

Disciplined Sciences?

Differentiation of Academic Subjects at Eighteenth and Nineteenth Century German Universities

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Abstract. The historiography of individual academic subjects and disciplines is an indispensable part of both university history and the history of science. Scientific disciplines are a relatively recent phenomenon from the university-historical perspective of *longue durée*, whose study has nevertheless undergone some striking developments in the past forty years. At the level of the historiography of disciplines, structural patterns of academic subject histories are highlighted, leading from the philosophy of science of the 1970s to the cultural turns of the 1990s and 2000s. Disciplines are partial results of a broader process of diversification, fragmentation, and specialisation that began as early as the eighteenth century. This survey reconstructs processes of disciplinary differentiation and disciplining from the order of faculties to the “regime of disciplines” in the transition from the eighteenth to the nineteenth century, focusing on the University of Göttingen as a dynamic hub of development. Using the example of German universities, the genealogies of individual chairs, subjects, and disciplines are traced. Special attention is paid to the dual character of disciplining as a submission to a system of rules and the organisation of knowledge.

Keywords: academic disciplines, faculties; historiography of science, humanities, knowledge, lecture catalogue, Göttingen

Introduction

The historiography of individual subjects and disciplines is an indispensable part of both university history and the history of science.¹ Nevertheless, research of this kind does not always enjoy the best reputation, and is often accompanied by distancing remarks, such as that one does not write ‘pure’ disciplinary history, provides ‘more’ than a disciplinary history, moves ‘beyond’ traditional disciplinary history, or

1 The methodological departure towards a disciplinary history grounded in philosophy of science began in Germany around 1980, see Lepenies, “Wissenschaftsgeschichte”; Schröder, *Disziplingeschichte*.

preferably works transdisciplinarily.² Disciplinary histories are suspected of self-reflection and historically legitimized identity construction and, in view of a history of science opening up to the history of knowledge, appear to be surrounded by too many boundaries.³

There is no shortage of anthologies on the history of faculties, subjects, and disciplines at a single university, but anthologies on a single discipline at different universities are rarer.⁴ This already shows a deficit of comparative perspectives, indispensable for a modern historiography of universities.⁵ Above all, there is a lack of systematic general accounts of the social and epistemological functioning of disciplines.⁶

The question of who writes the history of subjects and disciplines shakes the foundations of university and academic history. If, as is usually the case, it is the representatives of the disciplines themselves who become historiographically active in the context of anniversaries and commemorative days, this often seems less than ideal from the perspective of professional historians; but if, conversely, a historian poaches in the history of physics, law, or medicine, there is the fear of a lack of expertise. However, if historians and historians of science were to deal only with their own history, this would be considered all too self-referential.

But what are disciplines? Disciplines have always been “elementary categories and forms of organization” of science. From a social perspective they are “institutions”, from a scientific perspective they are “places of communication”, and from the perspective of their actors they are “complexes of rules to be known and followed.”⁷ The Latin conceptual field of “subject”, “knowledge”, “instruction”, and “obedience” surrounding the term *disciplina* already points to the dual character of disciplining as a submission to a system of rules and the organization of knowledge.⁸ According to Rudolf Stichweh, “the concept of ‘discipline’ owes its connotation of a form of appropriation of knowledge that eliminates subjectivity and, in this

2 Rothland, *Disziplingeschichte im Kontext*, 56.

3 See Füssel, “Wissensgeschichten”; Füssel, *Wissen*.

4 Boeck and Lammel, eds, *Wissen im Wandel*; Callmer, ed., *Anfänge der ur- und frühgeschichtlichen Archäologie*.

5 On the need for comparison, see Schwinges, *Deutsche Universitätsbesucher*, 10; Lemaine, ed., *Perspectives*; Guntau and Laitko, eds, *Ursprung der modernen Wissenschaften*; Schubring, ed., *Einsamkeit und Freiheit*.”

6 See the critical survey by Heilbron, “Das Regime der Disziplinen,” 25–26, and Messer-Davidow, Shumway, and Sylvan, eds, *Knowledges*.

7 Gierl, “Disziplinen, gelehrte”; Posner, “What is an Academic Discipline.”

8 Gierl, “Disziplinen, gelehrte,” 1064; Jüssen and Schrimpf, “Disciplina, doctrina”; Berndt and Lutz-Bachmann, eds, *Scientia und Disciplina*.

sense, disciplines it” to the fact that, in the academic context, knowledge is conveyed asymmetrically through the roles of professors and students.⁹ Scientific disciplines, however, from the university-historical perspective of long duration, are a relatively recent phenomenon whose study has undergone some striking developments in the past forty years. They are partial results of a broader process of diversification, fragmentation, and specialization that began as early as the eighteenth century, and that Peter Burke has outlined using the term “divided knowledge.”¹⁰

In what follows, I proceed in three steps: first, illuminating historiographical structural patterns of academic subject histories leading from the philosophy of science of the 1970s to the cultural turns of the 1990s and 2000s (Section 1); second, going into the processes of disciplinary differentiation and disciplining from the order of faculties to the “regime of disciplines”¹¹ (Section 2); and third, tracing the genealogy of individual chairs, subjects, and disciplines (Section 3).

