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## “Big”-ness in Action: Notes from a Lexicon

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### Introduction

Despite an early affinity for the “exalted image” of “the lone scientist in pursuit of truth,” the American physicist and Manhattan Project alum Robert R. Wilson, like many of his colleagues, found himself part of a contrary reality.<sup>1</sup> “[M]y search for truth led me deep into the nucleus of the atom,” wrote Wilson in an autobiographical sketch in 1970, “and it is almost as hard to reach the nucleus by oneself as it is to get to the moon by oneself.”<sup>2</sup> By then he was head of a large government laboratory and “the compleat bureaucrat”—presiding with pleasure over “perhaps the *ne plus ultra* of team research in high energy physics.”<sup>3</sup> The work entailed the suspension of Wilson’s periodic “fight against team research” and with it the posture of the singly acting scientist. His account’s wry coda—*sic transit gloria*—captures its central ambivalence: an appreciation for the moon-shooting and nucleus-splitting power of big collaboration, big apparatus, and big money, coupled with a recurrent suspicion that these trappings of “team research” came at a cost for the scientist’s identity, initiative, and creativity.

Such ambivalence was not atypical for those who saw the quick rise of twentieth-century physics from a “parochial establishment” to a pursuit that could help win wars and command lavish spending.<sup>4</sup> By the 1950s and 1960s, practitioners were taking high energy physics alongside efforts like space exploration (see Wilson’s reference to the moon) to represent a particular mode of “big” or “large-scale” research—“Big Science”—well-resourced,

collaboratively conducted and subject to some of Wilson's tensions "between the me and the us."<sup>5</sup> In the decades since, "Big Science" has acquired its own literature, which has been nicely synthesized elsewhere.<sup>6</sup> I will not retell it at length, but one can speak broadly of three principal, and often intertwined, lines of inquiry. The first is definitional: it looks to distill a set of attributes and implications that can be understood under the label "Big Science" (or "big science" or "large-scale science" or "team research"), as an actors' and/or an analytical category.<sup>7</sup> The second moves towards a genealogy of Big Science by identifying elements of its profile prior to the post-war context in which it has lately become an object of study.<sup>8</sup> The third entertains a similar shift away from the particle accelerators and lunar probes, discarding not just chronological but also disciplinary assumptions by examining "big"-ness in a wide array of knowledge-producing operations—including fields like history and philology.<sup>9</sup>

The present contribution is aligned most squarely with the third of these agendas. What I intend here is a short consideration of a remarkable philological project—an unprecedentedly comprehensive lexicon of the Latin language, begun in the late nineteenth century as a testament to German philological might and still underway in Munich today. Now as then the so-called *Thesaurus linguae Latinae* aims to deliver nothing less than a complete history of each Latin word from its first recorded usage through the sixth century CE, when Latin began to give way to the Romance languages.<sup>10</sup> To that end, it relies on a staggering collection of evidence: an archive of millions of paper slips, each documenting a single instance of a single word. For the literature of several centuries this *Zettelarchiv* is flatly exhaustive—including every appearance of every word of every text.<sup>11</sup> It is no exaggeration to say that the lexicographers at the project's Munich Bureau, in working through the slips available for a given word, acquire a more detailed view of its scope and development than any prior researcher. So painstaking is the work, and so ample the task, that after more than 125 years, the lexicon has advanced only as far as N and R: about a third of the alphabet remains to be treated.

Was—is—the *Thesaurus* "Big Science"? To be sure, the effort was designated by those involved as a "big undertaking" and it was in line with what contemporary doyens of organized research identified as "big research" (*Grosswissenschaft*) and "big enterprise" (*Grossbetrieb*).<sup>12</sup> It had demanded by 1900 coordinated work from the five principal academies of the German-speaking world, exacted pledges of half a million marks of state money, and erected a Bureau of full-time lexicographers. It was identified with a nation's

scholarly preeminence, and was projected to take two decades to complete. It is quite possible here to find parallels—division of labor, state funding, publicity imperatives—to characteristics of “big”-ness advanced in other studies. But rather than engage strictly in such a matching exercise, I would like to advance a concept from James Capshew and Karen Rader, who have written of “dramas of scale” in connection with Big Science.<sup>13</sup> My proposal is simply to let “big”-ness here be defined by the drama—the *friction*—created by perceived disparities in scale as reported by scientists and scholars at work. Deborah Coen has called recently for a “history of scaling” that will historicize how such disparities are handled—how differently sized or weighted layers of observation and experience are reconciled—and indeed how they arise: that is, how, in given contexts, components of sense-making come to appear differently sized in the first place.<sup>14</sup> Working in this line, I will present three instances of scalar friction in evidence at the *Thesaurus*, on the organizational, technological, and temporal planes, considering some of their perpetuating factors and evolving attempts at their resolution. I will close with summary thoughts about where further studies of “Big Humanities” are headed.

## Big Organization

What Wilson found to be true of the nucleus—that it was hard to get there alone—applied to any number of scientific objects. That included the history of a long-dead language, a point made in the nineteenth century’s final decades by a Basel-born Latinist named Eduard Wölfflin (1831–1908).<sup>15</sup> After ascending to an influential chair in Munich in 1880, Wölfflin took decisive steps to further an ambitious agenda—one based on comprehensive lexicographical investigation. The massive lexicon he had in mind was an operation “much bigger than is typically believed.”<sup>16</sup> He painted a dire picture of predecessors: “one hears of philologists, who have set up lexical collections for single or several authors, but then burned them in desperation,” he wrote, “after realizing halfway through that the task outstripped the powers of an individual.”<sup>17</sup> The truth was, he said, that such “huge tasks” could never be laid on the “shoulders” of single actors.<sup>18</sup> One did not unlock the secrets of Latin words alone.

Wölfflin had, by the early 1880s, begun to suggest ways to augment individual efforts. Soon after arriving in Munich, the mode he took up was a journal, the *Archiv für lateinische Lexikographie*, which he founded in 1883

to prepare for an eventual Latin *Thesaurus*. The journal was to rely on a network of over two hundred volunteers, each responsible for a portion of Latin literature. In response to a semesterly questionnaire, these volunteers would comb their assigned texts for particular words and grammatical phenomena, log them onto standardized paper slips, and send them to Wölfflin's home.<sup>19</sup> The result was meant to be a complete catalogue of the lexical items specified: in theory, if Wölfflin wished to witness every appearance of the word *abhorreo* (included on the third questionnaire), he could do so by consulting the citations his volunteers mailed him.<sup>20</sup> Wölfflin and others used the material to generate articles—published in the *Archiv*—that served as test-runs for the eventual *Thesaurus*. He touted the results: only a year after the journal's founding he credited it with helping “hundreds of philologists” learn its historical lexicographical methods and “see with different eyes and think differently than before.”<sup>21</sup>

