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The Growth of Professorial Research in Prussia, 1818 to 1848—Causes and Context¹

BY R. STEVEN TURNER*

During the nineteenth century the fame of German science rested not only upon its fundamental contributions to natural knowledge, but also upon the unique organizational system which Germany had created for scientific research. Unlike its major European neighbors, Germany pursued science almost entirely within the unlikely framework of its old university system. Within that framework it had constructed by 1875 a costly and highly influential series of university laboratories, seminars, and institutes.² The laboratory system gave institutional expression to the ethos of learning which had come to dominate the universities—a professional commitment to research and to the elaboration of research methods and a fundamental concern with training students in the techniques of scientific investigation.³ By 1830 the universities had already succeeded the various academies as centers of scientific research. By midcentury the career scientist was almost invariably a professor, while the laboratory in which he worked had been only recently annexed to a university structure reaching back to the middle ages.

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1. This paper is drawn from a dissertation in progress on the Prussian universities from 1818 to 1848, with special reference to the growth of scientific research. I am indebted to Professor Thomas S. Kuhn for invaluable criticisms and suggestions during the preparation of the paper, and to Professor Michael S. Mahoney for assistance with various translations from the German.

2. On the German institutes see W. Lexis, *Die deutschen Universitäten . . .* (Berlin, 1893), vols. 1 and 2.

3. See D. S. L. Cardwell, "The Development of Scientific Research in Modern Universities . . .," *Scientific Change*, ed. A. C. Crombie (New York, 1961), pp. 661-663.

That the unexpected, precipitous growth of German science after 1820 occurred within the universities rather than within academies, private laboratories, or newly created institutions for science resulted from an historical development almost unique to the German states. During the early nineteenth century the traditional German professorate was transformed from a predominantly teaching post to a position entailing responsibility for scientific research and publication as well. The professor of the eighteenth century had considered his main duty the transmission of established learning to certain professional groups; in addition to maintaining that goal, his nineteenth-century counterparts tried actively to expand learning in many esoteric fields. Although the roots of that change lay deep in the eighteenth century, the actual redefinition of the professor's duties occurred during the German *Vormärz* era, which stretched from the close of the Napoleonic wars to the March disorders signaling the onset of the Revolution of 1848.⁴ During this period, research emerged within university ideology as a fundamental duty of the scholar, and a reputation within one's specialist community beyond the university became more and more a *sine qua non* for even minor university appointments.

The transformation of the professorship occurred not only in the sciences, but also in every discipline of the fourth or philosophical faculty of the universities. The philological and historical disciplines first displayed the intense concern with research and research training. Only later—during the 1830's—were these commitments widely adopted by science professors, often in direct imitation of learned values and institutional models of the humanistic disciplines. In a similar manner these commitments spread even to the professional faculties of law, theology, and medicine, where they brought about a shift in emphasis from the training of practitioners to the education of scholars and research workers in the respective disciplines.

Transcending as it did the internal development of any individual field or faculty, the growth of research as a duty of the professor constitutes a major problem in university historiography. Only

4. See Friedrich Paulsen, *Die deutschen Universitäten und das Universitätsstudium*, 2nd ed. (Hildesheim, 1966), pp. 40-75.

rarely, however, have historians of the German universities disentangled this problem from the larger context of university history as a topic for special study. When they have done so, historians have still shown little agreement concerning the causes of this development. Historians writing before 1920 stressed the influence of new ideologies which glorified *Wissenschaft* and creativity. More recently competition and decentralization within the university system have been advanced as important elements stimulating the growth of research. Although both factors greatly influenced the development of research in the universities, neither in itself can fully explain that development.

The history of universities has taken insufficient consideration of a third important factor affecting the professorate: the state. In particular, the government's changing and always-critical role in making university appointments and in setting appointive criteria has been generally neglected. This study examines precisely this role, limiting its scope to the Prussian universities during the *Vormärz* period, and stressing the important, though by no means exclusive, part which the state played in establishing the new professorial values. As a basis for this discussion the study first summarizes the development of the Prussian universities after 1800, emphasizing those developments which particularly influenced science and scholarship. It goes on to critically examine the hypotheses traditionally advanced to explain the growth of research. Finally it discusses the new appointive criteria which promoted the growth in Prussia of a new type of professor committed to critical scholarship and original research.

