candidate would begin touring mines outside Saxony. In certain respects, the proposal resembled the structure of the 1702 scholarship fund, which had provided state support for aspiring young assayers and subterranean geometers to learn a trade from skilled subaltern officials. But Heynitz's plan was significantly different, for it aimed at cultivating high-level officials for service in central bureaus like the Oberbergamt, or even the Berggemach.

Heynitz not only planned to train a new generation of mining officials but aimed also to weed out "useless" officials from Saxon service. He had, for that purpose, begun to prepare an overview, in tabular form, of salaries and other income for all of Saxony's mining officials. He also examined their orders, promising "that many official posts (*Bedienungen*) can be eliminated or combined." In other cases it was simply a matter of replacing old, tired, corrupt, and useless officials with a new generation of better ones.[42] The success of the mines, he believed, depended on cultivating the right kind of mining official. In fact, Heynitz later claimed that the health of Saxony's mines rested completely on God's blessing and on the "diligence, insight, seriousness, application, liveliness, and integrity of the land's mining and smelting officials."[43] He attributed the decline of mines in the Harz and the Hungarian Carpathians, for example, to the absence of good officials there. A small investment in the education of Saxony's mining officials, therefore, would directly benefit the sovereign treasury. "This proposal," he promised, "will soon yield a rich profit [*sich rentiren*], and Your Excellency is already personally acquainted with the importance of Electoral Saxony's mines."[44]

Only two months later, Prince Xaver and the elector's widow, Maria Antonia, visited Freiberg. Heynitz, hoping they would support his plans for a mining academy, put on a show.[45] He had the mine shafts artificially illuminated and the miners' tools restored. He arranged demonstrations of ore stamping and separation. He ordered two officials, Christlieb Ehregott Gellert and Friedrich Wilhelm Charpentier, to perform chemical experiments.[46] And, perhaps most important of all, Heynitz arranged for a dramatic miners' parade to follow the evening meal. Xaver, who had a weakness for military processions, authorized Heynitz to write up a concrete proposal for the mining academy on the spot. Heynitz submitted his plan the very next day.[47]

Heynitz's plan for the new academy did not merely extend the purposes of the existing scholarship fund.[48] Rather, the new academy, as he

envisioned it, would prepare young members of the nobility for careers in the upper echelons of Saxony's mining administration. Whereas the existing scholarship fund had been established to support the acquisition of technical skills, especially assaying and subterranean surveying, the new academy would provide broader training in natural history and natural philosophy. Cadets (i.e., the students at the mining academy) were also expected to have legal training, and the plan provided for university study in jurisprudence, financed by the sovereign. Moreover, Heynitz strongly believed in the value of touring Germany's mines, and his plan thus set aside almost half of the total budget for travel costs. He designed his new academy specifically to educate those officials who would staff Saxony's high fiscal bureaus—especially the Berggemach and Oberbergamt—well into the future. Provided with noble titles, legal training, and well-placed connections from their extensive travel, the cadets were being groomed for positions in the upper levels of Saxony's administration. Unlike their predecessors, who had used the scholarship fund simply to learn specific skills, the Bergakademie had more ambitious goals. It would produce good cameralists to direct Saxony's mines.

The Bergakademie, as Heynitz had conceived it, posed a challenge to the old universities. The task of educating officials for state service, whether in law, medicine, or theology, had traditionally been the exclusive province of university education. With its new mandate, the mining academy now began to train state officials of its own.[49] Moreover, Freiberg's increasingly systematic instruction in mineralogy and chemistry offered an alternative to university education, which typically treated these subjects as auxiliary sciences for the medical faculty.[50] But the liberation of these sciences from the medical faculty signaled at the same time their subordination to Saxony's Oberbergamt. The mining academy, that is, gave the state bureaus direct control over certain kinds of knowledge and bypassed the troublesome universities, with their special academic privileges and quasi-autonomous faculties. But the Bergakademie, with its explicit subordination of scientific knowledge to the fiscal interests of the state, was much more like some universities than others; more specifically, its administrative structure and culture resembled Münchhausen's Göttingen more than the older universities in Heidelberg, Vienna, or Leipzig. By harnessing knowledge directly to the needs of the state treasury, Heynitz had perfected Münchhausen's Göttingen model.

Some four decades after the Freiberg Bergakademie first opened its doors, Abraham Gottlob Werner, the famous Freiberg mineralogist, submitted a report to the Saxon authorities in which he explained the im-

portance of the Bergakademie.[51] Prominent men, including the Prussian ministers Baron Stein and Count Reden, had heard lectures in Freiberg. Mining officials from across Europe and the Americas had studied there. But Werner also justified the mining academy on other grounds. It had, he argued, brought money to Freiberg by attracting wealthy foreigners. Like Justi and Heynitz and Münchhausen before him, Werner was a good cameralist who saw in the Bergakademie a many-sided source of sovereign income. He understood that Saxony's silver came not only from the mines of the Erz Mountains but also from the eager hands of wealthy foreign students.

Conclusion

The new model institutions of eighteenth-century Germany shared common goals and purposes. Within each territory, high-level officials like Münchhausen and Heynitz worked to bind institutions, whether manufactories or universities or prisons, into a single productive system. The point was to increase fiscal yields. Cameralists, the German Enlightenment's prophets of prosperity, sought to design the perfect mix of institutions. For them, no one institution could be viewed in isolation from the others or from the system as a whole. Like mines or manufactories, then, universities and academies had to generate silver, and they might do it in a number of ways. It was no accident, for example, that Hanover established its new university in a poor, dirty little town that had almost nothing going for it before 1734. Göttingen aimed to attract wealthy (preferably foreign) students; these wealthy students would draw skilled tradesmen; and skilled tradesmen would establish a basis for manufactures. It was a crazy idea: the place had to be advertised, promoted, and essentially misrepresented. Göttingen often appears as a nascent model for the German research university of the nineteenth century, but from the standpoint of those who ran the university, especially Curator Münchhausen, Göttingen's much-touted academic research also served as an elaborate advertisement, geared to draw money into the land.

The situation was little different in Freiberg, where officials were open about the need to attract wealthy students from at home and abroad. It is not at all clear, for example, that Abraham Gottlob Werner's famous scientific achievements or Novalis's Romantic science did much to fill Saxony's coffers with native silver. It *is* clear, however, that the professors in Freiberg built a towering reputation for the place and that it was teeming with well-heeled students from all over Europe by the end of the

eighteenth century. Moreover, the Bergakademie managed to keep some of Saxony's own elite, and thus its native silver, right at home. By 1765, when the Bergakademie first opened its doors, the once-legendary yields from Saxony's silver mines had long since been overshadowed by gold and silver from the Americas. But the relatively poor veins of the Erz Mountains did not present an insurmountable problem, because cameralists like Justi, Heynitz, and Münchhausen had meanwhile discovered how to transmute academic knowledge into silver coin.