Did Wölfflin perceive a friction in the *Archiv*-engineered shift of scale—from a single lexical collector to hundreds? He certainly did, and it is there, rather than per se the number of scholars involved, that we find “big”-ness in action. The fundamental problem was how to render compatible the collections of far-flung contributors. Wölfflin's solution was the regular *Archiv* questionnaire, meant to calibrate his volunteers' efforts.<sup>22</sup> The contributors were to have no choice in the lexical instances they noted: every occurrence of a requested word like *abhorreo* was to be taken up, without exception, so as to avoid the heterogenous material that would result if “one excerptor noted what the other passed over” based on individualistic notions of importance.<sup>23</sup> Still, engaging and aligning volunteers demanded hundreds of letters, not just to hector and instruct, but to maintain the personal connection that kept people involved.<sup>24</sup> Faced with unresponsive contributors, Wölfflin went so far as to note in the *Archiv* their delinquency—leveraging, in short, public shame as an organizational maneuver.<sup>25</sup> Regional politics were part of the challenge: working from the Bavarian *Hauptstadt*, Wölfflin complained of difficulty bringing in participation from Berlin.<sup>26</sup> The notebooks cataloguing his *Archiv* correspondence, as well as the slips and letters he received from contributors, all held at the *Thesaurus*-Bureau, are a rich source for the messy practice of administering “team research,” and engaging, dispatch by dispatch, in the “scaling” it demanded.

The *Archiv*'s organizational problems paled in comparison to what would follow a decade later. Wölfflin's journal was run out of his home, initially with a small amount of Bavarian Academy financing. A full-fledged *Thesaurus*

required a broader basis. The eventual arrangement, which emerged by 1893, included a new entity—the so-called “Cartel” of academies in Munich, Leipzig, Göttingen, and Vienna—in collaboration with the Berlin Academy. The Cartel and subsequent internationalization efforts have been treated by scholars like Brigitte Schroeder-Gudehus and Martin Gierl, both of whom have made clear the vexing persistence of particularist allegiances.<sup>27</sup> It is impossible to do succinct justice to the cacophony of interests needing to be harmonized to achieve the Cartel-plus-Berlin *Thesaurus* structure.<sup>28</sup> But a look at just a couple of the stakeholders indicates the difficulties. The Basel-born Wölfflin claimed to carry “republican” sentiments from his Swiss hometown and was stationed at the principal Bavarian university: neither fact predisposed him to affection for his Berlin colleagues, whom he found despotic and inflated. The rhetoric of regional rivalry ran like a red-thread through his correspondence, where he sniffed plots to make a *Thesaurus* without him and dredged up old schemes allegedly meant to drive him from his lexicographical labors so as to “pounce on the master-less inheritance with the Prussian Eagle.”<sup>29</sup> Wölfflin had lexicographical experience and the ear of the Bavarian regime. But colleagues in Berlin disliked him personally and maligned him professionally.<sup>30</sup> The ancient historian Theodor Mommsen, the weightiest voice in the Berlin Academy, considered it disqualifying for the *Thesaurus* to be “Wölfflinized.”<sup>31</sup> And the north, too, spoke the language of regional suspicion: Berlin was concerned that there not be “too much Müniching.”<sup>32</sup> In short, the very core of the *Thesaurus*-collaboration simmered with personal and political distrust.

The problems did not end there. Each of the five academies involved needed to have the assent of their members and of the interested ministries, activating layers of complexity that were on full display in Berlin. When Mommsen set out in 1892 to gather support for what would become the Cartel, counsel had to be taken with the Foreign Office.<sup>33</sup> As the collaboration developed, the members of the Berlin Academy—much to Mommsen’s chagrin—voted against formal entry, later agreeing instead to work with the Cartel on the *Thesaurus* as an individual case.<sup>34</sup> To help cover the Göttingen and Berlin contributions to the arrangement, the Prussian Ministry of Culture wanted an extraordinary allotment to be placed in the state-budget. This meant a petition to the Finance Ministry, which was hardly a rubber stamp: there were concerns about the project’s cost-estimate and Culture’s apparent lack of compunction about outstripping the funds already at its disposal.<sup>35</sup> Even in the run-up to the *Thesaurus*, in other words, an enormous amount of friction had to be resolved: organizing academies demanded

interpersonal, inter-regional, inter- (and intra-) academy, inter-ministerial, and international alignment. Robert W. Smith has written of the “coalition building” that was as much a part of the Hubble Space Telescope as its physical components.<sup>36</sup> The same can be said of the *Thesaurus*, which was a multi-front diplomatic exercise before it was words on page or paper slips in waiting. Asked in 1894, with the inter-academy cooperation secured, how he had managed it, Wölfflin’s answer said it all: “As number one on my recipe, I say: ‘Take ten years’ patience.’”<sup>37</sup>

## Big Equipment

The *Thesaurus*’ priority in its first years was to collect the lexical material—the trove of example citations—from which the lexicon would be written. A partly mechanized system that allowed copied sections of text to be quickly reproduced for filing helped generate 1.5 million slips by mid-year 1897, 4.5 million by fall 1899 when the collection was centralized in Munich and the A-volume begun.<sup>38</sup> Wölfflin reported the material’s impression on a visiting minister, who had walked slowly through the Munich Bureau, turning his head to take in the boxes cataloguing the (ample) works of the Roman orator Cicero.<sup>39</sup> The slips threatened to buckle some of the shelves on which they were placed.<sup>40</sup> In the early days, when they were still arrayed by author and not alphabetically, it took months for an aide simply to extract and arrange the slips for the letter “C.”<sup>41</sup> The question of where to house this new tool—one that allowed users to witness centuries of a word’s development—was not trivial: there was, after all, no equivalent elsewhere. When it was secured for Munich, Wölfflin wrote to the Bavarian ministry of the “honor and advantage” won thereby, since “numerous scholars will be forced to seek out the Munich university” to use it.<sup>42</sup> Carlos Spoerhase’s suggestion that the *Thesaurus* was a “big instrument” in its own right is evocative: like an accelerator or an early computer, it was physically imposing, effectively non-portable (for the collection’s safety, slips remained in the *Thesaurus* office), and able to yield singular results to those with access.<sup>43</sup>

That the *Zettelarchiv* might pose a scalar problem was something Wölfflin had noted by the early 1890s, thanks to his *Archiv* experience. In a co-authored memorandum on how the *Thesaurus* might proceed, he pointed to the slips his journal-contributors had collected to document the (very

common) preposition *a, ab*. There were seven boxes in all—an enormous quantity, the presence of which posed an “instructive, that is, terrifying example, in that no one can resolve to read through and work on them.”<sup>44</sup> The disjuncture, in other words, between the attention-limited, time-bounded will of a human lexicographer and the forbidding mounds of slips was significant—and the challenge of “scaling” between the two acknowledged at the outset. Indeed, one of the first, most consequential debates between the academy delegates steering the *Thesaurus* had much to do with precisely this: Wölfflin contended in effect that it would be best to collect citations with some discretion, leaving aside “dispensable ballast”—those lexical examples that did not appear useful for future analysis.<sup>45</sup> This would unburden the eventual lexicon-authors by presenting them with a more manageable, “already sifted” material.<sup>46</sup> Wölfflin’s Berlin counterpart Hermann Diels saw things differently: he believed allowing excerptors to determine what to collect and what not would yield a “subjectively colored and incomplete, therefore unscientific body of material.”<sup>47</sup> He suggested instead a process for generating more resolutely exhaustive collections.<sup>48</sup> Diels’ proposed solution for the exacerbated problem of scale on large articles was to insert an intermediary figure—a “pre-processor” (*Vorarbeiter*)—between the collected material and the lexicon-author.<sup>49</sup> The “pre-processor” would assess the slips for each word statistically and select the “most notable,” sending on a set of “sifted” items to the lexicographer. In the end, Diels’ position prevailed, though without the “pre-processor,” leaving the lexicon-authors to fend for themselves amid the looming “slip-towers.”<sup>50</sup>