I. THE DEVELOPMENT OF THE PRUSSIAN UNIVERSITIES,
1806 TO 1848

The nineteenth century opened in Prussia to strident demands for university reform. Throughout the eighteenth century the universities had suffered from poor financing by the state, precipitously declining enrollments, and a widespread public conviction that the universities were obsolete and corrupt. In the 1790's these chronic

problems evoked widespread calls for government action.⁵ When Prussia's defeat by Napoleon at Jena in 1806 brought reform ministries to power, Prussia embarked upon a thorough reform of its educational structure, including a basic reorganization of its university system. During the era of educational reform, which lasted from 1806 to 1818, Prussia founded new universities at Berlin (1810) and Bonn (1818), consolidated various institutions to form the universities of Halle-Wittenberg and Breslau, abolished several nonviable smaller schools, and provided the University of Königsberg with extensive new institutes and personnel. The reforms channeled new funds into the universities and established them upon a viable economic and geographical basis that was absent during the eighteenth century.⁶

No less important, the state moved to aid its universities through a simultaneous reform of secondary schools. Under Wilhelm von Humboldt's brief but epochal leadership, the Department of Educational Affairs initiated compulsory testing for all students wishing to enter the universities. Control of this examination not only permitted the state to reform and to regulate the secondary school curricula but also to improve the universities by enhancing the quality of their students and by sharply distinguishing secondary from higher education. In July 1810, the state took a similar step in decreeing compulsory examinations for all teachers seeking employment in the secondary schools. This edict initiated the reform of secondary teaching and led to the creation of an entire class of professional gymnasium instructors to be trained by the philosophical faculties of the local universities. Both these edicts produced beneficial, immediately noticeable effects in educational affairs.⁷

5. Though most Prussians favored extensive reform, many advocated outright abolition of the universities. See J. H. Campe, *Allgemeine Revision des gesammten Schul- und Erziehungswesens* (Vienna, 1792), 16, 145-220, and Adolf Stölzel, "Die Berliner Mittwochsgesellschaft über Aufhebung oder Reform der Universitäten (1795)," *Forschung zur brandenburgischen und preussischen Geschichte*, 2 (1889), 201-222. On the condition of the eighteenth-century universities see Karl Biedermann, *Deutschland in achtzehnten Jahrhundert* (Leipzig, 1854), 2, 513, 678-686, and passim.

6. Eduard Spranger, *Wilhelm von Humboldt und die Reform des Bildungswesen*, 2nd ed. (Tübingen, 1960), esp. pp. 199-234; C. Varrentrapp, *Johannes Schulze und das höhere preussische Unterrichtswesen in seiner Zeit* (Leipzig, 1889), pp. 225-285; Ernst Müsebeck, *Das preussische Kultusministerium vor hundert Jahren* (Berlin, 1918).

7. Friedrich Paulsen, *Geschichte der gelehrten Unterrichts* (Leipzig, 1885), pp. 567-590.

Not all the reforms of the reform era were institutional and financial, nor were all accomplished by the state. Between 1805 and 1810 a number of theorists turned to the spiritual and philosophical rejuvenation of the universities. This group, which included Wilhelm von Humboldt, J. G. Fichte, Friedrich Schleiermacher, Heinrich Steffens, and F. A. Wolf, elaborated and popularized a new concept of the university and its relationship to morality, to the state, and to scholarship.⁸ Reacting sharply to the educational theory of the Enlightenment, which stressed the utilitarian or purely propaedeutic function of university education, these men denied that the universities were merely pedagogical institutions or professional schools producing well-trained, docile subjects for the state. They created a new image of the scholar as an individual of moral insight and courage, simultaneously aware of his radical personal freedom and his responsibilities to the state. He was to be, in Fichte's words, the living expression of the divine idea, "morally the best man of his age;—he should exhibit in himself the highest grade of moral culture then possible."⁹

To be sure no consensus emerged on how to educate such a man. Humboldt and Wolf, representatives of the neohumanist movement, looked to philological inculcation in the values of Greece and Rome to cultivate the ethical and aesthetic refinement which they called *Bildung*.¹⁰ Fichte and Schelling—who, with Kant, were the founders of German Idealism—emphasized philosophy as the discipline in whose light all others were to be studied. True education, they argued, could only be insight into *Wissenschaft*, the great organic unity of all knowledge postulated by idealist philosophy. In Schelling's words, "A methodology of university study must be