Disciplinary memories and transformations of historiography

For the current status and treatment of the history of subjects and disciplines, a look at recent handbooks on the history of science is instructive.¹² The third volume of the *Cambridge History of Science* (2006), dealing with the early modern period before the eighteenth century, includes a major section on “Dividing the Study of Nature”, while the fourth follow-up volume on the eighteenth century edited by Roy Porter (2003) already includes a section on “Disciplines.”¹³ The real leap, however, begins with the transition to modernity, which takes into account disciplinary differentiation. While the pre-modern centuries up to 1800 are treated in four of the eight volumes, another four volumes are dedicated to the disciplinary science of modernity, dealing with “modern physical and mathematical sciences” (Vol. 5), “modern biological and earth sciences” (Vol. 6), “modern social sciences” (Vol. 7), and “modern science in a national, transnational, and global context” (Vol. 8), respectively.¹⁴ The series thus takes into account both the process of differentiation and the pre-disciplinary character of early modern “fields of knowledge”, such as natural history, natural philosophy,

9 Stichweh, “Professionen und Disziplinen,” 279.

10 Burke, *Explosion des Wissens*, 190–217. On the consequences of specialisation, see Ziman, *Knowing everything*.

11 See Heilbron, “Das Regime.”

12 Grote, “Wissenschaftsgeschichte,” 91–101.

13 Daston and Park, eds, *History*; Porter, *History*.

14 Nye, ed., *History*; Bowler and Pickstone, eds, *History*; Porter and Ross, eds, *History*; Slotten, Numbers and Livingstone, eds, *History*.

or alchemy.¹⁵ The three-volume *Histoire des sciences et des savoirs* (2015), edited by Dominique Pestre and others, includes a section on the “Champs de Sciences” in each volume, devoted to a detailed description of the early modern period, the nineteenth century, and the twentieth century, most of which consistently move beyond the disciplines.¹⁶ Completely removed is the reference to subjects and disciplines in the Wiley / Blackwell *Companion to the History of Science* (2016) and the Metzler *Handbuch Wissenschaftsgeschichte* (2017).¹⁷ In brief, while disciplinary history seems to be slowly disappearing from handbooks, university histories still tend to point in a different direction. The University of Leipzig, for example, dedicates a double volume of a total of 1,641 pages to the topic of “Faculties, Institutes, Central Facilities” structured strictly according to subjects in its five-volume *Gesamtdarstellung* (2009–2010).¹⁸

Much of the ‘subject research’ on the pre-modern university consists of faculty histories. Their ‘*causa scribendi*’ has always been, as already noted, mostly jubilee. Dissertations and jubilee writings of the type *The Theological Faculty of University X* have been legion since the nineteenth century.¹⁹ Preoccupation with medical faculties began relatively early.²⁰ In Germany, the jubilees of the universities of Freiburg in 1957,²¹ Jena in 1958,²² Kiel in 1965,²³ Munich in 1972, Tübingen in 1977,²⁴ Göttingen in 1987, and Leipzig in 2009,²⁵ to name but a few, produced a particularly strong output. At some of these universities, sustainable effective publication series on their own university history were created, specifically in Freiburg, Munich, Tübingen, Göttingen, Greifswald, and Rostock.²⁶

Many faculty histories with a longer time horizon make use of a narrative structure that is also popular for overall representations of university and town history and operate with the concepts of “flourishing” and “golden age” or “decline”,

15 On the concept of the ‘field’, understood by one tradition as a soil, by another as a physical field of forces, see Burke, “Explosion,” 206–8; Bourdieu, *Science*. For pre-modern Europe, see Füssel and Trüter, “Feld.”

16 Pestre, ed., *Histoire*. Grote reads significantly for all volumes “Champs des Disciplines” instead of “Champs des Sciences” Grote, “Wissenschaftsgeschichte,” 94.

17 Lightman, ed., *Companion*; Sommer, Müller-Wille, and Reinhardt, eds, *Handbuch*.

18 Huttner, *Geschichte*.

19 Schmidt, *Professoren*; Rother, *Fakultäten*; Göbell, *Geschichte*; Alwast, *Geschichte*; Falkner, *Geschichte*; Mraz, *Geschichte*.

20 Becker, *Geschichte*; Stübler, *Geschichte*; Burckhardt, *Geschichte*; Fossel, *Geschichte*.

21 Schumacher, *Geschichte*.

22 Giese and Hagen, eds, *Geschichte*.

23 Döhring, *Geschichte*; Rohs, *Geschichte*; Jordan, *Geschichte*.

24 Brecht, ed., *Theologen*.

25 Weiwoda, *Juristenfakultät*; Treide, *Ethnologie*.

26 See the references in Schwinges, “Universitätsgeschichte,” 34 with note 26.

“new beginning” and “crisis.”²⁷ Although subjects and disciplines are genuinely man-made entities, a biologicistic-naturalizing use of language is ubiquitous. There are discussions of “orchid subjects”, academic “biodiversity” and “diversity”, and “pregnancies”, “births”, and “paternity trials.” Small subjects must be protected like rare plants, because perhaps they will come to “bloom” again.

The structure of faculty and subject histories usually follows personal, constitutional, and institutional history.²⁸ Corresponding anthologies often highlight individual scholars and debates.²⁹ Overall, the historiography of faculties follows the trends characteristic of general university historiography. Beginning with constitutional history, this was followed by social history, which has been especially productive for the prosopography of faculties, and most recently by approaches from the history of culture and knowledge, which, however, are still used very cautiously in most subject histories.³⁰

Based on contemporary history, faculty histories are sometimes more experimental, as for example an anthology on the history of the Freiburg Faculty of Philosophy 1920–1960.³¹ It includes edited self-testimonies and adds new content, such as an article on “informal relationships of Freiburg professors” in regulars’ tables, circles, and *Kränzchen* (academic bees). In addition to such micro-political perspectives, especially in the German context, the reappraisal of Nazi and GDR history plays a central role for the contemporary history of faculties and subjects.³²

Within the framework of a voluminous history of sociology, in 1981 Wolf Lepenies remeasured the state of disciplinary history. In it, the sociologist critically noted that his own discipline in particular had only belatedly left behind the tradition of the progress narrative of “Whig historiography” and the presentism of classical historiography of science, which projects the “current disciplinary shape back into its prehistory.”³³ He sees essential impulses emanating from the critical and reflexive history of science, as it began at the latest with Kuhn’s *Structure of Scientific Revolutions*

27 Liess, *Geschichte*; Krause, *Rechtswissenschaften*.

28 More prosopographically oriented, for example, Hein, and Junghans, eds, *Professoren*; Walter, *Dozenten*; Heussi, *Geschichte*; Kantzenbach, *Theologie*. As an example of a content-based systematic approach, see Kaufmann, *Universität*.