As those towers materialized, Wölfflin continued to emphasize the misalignment between philologists and their paper instruments. Diels had said he considered the *Zettelatom*—the atomized slip, containing a single lexical instance—to be very suitable for the analytical work of the lexicographer.<sup>51</sup> But Wölfflin, who preferred slips that each displayed several citations (as the *Archiv* slips had) lambasted the design in what amounted to an endorsement of a different model of cognition: “the person who is supposed to read through 20 boxes [of slips] on a particle,” he wrote, “will already have a brain-sickness by the twelfth or thirteenth.”<sup>52</sup> The disregard for the lexicographer’s brain-health was symptomatic of what he elsewhere styled a Berlin tendency to show a higher regard for the developing slip apparatus—the equipment—than for the scholars meant to operate it. More than once, Wölfflin rendered spiteful account of the opinion—allegedly voiced by Mommsen—that “were the slip-material (the principal thing)

assembled, it didn't much matter what came at the head and what at the tail" of the articles to be written from it.<sup>53</sup> He warned against "instil[ling] the idea that all wisdom stands already on the slips, and that [the lexicographers] have only to press the juice out of the grapes offered to them."<sup>54</sup> It was not, he contended, the slips that were "the highest oracle" in lexicography, but the lexicographer who wielded them.<sup>55</sup> The evident concern to keep the equipment from overpowering or overdetermining the operator is familiar: one finds a parallel sense among Big Scientists of Wilson's generation that actual "thinking" might succumb to a reliance on expensive machines, or that work dictated by the routine of the apparatus could become "just a little dull."<sup>56</sup>

Despite Wölfflin's hand-wringing, the process went forward: the *Thesaurus* had its millions-strong slip-archive. The question of how to make it manageable for the individual lexicographer would become a significant through-line in the lexicon's history. It was suggested early on that the article-writing process could be expedited by having lexicographers physically manipulate the slips into the order of the eventual entry before writing out a manuscript—a strategy that was ultimately discarded.<sup>57</sup> Wölfflin urged that the philologists at work on the *Thesaurus* cultivate a particular mode of attentive "observation" that would allow them to establish more efficiently what was worth noting in the mass of available material.<sup>58</sup> Another tack—at odds with Wölfflin's push to elevate the lexicographer over the slips—was to warn *Thesaurus* lexicographers not to attempt too much of their own analysis: "it must always be borne in mind that the *Thesaurus* only wishes to offer *material*," read an internal instruction from the inter-war period: "to present this cleanly sifted and separated is the only task of the article-author: doing *research* on the basis of this material must be left to the specialized disciplines."<sup>59</sup> The scaling struggle continues to this day: after deciding in 2005, with "P" coming to a close, to take up work on "N" and "R," the *Thesaurus* faced certain words so often attested—some ten boxes of material for the particle *nam*, some 45,000 slips for the negation *non*—that new approaches had to be developed to deal with them.<sup>60</sup> To avoid "sink[ing] in the flood of material" for such "huge words," lexicographers devised a way of drafting their treatments first from a limited sub-sample of citations, then filling in from those remaining, giving only cursory attention to examples liable to deviate little from stylistic norms.<sup>61</sup> The compromise was a solution to a condition one *Thesaurus* editor—in words that would have resonated with Wölfflin a century earlier—pithily diagnosed: "the curse of completeness."<sup>62</sup>



## Big Time

Hundreds of feet below a mountain in the Black Forest, a former mine-tunnel now houses unlikely contents.<sup>63</sup> Stored in air-tight stainless-steel cylinders, behind pressure-sealed doors, and beneath enough granite to weather a nuclear blast, is a cache of microfilm-reels that would, if unspooled, extend thousands of miles. Here in the so-called *Barbarastollen* are reproductions of a range of one-of-a-kind archival materials—everything from the coronation document of Otto I, to building plans for the Cologne cathedral, to the text of the Peace of Westphalia, all accorded a secure place in Germany’s subterranean cultural “bunker.”<sup>64</sup> One item is particularly significant for our purposes: a set of images of the millions of slips that comprise the *Zettelarchiv* of the *Thesaurus*. The composition of the polyester film and the conditions of its storage ensure that the filmed documents can last for hundreds of years.<sup>65</sup> The archive is an emissary to a distant future.

The delivery of the *Thesaurus* slips into the bunker (and unto ages hence) in the 1990s—nearly a century after many of them were created, and while their originals were still in active use by those writing the lexicon—elegantly captures some of the temporal layering characteristic of the lexicon-project, which in fact has provided another of the scalar friction-points constitutive of its “big”-ness.<sup>66</sup> The *Barbarastollen* was hardly the *Thesaurus*’ first flirtation with eternity. Wölfflin himself had shown an early interest in handling certain components of philological work in a manner that could stand “for all time.”<sup>67</sup> It was an orientation maintained as he built support for his lexicographical program and one that went hand in hand with the totalizing pitch of the preliminary collections he organized for the *Archiv*—a thing done *totally* had staying power. The stance would have been legible to contemporaries, as work by Markus Krajewski and Lorraine Daston has made clear: both the concern for epistemic durability and the sort of exhaustiveness on display in cataloguing-cum-archival projects like the lexicon *Zettelarchiv* were period impulses.<sup>68</sup> In effect, so Daston’s argument, the elevation of archival collection—and not just by philologists—was a mode of scaling the patent time-boundedness of human work to the ambitions of eternal up-to-date-ness: the (eventually outmoded) conclusions of the moment could be emended by later recourse to the preserved material on which they were built.<sup>69</sup> Thus at the *Thesaurus* it was precisely the slip-archive, not the printed lexicon written from it, that was promised to be “for all time the center for studies of the Latin language.”<sup>70</sup> These were grand

words: they kept “for all time” on the agenda, and took some pressure off lexicographers’ published work. But, crucially, there were collateral effects: In the first place, by conferring immortality on the archived material one risked devaluing the decidedly mortal scholars working with it, a tendency to which we have seen Wölfflin react above. Secondly, there was a clear friction between celebrating the timelessness of the *Zettelarchiv*, and the fact that it, too, was obviously subject to the vicissitudes of age and fortune—a reality underscored by the need to station a copy in the *Barbarastollen*.