8. The major treatises upon this theme by Schelling, Fichte, Schleiermacher, Steffens, and Humboldt are collected in *Die Idee der deutschen Universität*, ed. Ernst Anrich (Darmstadt, 1964). For F. A. Wolf's ideas see *Über Erziehung, Schule, Universität*, ed. Wilhelm Körte (Leipzig, 1835). The German secondary literature upon this new ideology, here to be called *Wissenschaftsideologie*, is immense. See particularly Helmut Schelsky, *Einsamkeit und Freiheit; Idee und Gestalt der deutschen Universität und ihrer Reformen* (Reinbek, 1963). An excellent English discussion of the basic categories of the new ideology is found in Fritz K. Ringer, *The Decline of the German Mandarins. The German Academic Community, 1890-1933* (Cambridge, 1969), pp. 85-96.

9. Johann Gottlieb Fichte, *The Vocation of the Scholar. A Series of Lectures Given at Jena in 1794*, trans. William Smith (London, 1847), pp. 58-59.

10. Eduard Spranger, *Wilhelm von Humboldt und die Humanitätsidee* (Berlin, 1909), pp. 456-477.

rooted in actual and true knowledge of the living unity of all the sciences, and . . . without such knowledge any guidance can only be lifeless, spiritless, one-sided, limited."¹¹ In defending the universities the theorists invoked the universities' venerable historical role. They portrayed the universities as hoary symbols of German cultural unity embodying the ideal of *Wissenschaft*.

This radically new concept of the universities' essence and mission allied the new, reformed universities not only to German patriotic sentiment but also to German philosophic and scholarly thought. This *Wissenschaftsideologie* rapidly became the dominant ideology of the universities and was echoed and elaborated in rectorate addresses and academic ceremonies throughout the century.¹²

With the founding of Bonn University in 1818, the period of fervent reform ended abruptly; liberal agitation, centered in the universities, provoked a state policy of official mistrust and initiated two decades of censorship and political persecution of students and teachers all across the German Confederation.¹³ Nevertheless, the *Vormärz* period witnessed not only some of the greatest achievements of Prussian scholarship, particularly in law, linguistics, and history, but also the continued prosperity and modest expansion of the universities in students, faculty, and funds.¹⁴

11. F. W. J. Schelling, *On University Study*, trans. E. S. Morgan (Athens, Ohio, 1966), p. 7; also J. G. Fichte, "Deduced Scheme for an Academy to be Established in Berlin," in *The Educational Theory of J. G. Fichte*, ed. and trans. G. H. Turnbull (London, 1926), p. 195.

12. For example, August Boeckh, "Ueber die Pflichten der Männer der Wissenschaft gemäss der bisherigen Entwicklung und dem gegenwärtigen Standpunkt derselben," *Gesammelte kleine Schriften* (Leipzig, 1859), 2, 115-131; also Eduard Zeller, *Über akademisches Lehren und Lernen. Rede zur Gedächtnissfeier der Friedrich-Wilhelms-Universität zu Berlin . . .* (Berlin, 1879).

13. On the political persecutions see Varrentrapp, pp. 287-350 and Max Lenz, *Geschichte der königlichen Friedrich-Wilhelms-Universität zu Berlin*, 4 vols. (Halle, 1910-1911), 2, 34-176. The liberal movement within the universities is treated in a broader political context by Franz Schnabel, *Deutsche geschichte im neunzehnten Jahrhundert*, 4 vols. (Freiburg, 1949), 2, 234-271.