29 Brecht, ed., “Theologen.”

30 Müller, “Genese,” 181–202; In Müller’s reconstruction of a special discipline, the history of the subject and discipline as such is strangely absent.

31 Wirbelauer, ed., *Fakultät*. For a critical assessment of the volume, see Weber, “Review”; Hausmann and Paletschek, “Fakultät.”

32 Rössler, *Wissenschaft und Lebensraum*.

33 Lepenies, “Einleitung, IV–VII.” Some of the topics still described as desiderata, such as the history of journals and professional societies, have recently been dealt with in Moebius and Ploder, eds, *Handbuch*. As a local approach, see Römer and Alber-Armenat, eds, *Erkundungen*.

(1962); today, one would perhaps go back as far as Ludwik Fleck and the concepts of thought collectives and styles of thinking in the 1930s as an essential source of impulses.³⁴ For Lepenies, “disciplinary history is an invaluable source of new research ideas; controversies can be rationalized and more easily arbitrated by uncovering their historical roots; only an accurate knowledge of a discipline’s history helps to avoid duplication of effort and to avoid falling for fads; historical knowledge supports error reduction, especially in research, and increases the predictive ability of the researcher in question. Finally, an insight into the history of the discipline has therapeutic effects, as it pleasantly enlightens us about the misconceptions and prejudices common in our discipline.”³⁵ Younger subjects, such as sociology and education, and those with clear identity challenges, such as the “many-named subject” of folklore studies, obviously show stronger tendencies toward critical reflection on their own history.³⁶ Historical science as an “academically ponderous princess” (Ferdinand Tönnies) has long struggled with self-historicization.³⁷ Markus Huttner’s account of historical scholarship in Leipzig from the sixteenth to the nineteenth century is a successful history of the discipline that meets modern methodological demands.³⁸ Huttner’s work has set standards for the study of academic practice which, in many faculty and disciplinary histories remains mostly a kind of black box.

The call for a stronger historicizing and sociological approach to disciplinary histories had already left its mark on jubilee driven publications of the late 1980s. Symptomatic of the problematic nature of subject-historical narratives of origins is rebutting possible reservations in an anthology on the history of the Göttingen social sciences *avant la lettre* that emerged from the 1987 anniversary context. A preoccupation with the subject matter before its conceptual genesis, it says in the introduction, is “not done with a specialist archival or even legitimatory intention.” The analyses are “rather motivated by the assumption that one could draw profit from earlier approaches for the reflection and productive solution of our present subject problems.”³⁹ In the same year, the University of Göttingen published an anthology on the history of pedagogy, which, in its preface, explicitly wrestles with another problem of the history of the subject. All contributions are centred around

34 Lepenies, “Einleitung,” IV. For decades, Kuhn was a fixed point of reference in the discussion on the history of disciplines, which had long been conducted purely in terms of scientific theory, see Thiel, “Überlegungen,” 125–47 or Schröder, *Disziplingeschichte*.

35 Lepenies, “Einleitung,” XXVII.

36 On the science of education, see Lenzen, “Universitätsfächer,” 83–86; Drewek, “Disziplinbildung”; Horn, “Entstehung,” 189–210. On German Volkskunde, see Brückner and Beitzl, eds, *Volkskunde*.

37 Tönnies, *Studien*, 127.

38 Huttner, *Geschichte*.

39 Herrlitz and Kern, eds, “Sozialwissenschaft, 7.

the great white men of the discipline, although one explicitly distances oneself from “personalistic views of history.”⁴⁰ Purely “practical”, rather than “theoretical” reasons would have suggested an “exemplary characterization” along individual subject representatives, since no overall representation existed so far.⁴¹

In the past two decades, cultural turns have reached disciplinary history and opened up further horizons of inquiry. During the same period, for example, gender-historical perspectives have entered disciplinary history.⁴² In the wake of Pierre Bourdieu’s sociology, for example, questions have been raised about a habitus that is typical of a particular subject or discipline.⁴³ Thus, the “subtle differences” between schools, styles, and disciplines increasingly came into view.⁴⁴ The call for research on “science in context” was followed by the call for “disciplines in context.”⁴⁵ The path to contextualization was also accompanied by a change in metaphors; the traditional tree of knowledge (*arbor scientiae*), which had guided the structure from the Middle Ages to the *Encyclopédie*, in the nineteenth century was replaced by political spaces, such as empires, regions, and provinces.⁴⁶ More recent spatial translations interpret the academic knowledge culture of modernity as an archipelago of many smaller and larger islands, sometimes difficult to reach among themselves.⁴⁷ Something similar has been described for campus architecture, where philologies and historical scholarship condense around a central library building, while the natural sciences are located far from the city on their own campuses with laboratories, clinics, and other facilities.⁴⁸ The vast paths also symbolize the proximity and distance of the disciplines.