As for the time required to produce the printed lexicon volumes: the *Thesaurus* had originally projected a completion-date around 1914. But by 1902, the third year of production, it was already clear that the project was not keeping pace, necessitating attempts to accelerate the work, with Wölfflin proposing measures such as tying salary-increases to shorter articles.<sup>71</sup> Such conversations presaged things to come. In the early 1930s, speeding up was considered a *Lebensfrage* for the *Thesaurus*.<sup>72</sup> After the Second World War, too, some struck a bleak note: an American involved in arranging support for the lexicon found its protracted time-estimates “very sobering”—he had no confidence that “a stable Europe and a stable world” would endure for the decades of work still projected.<sup>73</sup> Seven decades later, the uncertainty persists: recent correspondence from Munich warns that even after the coronavirus pandemic, “there will not be a simple return to normalcy: the future of the *Thesaurus* is even with all its successes in no way secure.”<sup>74</sup> 2025 will mark yet another reckoning, with a best-case extension of a subsequent quarter-century forecast—and even that contingent on a competitive proposal. Scholars’ jobs, a storied international base for Latin-language study, not to mention the prospects of closing in on Z, hang in the balance. The tension at the uneasy juncture between the timing of a career, a long-term project, and a (budgeted) organization is not just palpable; it is existential.

## “Big” Future?

Whither work on “Big Humanities”? I offer here a few observations intended not as novel pronouncements but as weather-vane readings synthesizing live (in some cases already for some time) areas for investigation.

First, the “Big Humanities” dialogue is primarily inflected by a particular personage in a particular place and time: namely Theodor Mommsen, whom we have met briefly above, and the nineteenth-century Berlin Academy.<sup>75</sup>

For this there is eminent justification: Mommsen in his own time was known as the “master of scholarly *Grossbetrieb*.”<sup>76</sup> A cornerstone of his reputation was his role in establishing the *Corpus Inscriptionum Latinarum* (CIL), which looked to collect the widely scattered Latin inscriptions of the Roman world: the CIL had published some 130,000 of them by 1903, and—like the *Thesaurus*—continues its work today.<sup>77</sup> Regarded as “a first of its kind model of [scholarly] cooperation and *Grossbetrieb*,” the project was a harbinger of Mommsen’s prowess, unfolded in Berlin, as an organizer of collaborative efforts—including the *Thesaurus*, for which he drafted initial regulations (he had done the same for the Cartel).<sup>78</sup> Because of Mommsen’s extraordinary profile, and thanks especially to the work of Stefan Rebenich, we have a good outline of his activity and illuminating depictions of certain of the projects linked to him. There is, in short, a solid foundation from which to analyse characteristics of *Grosswissenschaft* as Mommsen and those around him understood and practiced it.

The story that has emerged is one in which *Big Science* or *Big Scholarship* in the study of antiquity (and/or at the Berlin Academy) has its “beginning” either in 1858, when Mommsen became an ordinary Academy-member, or in 1853, when his leadership of the CIL became assured: the “founding date” of joint humanities research, meanwhile, is set in 1815, coincident with a proposal for collecting Greek inscriptions that identified collaborative projects as an Academy *raison d’être*.<sup>79</sup> Subsequent decades saw both the CIL’s realization and the consolidation of Mommsen’s influence within the Academy, which by century’s end would support a wide array of comparable, comprehensive editorial and collection efforts, aimed at organizing scholarly labor to make available “fundamental” historical and philological sources.<sup>80</sup> There was a common profile to these academy *Unternehmungen*, as scholars like Petra Hoffmann have shown: division of labor, long time-horizons, supervision by a commission, a distinct material-collection period.<sup>81</sup> And they provided a model that would be emulated by Academy-projects in the sciences.<sup>82</sup> When Mommsen moved to assemble an inter-academy coalition, it was initially with expansive humanities projects in mind—the *Thesaurus*, a coin catalogue, further inscriptions work.<sup>83</sup> All of which has supported the conclusion that decades before twentieth-century scientists were remarking on “big science,” scholars in the humanities were using the same label as they organized expensive, collaborative, long-term projects, and took the lead in devising structures (the academy *Unternehmung*, the Cartel) to pursue them. This, then, is the so-called “birth of *Big Science* from the humanities.”<sup>84</sup>

The argument has an attractive counter-intuitive bent, perhaps encouraging its invocation in ways that are a bit too glib—collapsing a narrative about an advancing style of work in the Berlin Academy with one about scientific developments more broadly.<sup>85</sup> It is a bold leap from the observation that projects cataloguing fixed-star positions or flora and fauna availed themselves of an Academy-infrastructure developed by scholars of antiquity to the assertion that Mommsen's *Großwissenschaft* was “the prototype of all Big Science ever since, whether in the humanities or the sciences” or that it was with Academy-projects at century's end that the natural sciences at large “finally . . . enter[ed] the ‘era’ of the *Grossbetrieb der Wissenschaften*.”<sup>86</sup> In fact, at key points in the development from the CIL to the Cartel, there are of course indications of cues from the natural sciences. Entering the Academy in 1858, Mommsen greeted its ability to move on the CIL as having “delivered one more proof, that *as in the field of the natural sciences* and modern history, so also in that of classical philology, scientific organization delivers results.”<sup>87</sup> What precursors did he have in mind? Likewise, decades later, a ministerial letter on Mommsen's inter-academy ambitions introduced the idea by citing international organizations in areas like geodesy and astronomy. The goal was to *extend* the system to the study of antiquity.<sup>88</sup> And indeed, when Wölfflin began to work out his lexicographical ambitions in the 1870s and 1880s he invoked everything from a “central laboratory,” to meteorology, to forestry.<sup>89</sup> He certainly saw a family resemblance between the CIL and his envisioned *Thesaurus*, but he was also inclined to look elsewhere for organizational models and inspiration.

It is difficult to sustain the narrative, then, that the currents of what Mommsen called “big”-ness ran a direct channel downstream from the humanities to the sciences and outwards from there. Let us scramble over quickly to the scientists' side. With the Cartel in the making, the great Berlin physiologist and physicist Hermann von Helmholtz was asked his opinion: he endorsed the idea, while distancing himself from the type of work he believed it to represent (“collective efforts of many collectors and observers”).<sup>90</sup> This naturally wasn't because he was hidebound. He was at the time the head of the costly Physikalisch-Technische Reichsanstalt, overseeing some fifty personnel; two decades earlier, Prussia had put over 1.5 million marks towards the largest physics institute in Germany as part of a pledge meant to draw him to Berlin.<sup>91</sup> Institutes of this sort were taken by contemporaries to be the “capitalist counterpart to the big manufacturing enterprises (*Grossbetrieben*),” and one scholar could speak readily of the “world-mastering *Grossbetrieb* of a Mommsen or a Helmholtz.”<sup>92</sup> So

Helmholtz’s operation, too, was *Grossbetrieb*, and it wasn’t learned from Mommsen’s inscription collections.