14. The total budget of the University of Berlin, for example, grew from 241,324 marks in 1820 to 529,710 marks in 1850. Her student body numbered 942 in 1817/18 and grew to 1,540 by 1848. (Lenz, *Berlin*, 3, 529, 490-495.) At Halle the number of *Privatdozenten* in the philosophical and medical faculties more than doubled, growing from seven in 1827 to fifteen in 1857; the student enrollment of the philosophical faculty grew from fifty-one to ninety-three during the same period. The higher faculties at Halle, however, declined in enrollment. (*Verzeichniss des Personals der Universität Halle* [Halle, 1827-1857].) For a survey of the other Prussian universities during the *Vormärz* period see Carl

The *Vormärz* era brought significant changes to the internal structure of the universities. These changes represented in part the delayed, often unintended consequences of earlier reforms, in part the universities' response to social and intellectual pressures new to the *Vormärz* era. During the eighteenth century, for example, the philosophical faculty had been merely a poorly attended, penurious preparatory school for the three professional faculties of theology, law, and medicine. After 1820 the philosophical faculty began to expand phenomenally, largely in response to its new role in the education of Prussia's secondary teachers. It attracted new groups of students, and its teaching body swelled with specialists moving into more and more esoteric areas of philology, history, and the sciences.¹⁵

This growth in personnel occurred not only in the philosophical faculty but also in all branches of the university. The lower ranks of the academic hierarchy, the *Privatdozenten* and junior professors (*Extraordinarien*), expanded most rapidly, and this expansion led to an atmosphere of intense competitiveness, both among younger instructors for promotion and between them and the full professors (*Ordinarien*) for students.¹⁶ Upon beginning lectures at Berlin as a *Privatdozent*, for example, du Bois-Reymond wrote to Karl Ludwig that it was his "single hope to give [Johannes] Müller successful competition," and Ludwig in reply urged him to announce physiology lectures with vivisectional demonstrations, since these innovations would surely reveal the crassness of Müller's own lectures.¹⁷ This sort of academic competition had been induced during the reform era when the universities, following Berlin's lead, had closely regulated the qualifications of *Privatdozenten* and had established them

Friedrich Wilhelm Dieterici, *Geschichtliche und statistische Nachrichten über die Universitäten im preussischen Staate* (Berlin, 1836). On Prussian scholarship during the *Vormärz* period see Schnabel, 3, 36-172.

15. Paulsen, *Universitäten*, pp. 76-77. Counting all ranks, Berlin's philosophical faculty had thirty-two instructors in 1820; this number had grown to ninety-one by 1848. During this period the lower faculty's share of the total teaching body increased from 45 percent to 56 percent. (Lenz, *Berlin*, 3, 490 and 504.) The state exercised much initiative in expanding the philosophical faculty into specialized areas. See Varrentrapp, pp. 444-460.

16. Lenz, *Berlin*, 2, 407-411. The growth of the faculty was accompanied by declining salaries and a sharp decrease in the individual's chances of promotion.

17. Emil du Bois-Reymond and Karl Ludwig, *Zwei grosse Naturforscher des 19. Jahrhunderts. Eine Briefwechsel . . .*, ed. Estelle du Bois-Reymond (Leipzig, 1927), pp. 132-133, 146-147.

as competitors both for students and for professional chairs.¹⁸ Responding to the enhanced attractiveness of careers in the reformed universities, young men flocked to them all during the *Vormärz* period. As *Privatdozenten* they became the chief agents for specialization and innovation in the curriculum.¹⁹

In addition to the struggle within their own faculties, universities in the *Vormärz* period began to compete more intensively with each other for students, reputable professors, and learned prestige. During the eighteenth century the Prussian government, like the governments of most German states, had exercised a policy of “academic mercantilism” toward its universities. In the eyes of the state the universities existed to train bureaucrats, ministers, and other professional groups for civic life. By removing from these groups the necessity of studying outside Prussia, the territorial universities prevented the drain of talent and wealth from Prussia and allowed the state more easily to enforce political and religious conformity. To facilitate this primary function of the universities the state maintained monopolistic conditions for its own schools. It depressed inter-university competition by consistently prohibiting student migration between universities and by limiting the professor’s right to resign or to change posts.²⁰ During the reform period, however, the state gradually retreated from its mercantilistic policies and guaranteed both these specific rights.²¹ As a result the *Vormärz*

18. Alexander Busch, *Die Geschichte des Privatdozenten* (Stuttgart, 1959), pp. 20-23. The eighteenth-century *Privatdozent* had been literally a “private teacher”; only after the regulation of the *Habilitation* procedure in 1816 did the nineteenth century *Privatdozent* begin to attain his “apprentice” status within the university.