Microhistorical approaches to these islands have been tested, approaching the “academic tribal societies” with an ethnological eye.⁴⁹ Thus, increased attention has been paid to the different “cultures of science”, that is, to discipline-specific “traditions and customs”, “scientific practices”, “moral norms and rules of behaviour”, and the “knowledge of the proper use of discipline-specific linguistic and symbolic

40 Hoffmann, “Vorwort,” 8.

41 Hoffmann, “Vorwort,” 9–10.

42 Schekahn, *Spurensuche*; Glaser and Andresen, eds, *Disziplingeschichte*; Harders, *American studies*.

43 Reinhardt, “Habitus,” 125–46.

44 Danneberg, Höppner, and Klausnitzer, eds, *Stil*.

45 Peckhaus and Thiel, eds, *Disziplinen*; Bonß, Hohlfeld, and Kollek, eds, *Wissenschaft*; Heintz, “Wissenschaft,” 528–52.

46 Burke, “Explosion,” 199.

47 Burke, *History*, 19.

48 Daston, “History” 146–47.

49 Becher, *Academic Tribes*; on micro-history, see Dathe, “Verfahren,” 61–76; Rothland, *Disziplingeschichte*.

forms of knowledge as well as of communication.”⁵⁰

In addition to “faculty cultures”, the term “subject cultures” (*Fachkulturen*) also found its way into research in the course of general culturalization.⁵¹ In Anglo-American usage, cultures have been authoritative for the diagnoses of differentiation and demarcation since the 1950s. The thesis of the “two cultures” of natural sciences and humanities, which the British novelist and physical chemist Charles Percy Snow (1905–1980) put forward in 1959, was particularly effective.⁵² This has since undergone multiple modifications: Lepenies added the social sciences as a third culture, others argue about when and where the great separation occurred, or whether it ever occurred at all.⁵³ More recently, the debate has been revived, partly in the context of increased interest in the history of the humanities.⁵⁴ With the awareness of the contrasts between the disciplines that grew in the 1960s, there were also calls for interdisciplinarity, which also found their own institutional forms, such as the Bielefeld Center for Interdisciplinary Research (ZIF), established on the American model in 1968.⁵⁵

In view of the general dynamics of differentiation in the sciences, it seems logical that it does not stop at the history of science and universities. The history of subjects and disciplines forms a further special discipline and, as such, is subdivided into various research fields that are only in loose dialogue with each other. Thus, the study of specialized languages is mostly carried out by literary scholars and linguists, while that of the disciplinary habitus by social scientists, and faculty histories are written by subject representatives in the field. An interdisciplinary history of disciplines is thus a desideratum.⁵⁶

Differentiation and disciplining

The dominant structural principle of the pre-modern university was the hierarchical order of the four faculties: theology, jurisprudence and medicine as the so-called ‘higher’ faculties, and the arts or, later, philosophy as the propaedeutic preliminary

50 Arnold, “Disziplin,” 18.

51 Liebau and Huber, “Kulturen,” 314–39; Huber, “Fachkulturen,” 3–24.

52 Kreuzer, ed., *Kulturen*.

53 Lepenies, *Kulturen*. On the historicisation of the separation process, see Bouterse and Karstens, “Diversity,” 341–52; Dierse, “Begriffspaar,” 13–34; Diemer, “Differenzierung,” 174–223.

54 See, for example, the new journal published by the University of Chicago Press since 2016: *History of Humanities* or the *Society for the History of the Humanities*, as well as works by Bod, *A New History of the Humanities*; Bod, Maat, and Weststeijn, eds, *Humanities*.

55 Kocka, ed., *Interdisziplinarität*; with an international focus, see Burke, “Explosion,” 208–12.

56 Similarly already Boehm, “Wissenschaft,” 7–36; as a more recent problematisation, see Balsinger, “Disziplingeschichtsschreibung,” 223–42.

stage.⁵⁷ This hierarchy was never unchallenged, but proved institutionally stable until the end of the eighteenth century.⁵⁸ According to the historian Rudolf Vierhaus, it was not “the emergence of completely new sciences” that characterized the eighteenth century, but the “differentiation, reorganization, and accelerated change of the subject matter of older sciences.”⁵⁹ In the course of the century of enlightenment, individual subjects within the faculties slowly differentiated themselves into disciplines, although individual classificatory boundary work had already had a longer history.⁶⁰ Within the medical faculty, chemistry and biology⁶¹ emerged, and the philosophical faculty became the incubation space for a whole host of new subjects and disciplines, such as anthropology, history, art history, natural history, and physics. In the words of Rudolf Stichweh, “The philosophical faculty, which had become autonomous in its claim to science, became the site of the emergence of the modern system of scientific disciplines.”⁶² Stichweh characterizes the transformation of the scientific discipline at the beginning of modernity in terms of systems theory as a path from an “order of secured knowledge for purposes of teaching and research to a social system of specialized scientific research and communication.”⁶³ As “forms of social institutionalization” into a discipline, he names the following criteria:

1. “a sufficiently homogeneous communication context of researchers—a »scientific community«”
2. a “corpus of scientific knowledge represented in textbooks”
3. “a plurality of questions each of which being currently problematic”
4. “a »set« of research methods and paradigmatic solutions to problems”
5. a “discipline-specific career structure and institutionalized socialization processes that serve to select and »indoctrinate« the next generation.”⁶⁴

The last point in particular lends itself well to highlighting the specific historicity of disciplinarity. Indeed, until well into the eighteenth century, universities were characterized by the “absence of a monodisciplinary career.”⁶⁵ Rather, the principle of advancement applied: from the lowest professorship of the faculty of arts, one could advance to the professorships of the higher faculties, depending on vacancies or the acquisition of further doctorates. The decision for an “exclusive and lifelong