The prescription for Big Humanities enthusiasts is thus to work towards a core narrative of nineteenth-century scholarly “big”-ness that is a bit less ordinary and a bit more backward-facing, a bit less linear and a bit more “entangled”<sup>93</sup>: one that embraces the crucial insights about the essential role of philologists and historians without relegating scientists to their train or relying on Mommsen as the *terminus post quem*. Useful will be further pursuit of just how much identity humanists saw between their work and the comparanda—industrial, to be sure, but also military and scientific—that surface in their rhetoric. Useful, too—and this will hardly make news—will be continuing to devise detailed studies of ambitious humanities enterprises that adjust the lens anterior to Mommsen or laterally away from Berlin.<sup>94</sup> Our *Thesaurus*-story above hardly writes the “Mommsenians” out of the picture—indeed some in Berlin, much to Wölfflin’s dissatisfaction, insisted on regarding Mommsen as the *pater Thesauri*.<sup>95</sup> But precisely because it is a story with a gravitational center in Munich, it stands at an angle to the Berlin paradigm. One sees the perspective of an eager founder looking to achieve something that would not sit in Prussia’s shadow, who had to engage in diplomacy on the part of an Academy (Munich) with considerably less discretionary funding than Berlin, who was eager to resist the north on key points (see Wölfflin’s tangle with Diels), and who expressed a set of referents and templates (the laboratory, the forestry garden) that direct our eyes beyond the frame of other Academy-projects.

A second point is that collaboration comes in many forms, which remain difficult to taxonomize.<sup>96</sup> Indeed, one of the things that a close look at the *Thesaurus* tells us is that those involved could register significant differences in the organization of projects as apparently isomorphic as collecting inscriptions and collecting Latin words. For the lexicon, Wölfflin (though flexible) inclined towards a model of coordinated work based at a single centralized workplace similar to what eventually prevailed—a Bureau of on-site lexicographers under an editor proceeding through the alphabet together.<sup>97</sup> Mommsen’s preference—modeled on the CIL—was to divide the *Thesaurus* into segments of the alphabet to be worked as separate volumes by largely independent individuals under Academy oversight.<sup>98</sup> Each was repulsed by the perceived inclination of the other. Wölfflin thought Mommsen’s CIL-adjacent plan would amount to a “race for favor,” editor-versus-editor, in Berlin and fail to give the work a “uniform spirit.”<sup>99</sup> Mommsen, meanwhile, recoiled at Wölfflin’s “perverse” notion of the “leader, and under him the Philologist-*Bureau* working with several horsepower.”<sup>100</sup> The devil was in the details in project organization,

and, depending on the circumstances, a myriad political and efficiency calculations could attend each permutation. Caution is therefore in order around assertions that, for instance, modern digital humanities projects “share the same form of research organization as the long-term projects of the Prussian Academy of Sciences,”<sup>101</sup> since the forms involved may prove to be more variegated than one initially suspects.

Third, scholars have already generated exciting results by examining not just the leaders of “big” enterprises—chair-holders like Mommsen and Wölfflin—but the less well-known figures toiling inside or in support of them.<sup>102</sup> Contemporary discourse attested the risks such figures faced. One could be straitjacketed by “mechanical” tasks, consigned to the menial service of the “cartei,” to dulling “factory-work.”<sup>103</sup> As studies have indicated, such language speaks to period notions of creativity and the hierarchicalization of academic labor.<sup>104</sup> How much it reveals about what people were in fact doing, and how routinized their work actually was, is less clear. The script grows suspect when one finds Mommsen, for example, apparently on a swivel: describing the work of editing inscriptions in elevated fashion as requiring scholars to “consider and examine the whole of Roman antiquity,” but later equating editing to mere cart-hauling: “the carting—which one calls *editing*—everyone can do.”<sup>105</sup> Certainly Wölfflin was not inclined to downplay rank-and-file lexicographers: others might see them as “boot-cleaner[s]”—for him, he insisted, they had the noble role “of the artist, the architect, or the painter.”<sup>106</sup> But exactly what “boot-cleaning” and what “painting” those on projects like the *Thesaurus* did, and whether they believed their hands to be caked with dirt or with pigments, remains for the historian to show.

A final note: there is further room to probe the relationship between the “official” or initial rhetoric of humanities projects and the shifting realities of behavior under the gun and on the ground. The vexing topic of “completeness” provides an example.<sup>107</sup> Mommsen could speak neatly of “unify[ing] all Latin inscriptions in a collection,” even while signaling the far more realistic view that to “visit every little place where there is even the prospect of old inscriptions” was completely impractical.<sup>108</sup> Wölfflin, meanwhile, could move in a decade from extolling “complete lexical material” and “absolute completeness” in his *Archiv* to pushing back in *Thesaurus*-planning against Diels’ advocacy for an exhaustive approach.<sup>109</sup> Experience and exigency had a way of tarnishing shiny objectives, or turning them into moving targets.

The same was true of the “archive” that featured in both the *Thesaurus* and the CIL. In Mommsen’s oft-quoted formulation, the “groundwork of historical *Wissenschaft*” lay in organizing “the archives of the past.”<sup>110</sup> At

mid-century, an example of the “organized” archives he had in mind appears to have been the printed CIL volumes themselves, neatly presenting inscriptions. But as Daston shows, there arose another, subtending archive, one consisting of the materials—including the paper impressions of faraway inscriptions known as “squeezes”—from which the CIL was assembled, and from which it could be checked after the fact.<sup>111</sup> It is worth underscoring that the embrace of the latter seems to have been a process and not foreordained. Indeed, when confronted in the 1850s with a mass of such “squeezeery,” mailed to him by another scholar, Mommsen expressed little enthusiasm.<sup>112</sup> And in a volume published three decades later, the CIL epigrapher, Berlin professor, and former Mommsen acolyte Emil Hübner would note that when he had set about gathering visual examples of inscriptions, the CIL had not laid in many squeezes: “manuscript and printed copies had been collected as fully as possible for preparing the CIL volumes, but only rarely paper or plaster or aluminum impressions, or photographs—and usually only of these inscriptions which presented some difficulty in making out.”<sup>113</sup> Clearly, then, there had been no effort from the outset to construct a systematic library of paper impressions. Hübner would go on to collect more than 4,000, which were available for viewing in Berlin, and which he knew could reveal discrepancies with what had been “archived” in the printed CIL.<sup>114</sup>

For its part, the *Thesaurus* could assert by 1900 that its slips would be there perpetually for lexicon-revisions future.<sup>115</sup> But as we have seen that was easier said than done, with the *Barbarastollen* but one step in a long effort, begun in the lexicon’s planning stages, to determine the make-up and shape of the archive. Those leading the project tangled not just on how complete the slips should be, but also their appearance, production, and storage. The fault-lines opened on issues like this, expressed in protocols, in letters, and in manuscript memoranda, do not emerge readily in the lexicon’s public-facing materials. But digging for them is worthwhile: they show epistemological commitments, scholarly priorities, and politics worked out in real time, in the language of boxes and paper slips. They represent for us “big” humanities in action.

## Notes

1. Robert R. Wilson, “My Fight Against Team Research,” *Daedalus* 99, no. 4 (1970): 1076–87, at 1076. Citations have been held to a minimum for reasons of space.