19. During the *Vormärz* period full professors and *Privatdozenten* reached a tacit understanding whereby the former offered only elementary, well-attended, “survey” courses and the latter, more specialized and advanced lectures. The full professors preferred the more elementary courses because attendance, and hence student fees, were correspondingly higher, and they used their power to maintain a monopoly over such courses.

20. Conrad Bornhak, *Geschichte der preussischen Universitätsverwaltung bis 1810* (Berlin, 1900), pp. 118-122.

21. Prussia recognized the professor’s right to resign in the *Allgemeines Landrecht für die preussischen Staaten* of 1794, Part 2, Title 10, Paragraph 95. Frederick William III lifted the prohibition on student migration on April 13, 1810. Students were again forbidden to study outside Prussia from 1833 to 1838, at the height of the political reaction. (Johann Friedrich Wilhelm Koch, *Die preussischen Universitäten. Eine Sammlung der Verordnungen . . .*, 2 vols. [Berlin, 1839-1840], 2, 531-534.)

period witnessed a gradual upswing in professorial mobility and the rise of fervent struggles between universities to woo and win famous professors. The state also abandoned another monopolistic eighteenth-century policy, its outspoken favoritism of Halle University.²² During the nineteenth century the Prussian government supported its universities as near equals and carefully maintained intense competition both among its own institutions and between them and the universities of neighboring states.

In matters of scholarship the *Vormärz* era witnessed the expansion of activities and institutions devoted to research into all academic fields. Seminars oriented decisively toward research techniques were established in the universities under state auspices after 1810, first predominantly in classical philology and later in history.²³ Their purpose was, as the statutes of August Boeckh's seminar in Berlin insisted,

to educate by means of all possible diverse exercises leading into the core of learning and by means of literary support of every kind, all those who are properly prepared for [training in] the classics, so that in the future they will be capable of sustaining, propagating, and enlarging these studies. . . . As a rule only those are qualified for acceptance into this institute who dedicate themselves chiefly to philology, not those who expect their future advancement from the exercise of another branch of academic learning.²⁴

The statutes of these powerful and influential seminars left no doubt of their "purely scientific" aims, nor of their intention to provide training for specialists, not for the liberally educated.

22. Prussia's last consideration of a one-university policy centered upon Berlin seems to have occurred in 1819 after having been advanced by the *Kultusminister* Altenstein. See Lenz, *Berlin*, 2.1, 10-30.

23. These early German "seminars" were programlike institutions in which ten to twenty select students might be enrolled for two or three years, and in which they received intensive practical training under direct supervision of the full professor in charge. Seminars usually possessed their own rooms, libraries, and scientific instruments; their members received subsidies from the state in the form of scholarships, prizes, and exemption from state tests. Only nominally connected with the university faculties, the early seminars constituted an exclusive "inner track" of intensive academic training. The seminars contrasted sharply with the educational experience of the average German student, who merely attended lectures and who rarely had assigned problems and exercises or outside contact with professors.

24. Koch, 2.2, 560. This and all subsequent translations are my own unless otherwise indicated.

Although many graduates of these early seminars went on to become university professors and although a few went into the bureaucracy, most graduates entered the Prussian gymnasia as advanced instructors. In fact, the need to train a corps of competent teachers for the reformed and rapidly growing gymnasium system had initially motivated the state to found the institutions.²⁵ Quite early in their history, however, the seminars had asserted their allegiance to philology as a scholarly discipline and their disdain of mere teacher-training. Before 1800 F. A. Wolf, founder of the philological seminar at Halle, pointedly refused to give teaching exercises or instruction in pedagogical theory to his seminar students and insisted upon rigorous philology and critical training as the only proper education for future schoolmen.²⁶ Prussia rapidly adopted Wolf's views as orthodoxy and embodied them in the statutes of the later seminars of the *Vormärz* period.²⁷ This approach to the education of teachers not only insured rigorous, advanced instruction in history and classical literature in the gymnasia, but it also created a large reservoir of highly trained scholars capable of independent research on which the universities could draw as they chose.