57 On the faculty of Arts and later Philosophy, see Schwinges, ed., *Artisten*.

58 Füssel, “The Conflict.”

59 Vierhaus, “Einleitung,” 11.

60 Kelley, ed., *History*; Yeo, “Classifying,” 241–66.

61 Meinel, “Artibus,” 89–115; Kohler, *Chemistry*.

62 Stichweh, “Disziplinen,” 36.

63 Stichweh, “Professionen,” 279.

64 Stichweh, *Wissenschaft*, 17.

65 Stichweh, *Zur Entstehung*, 33.

responsibility for a single field of teaching (and research) was only the historical result of intra-scientific as well as institutional processes.”⁶⁶

The systems theoretical view has done much for the history of disciplines and has great heuristic potential, but it also has some blind spots, especially with regard to the power effects of disciplines and subjects.⁶⁷ Thus, there has been talk of the “ethnocentrism of disciplines” (Campbell), of “scientific establishments” (Elias), or “academic tribes and territories” (Becher).⁶⁸ It must also be argued against the strong differentiation thesis that there were other mechanisms of the genesis of disciplines, such as the “upgrading” (e.g., chemistry) or the “merging of hitherto separate fields into a single discipline” (e.g., biology), and it is not by chance that Stichweh developed his model on the example of physics.⁶⁹

An important medium for the historical reconstruction of discipline formation is lecture catalogues.⁷⁰ They manifest the pluralization of subjects as well as disciplinary characteristics.⁷¹ The lecture catalogue essentially served two functions: disciplining students as well as professors, and advertising the university.⁷² Originally, primarily external advertising and profile-building in the course of confessionalization, with the erosion of the *ordo studiorum*, advertising was also mainly addressed inwardly. From the 1780s onward, the German-language lectionary catalogues also had a disciplining effect in the sense of academic discipline formation. Let us take a look at some Göttingen lecture catalogues as examples.

The first printed catalogue dates from 1736 and is strictly structured according to the four faculties, and within the faculties according to the professors, followed by the professors *extraordinariae*.⁷³ While from 1748 lectures were also announced in German in a local journal, the first independently printed German-language lecture directory appeared in Göttingen in 1771. It is already

66 See Stichweh, “Die soziale Rolle,” 341.

67 See the critical position by Heilbron, “Regime,” 24–25 and 29–33. Alternatively, see Lenoir’s theory of the production of disciplines based on Foucault’s “discursive formation” and Bourdieu’s “field” in Lenoir, *Instituting Science*. A “fractal” history of disciplines inspired by chaos theory has been developed by Abbot, *Chaos of Disciplines*.

68 Campbell, “Ethnocentrism,” 328–48; Elias, “Establishments,” 243–344; Becher, *Academic Tribes*.

69 Heilbron, “Regime,” 39–40.

70 Rasche, “Vorlesungsverzeichnisse,” 445–78. See exemplary for this question the website “Vorlesungsverzeichnisse als Quellen disziplinär organisierter Wissenschaft. Die Ausdifferenzierung wissenschaftlicher Fächer an der Universität Leipzig 1814/15–1914” under <https://histvv.uni-leipzig.de/> (31 August 2020).

71 Bach, Maatsch, and Rasche, eds, *Wissenschaft*.

72 Rasche, “Vorlesungsverzeichnisse,” 454–58.

73 Digitally under http://resolver.sub.uni-goettingen.de/purl?PPN687592380_1736_SS (31 August 2020).

subdivided into: *Gottesgelahrtheit* [Theology], *Rechtsgelahrtheit* [Jurisprudence], *Arzneygelahrtheit* [Medicine], *Weltweisheit* [Worldly Wisdom=Philosophy], *Mathematik* [Mathematics], *Geschichtskunde* [History], then as a section *Philologie, Kritik, Altherthümer und schöne Wissenschaften*, [Philology, Criticism, Classics and Aesthetics], and finally *Ausländische und Lebende Sprachen* [Foreign and Living Languages].⁷⁴ Within the subject groups, the list is by subject, not by professor, while the Latin *Catalogus Praelectionum*, published in parallel, retained the order by rank of professors until 1895.⁷⁵

Twenty years later, in the summer semester of 1791, many things are already different: theology and law remain the same, but *Arzneygelahrtheit* [Medicine] is now called *Heilkunde* [Healing Science], while the real dynamics are to be found in the Faculty of Philosophy: After Worldly Wisdom (*Weltweisheit*) and Mathematical Sciences, “Natural History”, “History with its Auxiliary Sciences”, “Literature”, “Fine Sciences and Arts”, “Ancient History”, “Philology, Criticism and Ancient Languages”, and finally “Modern Languages and Literature” follow as separate sections. The innovation starts from the natural sciences, i.e., from natural philosophy and natural history, as well as the philologies.⁷⁶ Natural History becomes the basis of the natural sciences.⁷⁷

Another twenty years later, *Gelahrtheit* [Learning] gave way to the concept of science, and we find a general *Wissenschaftskunde* [Introduction to Science] before *Theologische Wissenschaft* [Theological Science], then after Theology in the classical order of precedence Jurisprudence, Medicine, Philosophical Sciences, Mathematical Sciences, Natural Sciences, Historical Sciences, Fine Sciences and Arts, Classical Studies, Philological Sciences, and finally Modern Languages and Literature. In 1796, for example, the Mathematical and Philosophical “Sciences” were already there, while the jurists were still teaching “Jurisprudence” as “*Rechtsgelahrtheit* [Learned Jurisprudence]”.