2. Ibid.
3. Ibid., 1087.
4. Ibid., 1076. For the growth of physics, see, e.g., Peter Galison, *Image and Logic: A Material Culture of Microphysics* (Chicago, IL: University of Chicago Press, 1997), 239–431.
5. So, e.g., Merle Tuve, “Is Science too Big for the Scientist?” *Saturday Review* (6 June 1959): 48–52; Alvin M. Weinberg, “Impact of Large-Scale Science on the United States,” *Science* 134, no. 3473 (1961): 161–4; Wilson’s words at “My Fight,” 1076.
6. See James H. Capshew and Karen A. Rader, “Big Science: Price to the Present,” *Osiris* 7 (1992): 3–25; Carlos Spoerhase, “Big Humanities: ‘Größe’ und ‘Großforschung’ als Kategorien geisteswissenschaftlicher Selbstbeobachtung,” *Geschichte der Germanistik* 37/38 (2010): 9–27, esp. 9–19; Torsten Kahlert, “‘Große Projekte’: Mommsens Traum und der Diskurs um Big Science und Großforschung,” in *Wissenskulturen: Bedingungen wissenschaftlicher Innovation*, ed. Harald Müller and Florian Eßer (Kassel: Kassel University Press, 2012), 67–86, at 70–9.
7. See Weinberg’s “Impact”; Derek J. de Solla Price, *Little Science, Big Science* (New York: Columbia University Press, 1963); *Big Science: The Growth of Large-Scale Research*, ed. Peter Galison and Bruce Hevly (Stanford, CA: Stanford University Press, 1992).
8. Often cited is Lawrence Badash, “The Origins of Big Science: Rutherford at McGill,” in *Rutherford and Physics at the Turn of the Century*, ed. Mario Bunge and William R. Shea (New York: Science History Publications, 1979), 23–41, but there is plenty that fits the bill, including, e.g., the *longue durée* reflections in Capshew and Rader, “Big Science,” 19–22.
9. See Stefan Rebenich, *Theodor Mommsen und Adolf Harnack: Wissenschaft und Politik im Berlin des ausgehenden 19. Jahrhunderts* (Berlin: Walter de Gruyter, 1997), 55–94; *Theodor Mommsen: Eine Biographie* (Munich: C. H. Beck, 2002), 135–64, and a number of further works by the same author, cited below. Likewise, Rüdiger vom Bruch, “Mommsen und Harnack: Die Geburt von *Big Science* aus den Geisteswissenschaften,” in *Theodor Mommsen: Wissenschaft und Politik im 19. Jahrhundert*, ed. Alexander Demandt et al. (Berlin: Walter de Gruyter, 2005), 121–41; Torsten Kahlert, “*Unternehmungen großen Stils*”: *Wissenschaftsorganisation, Objektivität und Historismus im 19. Jahrhundert* (Berlin: be.bra wissenschaft, 2017).
10. On the *Thesaurus*, see esp. *Wie die Blätter am Baum, so wechseln die Wörter: 100 Jahre Thesaurus linguae Latinae*, ed. Dietfried Krömer (Stuttgart: B. G. Teubner 1995). Further publications are listed online at <https://www.thesaurus.badw.de/ueber-den-tll/literaturhinweise.html>
11. All texts into the second century CE are exhaustively represented. Thereafter, some have been taken into the *Zettelarchiv* in their entirety, but most have been excerpted.



12. For *Thesaurus*-idea as “großes Unternehmen” see, e.g., transcript of Theodor Mommsen to Friedrich Vogel, 22 January 1880, *Thesaurus linguae Latinae* Archive (= TLLA) (“Je mehr die Realisierung des . . . geplanten grossen Unternehmens”); Eduard Wölfflin, “Vorwort,” *Archiv für lateinische Lexikographie* 1:1-12, at 6. For “Großwissenschaft” and “Grossbetrieb,” see Rebenich, *Theodor Mommsen und Adolf Harnack*, 55–94; further, *Adolf von Harnack als Zeitgenosse: Reden und Schriften aus den Jahren des Kaiserreichs und der Weimarer Republik*, vol. 2, ed. Kurt Nowak (Berlin: Walter de Gruyter, 1996), 1007, 1009–19.
13. Capshew and Rader, “Big Science,” 4, 18–22.
14. See Deborah R. Coen, “Big Is a Thing of the Past: Climate Change and Methodology in the History of Ideas,” *Journal of the History of Ideas* 77, no. 2 (2016): 305–21, at 311–14 and Coen, *Climate in Motion: Science, Empire, and the Problem of Scale* (Chicago, IL: University of Chicago Press, 2018), 16–20.
15. On Wölfflin, see Christian Flow, “Philological Observation,” *Modern Intellectual History* 19, no. 1 (2022), 187–216.
16. Wölfflin, “Vorwort,” 6.
17. *Ibid.*
18. *Ibid.*
19. Eduard Wölfflin, “Organisation der Arbeit,” *Archiv für lateinische Lexikographie* 1:12–15; first questionnaire at *Archiv für lateinische Lexikographie* 1:15–19.
20. For *abhorreo* see *Archiv für lateinische Lexikographie* 1:462 (no. 85).
21. *Archiv für lateinische Lexikographie* 1:573.
22. Wölfflin, “Organisation,” 14: “auch dürfte die einheitliche Fragestellung . . . die Verschiedenheit der HH. Mitarbeiter wesentlich ausgleichen.”
23. See Wölfflin on the shortcomings of a prior *Thesaurus* plan: “Vorwort,” 4.
24. Wölfflin, “Zwei Gutachten über das Unternehmen eines lateinischen Wörterbuches” (1892), in Krömer, *Wie die Blätter*, 145–56, at 150, 152; Friedrich Vogel, “Zu Eduard Wölfflins hundertstem Geburtstag: Die schwierigen Anfänge des *Thesaurus linguae latinae*,” *Bayerische Blätter für das Gymnasial-Schulwesen* 66 (1930): 345–50, at 346, 349.
25. *Archiv für lateinische Lexikographie* 2:147.
26. See Vogel, “Die schwierigen Anfänge,” 348, quoting Wölfflin letter from 27 February 1884. From the (TLLA) original: “Die Folge davon ist, dass Archiv I.1 + 2 nichts aus Berlin enthält. . . Ein schöner Anfang zu dem *Nationalwerke*.”
27. B. Schroeder-Gudehus, “Die Akademie auf internationalem Parkett: Die Programmatik der internationalen Zusammenarbeit wissenschaftlicher Akademien und ihr Scheitern im Ersten Weltkrieg,” in *Die Königlich Preussische Akademie der Wissenschaften zu Berlin im Kaiserreich*, ed. J. Kocka et al. (Berlin: Akademie Verlag, 1999), 175–95; Martin Gierl, *Geschichte und Organisation: Institutionalisierung als Kommunikationsprozess am Beispiel der Wissenschaftsakademien um 1900* (Göttingen: Vandenhoeck & Ruprecht, 2004), esp. 213–320.