The development of science and mathematics during the early *Vormärz* period proceeded less rapidly than that of the humanities, yet these disciplines also underwent important changes. During the eighteenth century science and mathematics instruction remained elementary with little practical instruction and only occasional experimental demonstrations in the sciences. The universities taught these disciplines primarily as auxiliary studies to medicine and technology. Until well past 1750 chemistry and many branches of the life sciences were taught exclusively by the medical faculty. Mathematics and the mathematical sciences, on the other hand, were taught largely in the service of technological education, to which the universities increasingly committed themselves after 1760. At

25. Paulsen, *Gelehrten Unterrichts*, pp. 586-589.

26. Wilhelm Schrader, *Geschichte der Friedrichs-Universität zu Halle*, 2 vols. (Berlin, 1894), 1, 455-456. Also Friedrich August Wolf, *Ein Leben in Briefen*, ed. Siegfried Reiter, 3 vols. (Stuttgart, 1935), 1, 52-63. The letters include Wolf's correspondence with Freiherr von Zedlitz over the founding of the seminar and his rebellion against responsibility for teaching pedagogy.

27. See Koch, 2.2, *passim*.

Göttingen University in 1790, for example, almost three-fourths of the sixty lectures offered in the mathematical sciences stressed surveying, mechanics, machines, perspective, building, or general applied mathematics. Four of the thirteen lectures offered in the experimental and observational sciences stressed technological applications such as the "chemistry of smelting" and the "economics of natural history."²⁸

Even though the Prussian universities enjoyed no reputation as centers of research in pure science, scientific activity expanded in Germany as a whole throughout the late eighteenth century. German scholars contributed to European research on particular problems such as electricity and irritability, and by 1790 mature, well-defined German scientific communities had arisen in chemistry, astronomy, and mathematics.²⁹ New, specialized journals stimulated the consolidation of these communities, journals like C. F. Hindenburg's *Archiv der reinen und angewandten Mathematik* and Lorenz Crell's *Chemisches Journal für die Freunde der Naturlehre*. . . . Although many university professors helped to staff them, these young communities included large numbers of academicians, physicians, and bureaucrats in the technical service.

During the reform period the new *Wissenschaftsideologie*, allied with the related movement of *Naturphilosophie*, had violently attacked the utilitarian approach to science characteristic of the eighteenth century. They condemned utilitarian studies as morally corrosive to the student and as tending to divert his attention from the idealistic ends which they advocated for the universities.³⁰ Partly as a result of this attack, technological education during the 1820's and 1830's was relegated to other types of institutions, the predeces-

28. "Vorlesungs Verzeichnis der Universität Göttingen," *Göttingische Anzeigen* (1790), pt. 1, 441-456.

29. For chemistry see Karl Hufbauer, *The Formation of the German Chemical Community (1700-1795)*, an unpublished doctoral dissertation from the University of California at Berkeley, 1969. On the community of German mathematicians before 1800 see E. Netto, "Kombinatorik," *Vorlesungen über Geschichte der Mathematik*, ed. Moritz Cantor (Leipzig, 1908), 4, 201-221 and Wilhelm Lorey, *Das Studium der Mathematik an den deutschen Universitäten seit Anfang des 19. Jahrhunderts*, in *Abhandlungen über den mathematischen Unterricht in Deutschland*, ed. Felix Klein (Berlin, 1916), 3, pt. 9, 26-29.

30. For example, Lorenz Oken, *Über den Werth der Naturgeschichte, besonders für die Bildung der Deutschen* (Jena, 1809).

sors of the *Technische Hochschulen*.³¹ In turn the universities began to teach the sciences for their intrinsic value, and chemistry and the life sciences migrated definitively into the philosophical faculty. Professors began to offer more specialized lectures and to open their own small laboratories to students for occasional practice.

Building upon this basis, Prussian science suddenly began to expand prodigiously on all fronts after 1830. This new development shared traits of previous growth in various fields within the humanities. Young academics cultivated research and publication with intensity; advanced, specialized courses were rapidly introduced; special problems and subfields were quickly developed; and the universities began to establish special institutions for the practical instruction of students.³² Within two decades Prussian science, like German science in general, rapidly attained the European pre-eminence which German classical and historical studies had already long enjoyed.³³

The ethos and the organization of humanistic studies became models for the new academics who helped to develop Prussian science after 1830. The philological seminars insisted upon complete independence from traditional pedagogy and upon their aim of giving students sufficient training in philological techniques to enable them to carry out their own independent investigations. These aims were transferred into the organization of science and mathematics by C. G. J. Jacobi. As a student at Berlin, Jacobi had been a favorite of Boeckh and had attended his seminar, originally

31. On German technical education during the nineteenth century see Karl-Heinz Manegold, *Das Verhältnis von Naturwissenschaft und Technik im 19. Jahrhundert im Spiegel der Wissenschaftsorganisation*, in *Technikgeschichte in Einzeldarstellungen*.