From a long-term developmental perspective, the next major break came in the summer semester of 1844, when *Staatswissenschaft und Gewerbewissenschaft* [Political Science and Trade science] were established behind “Philosophical Science” and before “Mathematical Science.” Within this new disciplinary rubric, there are “Politics and European Constitutional Law”, “National Economics and

74 Digitally under http://resolver.sub.uni-goettingen.de/purl?PPN654655340_1771_WS (31 August 2020).

75 Rasche, “Vorlesungsverzeichnisse,” 469.

76 For the dynamization of knowledge classification in Göttingen also van Miert, “Structuring the History,” 389–416; Clark, *Academic Charisma*, 33–68.

77 Ziche, “Von der Naturgeschichte,” 251–63. On the formation of the natural sciences in Germany, see also Phillips, *Acolytes of Nature*.

Finance”, “Forestry Science”, and “Technology”, and thus cores of the later Political, Economic, Social, and Forestry Science.

However, not every subject area taught led to an academic discipline of its own; military science, for example, did not grow into a discipline of its own under the umbrella of mathematical sciences, although a glance at the course catalogue for the summer semester of 1791 shows that as many as four courses were offered on *Kriegsbaukunst* [Military Architecture] *Feldbefestigungskunst* [Field Fortification], *Militärische Encyclopädie* [Military Encyclopaedia], and *Artillerie und Feuerwerkerey* [Artillery and Fireworks].⁷⁸

However, the periodic announcement of the entire teaching program in print remained a predominantly Protestant feature for a long time. The directories of the Catholic University of Dillingen were a striking exception, to be followed by universities, such as Ingolstadt only in 1780, Mainz and Cologne in 1784, Würzburg in 1785, and Freiburg in 1807.⁷⁹

“The first chair for...” Seniority and authority

The universities’ ambition to trace their own institutional history as far back in time as possible is also reflected in the historical memory policy of individual disciplines and subjects, all of which cultivate their ancestors and traditions.⁸⁰ It is no coincidence that early traces of historical retrospection on individual academic subjects can be found in academic jubilee and commemorative publications, the essential driving force of university historiography.⁸¹ As early as 1978, Wolf Lepenies saw a “traditional function” of disciplinary history as “to demonstrate anciennity for the purpose of gaining or reinforcing legitimacy”.⁸² More recently, William Clark, in his genealogy of the modern research university, has pointed to the charisma generated by particular chairs: “if an Isaac Newton or an Immanuel Kant has sat in a particular chair, then the ghost or spirit of that individually famous academic infuses that chair. One of Stephen Hawking’s many claims to fame today is that he occupies »Newton’s chair«”.⁸³ The chair refers to a quite literal material basis of many professorships.

78 Verzeichnis der Vorlesungen, SoSe 1791, 11 (digitalized: http://resolver.sub.uni-goettingen.de/purl?PPN654655340_1791_SS [31 August 2020]). On the context of military science at Göttingen University, see Tütken, „Privatdozenten,” 849–59.

79 Rasche, “Vorlesungsverzeichnisse,” 463.

80 Rieger-Ladich, Amos, and Rohstock, eds, *Erinnern*. For the founding years of individual chairs, see the overview in Baumgarten, “Professoren,” 277–86.

81 Hammerstein, “Jubiläumsschrift,” 601–33.

82 Lepenies, “Wissenschaftsgeschichte,” 449.

83 Clark, *Academic Charisma*, 19.

Academic teaching practices and their material culture of knowledge, especially academic collections, acted as engines of disciplinary differentiation, for many custodians and keepers of collections also became the first professors of a new discipline.⁸⁴ Thus, in many cases, academic collections are thus institutional crystallization points.⁸⁵ Johann Dominik Fiorillo (1748–1821), for example, is considered the founder of art history as an academic subject.⁸⁶ After he came to the University of Göttingen in 1781 as a teacher of drawing, he was given supervision of the university's graphic collections in 1784, and appointed associate professor in 1799, and full professor in 1813. At the University of Landshut, Simon Klotz (1777–1825) was appointed full professor of art history as early as 1804, but due to lack of demand, this remained an episode.⁸⁷

Fiorillo's colleague in Göttingen, Johann Nikolaus Forkel (1749–1818), is considered one of the founders of historical musicology. Forkel had been lecturing on music since 1772 and advanced to the position of university music director in 1779.⁸⁸ Johann Friedrich Blumenbach (1752–1840), who also worked in Göttingen, is considered the founding father of two scientific disciplines—anthropology and zoology. Appointed associate professor and inspector of the natural history collection in 1776, he became a full professor as early as 1778. In his almost sixty years of teaching, he taught Natural History and Comparative Anatomy, among other subjects, and accordingly published a *Handbuch der Naturgeschichte* [Compendium to Natural History] (1779–1780) and a *Handbuch der vergleichenden Anatomie* [Compendium to Comparative Anatomy] (1805).⁸⁹

There is no consensus on all genealogies of disciplines. Only recently, for example, has the history of ethnology been extended from the nineteenth to the eighteenth century: Han F. Vermeulen considers Gerhard Friedrich Müller's Siberian expedition in the 1730s/40s, August Ludwig Schlözer's *Völkerkunde* [Ethnography] in Göttingen in the 1770s, and Adam Franz Kollár's (1718–1783) research in Vienna in the 1780s to be the birth moments of academic ethnology.⁹⁰ On the other hand, the disciplinary history of folklore has been shortened again since the late 1980s, when the narrative of its emergence from early modern statistics and geography was

84 See the example of natural history research on the co-evolution of museum and academic discipline Häner, *Dinge sammeln*.