28. See Gierl, *Geschichte*, 215–63.
29. See Wölfflin to Franz Bücheler, October 25, 1891 (“die herrenlose Erbschaft”), November 11, 1893 (“*ganz ohne mich*”), Stadtarchiv und Stadthistorische Bibliothek, Bonn (= SSBB), SN 43.
30. Stefan Rebenich, “‘Mommsen ist er niemals näher getreten’: Theodor Mommsen und Hermann Diels,” in *Hermann Diels (1848–1922) et la science de l’antiquité*, ed. W.M. Calder III and J. Mansfeld (Geneva: Fondation Hardt, 1999), 85–142, at 123–27.
31. *Ibid.*, 124 (“wölfflinisirt”).
32. Hermann Diels to Theodor Mommsen, October 13, 1893, Staatsbibliothek zu Berlin, Preußischer Kulturbesitz, NL Mommsen I: Diels, 45v: “so kann man vielleicht verhüten, dass zu stark gemünchnert wird.”
33. Gierl, *Geschichte*, 221–23.
34. *Ibid.*, 237–63.
35. See Robert Bosse to Johannes Miquel, August 20, 1894, GSA-PK I. HA Rep. 76 V<sub>c</sub> Sekt. 1 Tit. XI Teil VD Nr. 8 Bd. 1. For Finance’s stern posture, see correspondence to Bosse of October 14 and December 3, 1984.
36. Robert W. Smith, “The Biggest Kind of Big Science: Astronomers and the Space Telescope,” in Galison and Hevly, *Big Science*, 184–211.
37. Eduard Wölfflin to Heinrich Wölfflin, May 18, 1894, Universitätsbibliothek Basel (=UB) NL 95, IV, 1368.
38. See (Beilagen to) protocol of 1897 and report of 1899 Thesaurus Commission meetings, TLLA.
39. Wölfflin to Franz Bücheler, January 8, 1899, SSBB SN 43: 995.
40. TLLA binder: Geschäftsführung I, 144.
41. Friedrich Vollmer, “Vom Thesaurus Linguae Latinae,” *Neue Jahrbücher für das klassische Altertum, Geschichte und deutsche Literatur* 17, no. 1 (1904): 46–56, at 49.
42. Wölfflin report of June 7, 1898, Bayerisches Hauptstaatsarchiv, MK 11769, vol. 1.
43. Spoerhase, “Big Humanities,” 14.
44. Franz Bücheler and Eduard Wölfflin, “Memorial betr. Thesaurus linguae latinae” (1893), in Krömer, *Wie die Blätter*, 162–76, at 164.
45. *Ibid.*, 163.
46. *Ibid.*
47. Diels, “Stellungnahme zum Memorial” (1893), in Krömer, *Wie die Blätter*, 177–86, at 177.
48. *Ibid.*, esp. 181–6.
49. *Ibid.*, 184–5.
50. Friedrich Vollmer to Eduard Wölfflin, June 8, 1899, UB NL 93 83: 930 (“vor den Zetteltürmen”).
51. Diels, “Stellungnahme,” 184.

52. Wölfflin to Franz Bücheler, October 16, 1894, SSBB, SN 43: 999.
53. See, e.g., Wölfflin, “Die Form der Lexikonartikel,” May 23, 1896, TLLA, 34–5.
54. *Ibid.*, 25.
55. *Ibid.*, 15.
56. See Weinberg, “Impact,” 162; Galison, *Image and Logic*, 422.
57. For slip-manipulation, see TLLA binder: Geschäftsführung I, 147.
58. Flow, “Philological Observation,” 207–11.
59. “Entwurf einer Arbeitsinstruktion für die Mitarbeiter des Thesaurus linguae Latinae,” TLLA, 2.
60. Hugo Beikircher, “Der Fluch der Vollständigkeit,” *Akademie Aktuell* 15 (2005): 62–3.
61. *Ibid.*, 63.
62. *Ibid.* (see title).
63. On the *Barbarastollen*—officially “Zentraler Bergungsort der Bundesrepublik Deutschland”—I rely on Stephan Krass, “Der Kulturbunker,” in *Deutsche Erinnerungsorte*, vol. 3, ed. Etienne François and Hagen Schulze (Munich: C. H. Beck, 2001), 651–9.
64. *Ibid.*, 653.
65. *Ibid.*, 655.
66. The author is currently at work on an article-length treatment of temporality at the *Thesaurus*.
67. See Flow, “Philological Observation,” 204.
68. See Markus Krajewski, *World Projects: Global Information Before World War I*, trans. Charles Marcrum II (Minneapolis, MN: University of Minnesota Press, 2014); Lorraine Daston, “The Immortal Archive: Nineteenth-Century Science Imagines the Future,” in *Science in the Archives: Pasts, Presents, Futures*, ed. Lorraine Daston (Chicago, IL: University of Chicago Press, 2017), 159–82.
69. Daston, “Immortal Archive.”
70. “Denkschrift über den Thesaurus linguae Latinae,” November 29, 1913, in TLLA binder: Thesaurus-Geschichte 1893–1948, I, at 2. See further Flow, “Philological Observation,” 212–13.
71. See I(9) and II(1) of the 1902 Thesaurus Commission meeting protocol, and Wölfflin’s memorandum “Auch der Thesaurus”—with, e.g., suggestion about exercising “[e]ine sanfte Pression” on article-authors at [3]. Both TLLA.
72. See “Bericht der Herren Fraenkel, Norden und Stroux über ihre Vorberechnung in Naumburg am 14. February 1931,” TLLA.
73. Howard Comfort to Heinz Haffter et al., November 21, 1948, TLLA.
74. Michael Hillen and Manfred Flieger to Friends of the Thesaurus, December 2020.
75. So, e.g., treatments like Annette M. Baertschi, “‘Big Science’ in Classics in the Nineteenth Century and the Academicization of Antiquity,” in *The Making of*