85 On the genesis of university collections in Germany, see Müller, *Der sammelnde Professor*.

86 Dilly, *Kunstgeschichte*, 175.

87 Stalla, "Das »Institut der bildenden Künste«, " 195–214.

88 Fischer, *Das Wissenschaftliche der Kunst*. On the history of the discipline, see Gerhard, ed., *Musikwissenschaft*.

89 Kroke, *Johann Friedrich Blumenbach*; Rupke and Lauer, eds, *Johann Friedrich Blumenbach*.

90 Vermeulen, *Before Boas*.

deconstructed and the beginning was placed in the middle of the nineteenth century with Wilhelm Heinrich Riehl.⁹¹ With Gottfried Achenwall, Göttingen lost a founding father in the history of scientific folklore studies, which turned into a historical “paternity trial.”⁹²

The example of biology shows that in many cases a kind of disciplinary co-emergence was at work, i.e., scientists in different places developed similar ideas at the same time. Thus, researchers, such as Jean Baptiste Lamarck in France or Erasmus Darwin in England, must be added to or contrasted with the ‘Göttingen School’, which has long been the only one to be emphasized in the development of biology around 1800.⁹³ The ongoing search for the founding fathers and the veneration of patron saints of individual disciplines should not obscure the basic insight of the sociology of knowledge that science is always a collective project, never one of individual original geniuses.⁹⁴

The increasing importance of the material foundations of teaching and research is also reflected in the medium of professors’ portraits.⁹⁵ With time, increasing numbers of professors staged themselves next to the traditional wall of books with specific artifacts of their profession. The portrait of professors flourished especially at Protestant universities; there are significant collections in Tübingen, Marburg, Jena, or Göttingen, among others. Viewed serially, the robes of the four faculties initially dominate, but these are repeatedly broken up by individual representations that provide a good barometer for processes of distinction and differentiation. At the University of Marburg, only a few professors stood out from the uniformity with individual artifacts. Among them was Denis Papin (1647–1712), a French physicist and mathematician known for his sense of prestige. His portrait breaks up the contrast between book and object science by placing his famous steam pot in the picture as a third-order object presentation: thus, Papin holds an open book with a clearly visible copperplate of the pot in his hands. The use of objects was particularly pronounced in the portrait of professors at the University of Göttingen, which, after all, claims a whole series of disciplinary formation processes for itself.⁹⁶

For Catholic universities, the four bass violin format paintings in the Orban Hall of the Jesuit College in Ingolstadt, made by Christoph Thomas Scheffler (1699–1756) around 1725, represent a striking example.⁹⁷ They feature Christoph

91 See Könenkamp, “Volkskunde,” 1–25; the older position in Möller, “Aus den Anfängen,” 218–33.

92 Könenkamp, “Volkskunde,” 1.

93 Zammito, *The Gestation*; Scheele, *Grundzüge*, 144–54.

94 Fleck, *Entstehung*; Burke, “Die Explosion,” 202.

95 Füssel, “Die Kunst,” 59–78.

96 Füssel, “Die Kunst.”

97 Mayer-Deutsch, “»Quasi-Optical Palingenesis«,” 105–29.

Scheiner (1573–1650) and Johann Baptist Cysat (1587–1657), two Ingolstadtians, and Athanasius Kircher (1602–1680) and Christoph Clavius (1537–1612), two Roman Jesuits who all rendered outstanding services to astronomy. All four are richly endowed with objects; Kircher's portrait, for example, creates a direct link to Orban's collection in Ingolstadt through the inscription "Museum" on one of the spines.

Once again, a look at the Göttingen lecture catalogues reveals something about the increased importance of material cultures of knowledge. Excursions to the mining industry in the Harz Mountains or to local farms could be useful for botany as well as for cameral science or technology. Anatomical theatres and botanical gardens became increasingly important as academic teaching infrastructures. Professor Johann Beckmann, for example, announces his *Göttingen Introduction to Economics and Technology* in the summer of 1789 saying, "At 4 o'clock Economy will be taught by Herr Hofrat Beckmann following his handbook, and the economic plants and their construction in the economic garden will be demonstrated. Technology is taught the same way with the help of manuals at 10 o'clock, visiting the crafts, factories and manufactories in the city and the neighbourhood with his listeners."⁹⁸ He had already published his *Anleitung zur Technologie* [Guide to Technology] in 1777, a manual that would go through five editions by 1809. A not insignificant factor among several that were responsible for the flourishing and pre-eminence of the University of Göttingen in the last third of the eighteenth century was the production of its own textbooks, which were then also taught at other universities.⁹⁹ The phrase "according to his manual" is almost ubiquitous in Göttingen's lecture catalogues. Thinkers, such as Immanuel Kant in Königsberg, also lectured according to Göttingen manuals, such as Gottfried Achenwall's *Naturrechtslehre* (natural law).

In addition to having its own handbook, the specific material equipment also increased both the disciplinary identity formation and the popularity of the course. In the winter semester of 1785, Professor Johann Christoph Gatterer teaches natural history "with a demonstration of his own naturalia"; in the winter semester of 1803, Professor Hofmann treats the physiology of plants in botany "and combines with this the demonstrations and examinations of the construction of plants under the microscope."¹⁰⁰ An introduction to War Sciences is advertised in the winter of 1795,

98 Verzeichnis der Vorlesungen SoSe 1789, 8 (digitalized under http://resolver.sub.uni-goettingen.de/purl?PPN654655340_1789_SS, accessed: 31 August 2020). Kernbauer, ed., *Beckmanns Allgemeine Technologie*. Bayerl and Beckmann, eds, *Johann Beckmann*.

99 Saada, "Universität," 45; Schlumbohm, "Markt," 245.

100 Verzeichnis der Vorlesungen WiSe 1785, 12 (Gatterer) (digitalized under http://resolver.sub.uni-goettingen.de/purl?PPN654655340_1785_WS, accessed: 31 August 2020); Verzeichnis der Vorlesungen WiSe 1803, 11 (Hoffmann) (digital unter http://resolver.sub.uni-goettingen.de/purl?PPN654655340_1803_WS, accessed: 31 August 2020).

in which the engineering major Gotthard Christoph Müller (1740–1803) lectures according to his manual, which is in press, and “everything is shown partly by drawings and silhouettes. As an appendix, he will give a short but interesting account of navigation and naval warfare and will use a very nice ship model”.¹⁰¹ Naturalia, instruments and models, the list is endless.

In addition to the production of handbooks, from about 1780 onwards, an increasing number of journals ensured the discursive cohesion of a discipline.¹⁰² Publication became that “basic social act of the scientist that documents his participation in disciplinary communication”.¹⁰³ Organs devoted to a multiplicity of disciplines, such as the *Journal des Sçavans*, the *Acta Eruditorum*, or the *Philosophical Transactions*, could no longer do justice to the dynamics of differentiation and specialization.¹⁰⁴ An earlier example of mono-disciplinarity is the *Medizinische und Chirurgische Berlinische wöchentliche Nachrichten*, published by the Berlin surgeon Samuel Schaarschmidt between 1738 and 1748 and considered the first German medical journal. Lorenz Friedrich von Crell founded the *Chemisches Journal* in 1778, which continued as the *Chemische Annalen* until 1803; the *Annales de Chimie*, published in Paris in 1789 and still running today, proved more durable.¹⁰⁵ The natural scientist Friedrich Albert Carl Gren from Halle established the *Journal der Physik* in 1790–1794, which was replaced by the *Neues Journal der Physik* in 1795–1797 and has continued to exist as the *Annalen der Physik* since 1799.¹⁰⁶ The preface of a 1832 physics journal makes clear how a new virtual communication space is established with the journals:

“The individual researcher standing isolated, however active, can only find a substitute for the lack of an immediate connection among the various fellow citizens in the realm of the natural sciences in the rapid communication of the results of others, and only journals can reduce the physical space that separates them from one another.”¹⁰⁷

101 Verzeichnis der Vorlesungen WiSe 1795, 11 (digitalized under http://resolver.sub.uni-goettingen.de/purl?PPN654655340_1795_WS, accessed: 31 August 2020). The handbook was published 1796 as Müller, *Militärische Encyclopädie*.

102 Becher, “Fachzeitschrift,” 770–72; Stichweh, *Zur Entstehung*, 394–441; on single subjects, see the articles in: Fischer, eds, *Von Almanach*.

103 Stichweh, *Zur Entstehung*, 294; Josephson, “Publication Mill.”

104 Josephson, Karlsohn, and Östling, eds, *The Humboldtian tradition*, 401–3.

105 On Crell see Josephson, Karlsohn, and Östling, eds, *The Humboldtian Tradition*, 422–25; Toftlund, “Lorenz Crell,” 199–200. On the *Annales de Chimie*, see Crosland, *In the Shadow of Lavoisier*.

106 Stichweh, *Zur Entstehung*, 432–35.

107 Stichweh, *Zur Entstehung*, 426.

At the intersection of book studies and disciplinary history, the role of publishers in publication strategies and the establishment of new disciplines has also been elaborated more recently.¹⁰⁸ A particular engine of disciplinary demarcation is the development of specialized disciplinary languages.¹⁰⁹ The three higher faculties produced a high degree of 'subject dialectal' distinction potential early on. For German as a language of science, the philosophy of Christian Wolff is considered an important factor.¹¹⁰

Chairs and collections, portraits, lecture catalogues, handbooks, journals, and languages show the wide range of institutional, settings, media, and materiality that not only depict the process of disciplinary differentiation, but constitutively help to shape it.

Conclusion

Our comparative overview of the emergence of academic disciplines in Germany has shown that their study is itself subject to a process of increasing differentiation. This leads to the demand for a transdisciplinary history of disciplines. A multi-perspective history of disciplines is also necessary in order to generate more analytical potential from it than is often realized by the anniversary-driven individual histories of individual subjects at individual universities.

As important as the systems-theoretical approach has been for establishing a comparative perspective on the historical formation of disciplines, it is equally necessary to complement it with other approaches. Thus, there were also quite a few dead ends in the formation of subjects; not every subject of pre-modern scholarship found its way into a modern scientific discipline. A look at the broad German university landscape has shown how important a comparative analysis is in order to avoid findings of one-sided path dependencies. In a further step, transnational comparisons would be necessary to avoid repeating the mistake of a local bias on a European scale. In many cases, it is more likely to assume a kind of co-emergence of certain disciplinary developments.

Finally, the question of how disciplined science has been refers back once again to the ambivalent double character of the concept of discipline, which on the one hand denotes submission to a norm and, on the other, a form of organization.

108 Remmert and Schneider, *Eine Disziplin*.

109 Wiegand, ed., *Sprache*; Hoffmann, Ungeheuer, and Burkhardt, eds, *Fachsprachen*; Pörksen, *Wissenschaftssprache*; Drozd and Seibicke, *Fach- und Wissenschaftssprache*.

110 Menzel, *Vernakuläre Wissenschaft*. For nuanced research, see the de Gruyter book series *Lingua Academica. Beiträge zur Erforschung historischer Gelehrten- und Wissenschaftssprachen*.

The never-ending call for interdisciplinarity, however, is not to be understood as a demand for a return to a less standardized and less differentiated realm of scholarship, but rather as a stimulus for critical reflection on one's own boundary-drawing work.¹¹¹ The history of disciplines offers a rich field of activity for this in the future as well.

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111 Gieryn, "Boundary-Work."

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