- the Humanities*, vol. 3, ed. Rens Bod, Jaap Maat, and Thijs Weststeijn (Amsterdam: Amsterdam University Press, 2014), 233–49; and Chad Wellmon, “Loyal Workers and Distinguished Scholars: Big Humanities and the Ethics of Knowledge,” *Modern Intellectual History* 16, no. 1 (2019): 87–126, are heavily framed by earlier argumentation on Mommsen and the Academy (esp. that of Rebenich and Vom Bruch).
76. See Wilhelm von Hartel, “Organisation der wissenschaftlichen Arbeit,” *Zeitschrift für die österreichischen Gymnasien* 58 (1907): 1–15, at 10; similarly, Hermann Diels, “Die Organisation der Wissenschaft,” in *Die Kultur der Gegenwart*, vol. 1, no. 1, ed. P. Hinneberg (Berlin: B. G. Teubner, 1906), 591–650, at 626.
  77. See Stefan Rebenich, “Berlin und die antike Epigraphik,” in *Öffentlichkeit—Monument—Text*, ed. Werner Eck et al. (Berlin: Walter de Gruyter, 2014), 7–75.
  78. See Hartel, “Organisation,” 5. For the Cartel statutes see *Theodor Mommsen und Friedrich Althoff: Briefwechsel 1882–1903*, ed. Stefan Rebenich and Gisa Franke (Munich: Oldenbourg, 2012) no. 457; Mommsen’s *Thesaurus* regulations at no. 509.
  79. See Stefan Rebenich, “Vom Nutzen und Nachteil der Großwissenschaft: Altertumswissenschaftliche Unternehmungen an der Berliner Akademie und Universität im 19. Jahrhundert,” in *Die modernen Väter der Antike: Die Entwicklung der Altertumswissenschaften an Akademie und Universität im Berlin des 19. Jahrhunderts*, ed. Annette M. Baertschi and Colin G. King (Berlin: Walter de Gruyter, 2009), 397–421, at 398 (1858); Rebenich, “Berlin,” 19 (1853), 9 (1815).
  80. See Stefan Rebenich, “Die Altertumswissenschaften und die Kirchenväterkommission an der Akademie: Theodor Mommsen und Adolf Harnack,” in Kocka, *Königlich Preussische Akademie*, 199–233.
  81. See Petra Hoffmann, *Weibliche Arbeitswelten in der Wissenschaft: Frauen an der Preussischen Akademie der Wissenschaften zu Berlin 1890–1945* (Bielefeld: transcript, 2011), 55–110.
  82. Rebenich, “Altertumswissenschaften,” 223; Diels, “Organisation,” 626.
  83. *Theodor Mommsen und Friedrich Althoff: Briefwechsel*, no. 431.
  84. Vom Bruch, “Geburt.”
  85. Kahlert, “Große Projekte,” 71–2, 77 for cautionary notes.
  86. Lorraine Daston, “Authenticity, Autopsia, and Theodor Mommsen’s *Corpus Inscriptionum Latinarum*,” in *For the Sake of Learning: Essays in Honor of Anthony Grafton*, ed. Ann Blair and Anja-Silvia Goeing, vol. 2 (Leiden: Brill, 2016), 955–73, at 967–8; Wellmon, “Loyal Workers,” 113.
  87. See his oft-cited Antrittsrede at Rebenich, *Theodor Mommsen und Adolf Harnack*, 44. Emphasis mine.
  88. *Theodor Mommsen und Friedrich Althoff: Briefwechsel*, no. 431. See Gierl, *Geschichte*, 219–20.

89. Flow, “Philological Observation,” esp. 195–204, 214–15.
90. *Theodor Mommsen und Friedrich Althoff: Briefwechsel*, no. 447.
91. David Cahan, *An Institute for an Empire: The Physikalisch-Technische Reichsanstalt 1871–1918* (Cambridge: Cambridge University Press, 1989), 21–2, 70–1. For the rise and size of institutes in German physics generally, see the same author’s “The Institutional Revolution in German Physics, 1865–1914,” *Historical Studies in the Physical Sciences* 15, no. 2 (1985): 1–65.
92. Adolph Wagner, *Die Entwicklung der Universität Berlin 1810–1896* (Berlin: Julius Becker, 1896) at 28–9 (“ein kapitalistisches Seitenstück”); Richard M. Meyer, *Betrieb und Organisation der wissenschaftlichen Arbeit* (Berlin: Leonhard Simion, 1898), 54.
93. See Sjang ten Hagen, “History and Physics Entangled: Disciplinary Intersections in the Long Nineteenth Century” (PhD thesis University of Amsterdam, 2021).
94. See, e.g., Laetitia Boehm, “Langzeitvorhaben als Akademieaufgabe: Geschichtswissenschaft in Berlin und in München,” in *Die Preußische Akademie der Wissenschaften zu Berlin 1914–1945*, ed. Wolfram Fischer (Berlin: Akademie Verlag, 2000) 391–434 (Munich as comparandum); Kahlert, *Unternehmungen*, 185–273 (non-Academy project as comparandum; also attempt to de-center Mommsen in CIL account: e.g., 55, 121).
95. Wölfflin to Bücheler, October 3, 1893, SSBB, SN 43 for “Mommsenianer.”
96. See, e.g., Capshew and Rader, “Big Science,” 22–3.
97. See MA no. 506.
98. See MA no. 509: 7 (lies: 8).
99. Wölfflin’s reaction at “Zwei Gutachten,” 152 (“eine Seele erhalten”; “ein einheitlicher Geist”); Wölfflin to Bücheler, October 25, 1891, SSBB, SN 43 (“Wettrennen”); Wölfflin to Heinrich Wölfflin, December 20, 1891, TLLA (“Gunst-Wettrennen”). This in response to Mommsen, “Gutachten über das Unternehmen eines lateinischen Wörterbuchs (1891),” in Krömer, *Wie die Blätter*, 139–44, at 140–1.
100. *Theodor Mommsen und Friedrich Althoff: Briefwechsel*, no. 508.
101. Baertschi, “Big Science,” 242.
102. Hoffmann, *Weibliche Arbeitswelten*; Horst Fuhrmann, “Sind eben alles Menschen gewesen”: *Gelehrtenleben im 19. und 20. Jahrhundert* (Munich: C.H. Beck, 1996), esp. 37–44, 77–115.
103. See Nowak, *Adolf von Harnack*, vol. 2, 1012; Rebenich, “Vom Nutzen,” 412–13; Rebenich, *Theodor Mommsen und Adolf Harnack*, 81, 621–2 (Kärner); further, Katharina Manteufel, “A Three-Story House: Adolf von Harnack and Practices of Academic Mentoring around 1900,” *History of Humanities* 1, no. 2 (2016): 355–70, at 365–6.
104. Manteufel, “Three-Story House,” 362–9; Rebenich, *Theodor Mommsen und Adolf Harnack*, 80; Diels, “Organisation,” 627–8.

105. See CIL 9 (1883): X, and compare Mommsen letter of August 10, 1871, quoted in Lothar Wickert, *Theodor Mommsen: Eine Biographie*, vol. 3 (Frankfurt am Main: Klostermann, 1969), 137–8.
106. Wölfflin to Franz Bücheler, June 25, 1894, SSBB, SN 43.
107. See Kahlert, *Unternehmungen*, 40–9.
108. See Mommsen, “Über Plan und Ausführung eines Corpus Inscriptionum Latinarum,” in A. Harnack, *Geschichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin*, vol. 2 (Berlin: Reichsdruckerei, 1900), 522–40, at 523, with the practical take at 527.
109. Wölfflin, “Vorwort,” 7–8.
110. Rebenich, *Theodor Mommsen und Adolf Harnack*, 227.
111. Daston, “Immortal Archive,” 165–6, 173.
112. Wickert, *Theodor Mommsen*, vol. 3, 273.
113. Emil Hübner, *Exempla scripturae epigraphicae latinae* (Berlin: George Reimer, 1885), xvii.
114. *Ibid.*, xx–xxi.
115. *Thesaurus linguae Latinae*, vol. 1 (Leipzig: B. G. Teubner, 1900), [iii].