32. Note the comparison of the works of Ritschl and Liebig by John Theodore Merz, *A History of European Thought in the Nineteenth Century*, 2nd ed. (New York, 1965), 3, 145-146.

33. German science lagged behind the humanities in this development for many reasons, not all of which are entirely clear. The achievements of German humanistic scholarship rested largely on methods of textual criticism and reconstruction which German scholars both invented and exploited. The sciences, on the other hand, had to await the importation of mathematical and experimental techniques from France. The repressive role of *Naturphilosophie* has also been frequently invoked to explain the retardation of German science, but in fact we know too little about the real effects of *Naturphilosophie* to assess its role.

intending a career in philology.³⁴ After deserting philology for mathematics, Jacobi was transferred to the University of Königsberg, where he founded a mathematical tradition through his work on elliptical functions and where he introduced the radically new practice of lecturing directly from the material of his research.³⁵ With Franz Neumann in 1835/36 Jacobi founded the Königsberg mathematics-physics seminar modeled directly upon Boeckh's seminar.³⁶ Like the latter the Königsberg seminar insisted upon the use of independent investigation as a pedagogical tool, demanding of students "independent works . . . , which are either purely theoretical or which demand individual observations and measurements on the basis of a mathematical theory."³⁷ Like those of the philology seminars its statutes neglected any mention of teachers or teacher-training, even though its graduates were intended for the secondary schools of East Prussia.

The Königsberg seminar rapidly became the center of German mathematical physics and inspired much imitation. In 1839 Jacobi's student Ludwig Adolph Sohncke founded a general science seminar at Halle modeled upon the Königsberg seminar and the Universities of Göttingen and Berlin founded mathematics-physics seminars in 1850 and 1864 respectively.³⁸ Gustav Robert Kirchoff and Ludwig Otto Hesse exported the Königsberg scientific and pedagogical methods to Heidelberg in the 1850's. Rudolph Clebsch and Paul

34. Lejeune Dirichlet, "Gedächtnissrede auf Carl Gustav Jacob Jacobi," *Abhandlungen der königlichen Akademie der Wissenschaften zu Berlin* (1852), p. 2.

35. Lorey, pp. 59-64.

36. Götz von Selle, *Geschichte der Albertus-Universität zu Königsberg in Preussen* (Würzburg, 1956), pp. 284-285.

37. Koch, 2.2, 859. Jacobi insisted that his students prepare themselves immediately for independent research. He wrote to his brother M. H. Jacobi in 1840: "Ich habe in dieser Beziehung viel an Socoloff gearbeitet, bei dem es mir am meisten zu lohnen schien; er hielt mir immer die gewöhnliche Rede entgegen, wie er denn an eigne Untersuchungen denken könne da ihm noch so viele Kenntnisse fehlen, worauf ich ihm einmal entgegnete, wenn seine Familie von ihm verlangen würde dass er sich verheirathen solle ob er denn sich antworten würde, wie er sich denn verheirathen könne da er noch nicht alle Mädchen kennen gelernt. Erst in der letzten Zeit gelang es mir etwas sie zu eignen Bemühungen zu bringen. . . ." (*Briefwechsel zwischen C. G. J. Jacobi und M. H. Jacobi*, ed. W. Arens, in *Abhandlungen zur Geschichte der mathematischen Wissenschaft*, 22 [1907], 64.)

38. Lorey, pp. 117-120.

Gordan carried them to Giessen in the early 1860's, where Liebig had introduced similar methods in chemistry much earlier.³⁹ These later seminars retained the preoccupation with research and its use as a pedagogical tool shown by their parent institution. Sohncke's seminar at Halle attempted "to give an introduction to independent study and to the academic lecture, with special emphasis on the education of such teachers . . . who are capable of contributing something not merely to the propagation but also to the expansion of science."⁴⁰ These institutions, combined with the growing use of laboratories and field exercises in scientific education, helped to establish the research orientation among the new generation of Prussian science professors.

As Jacobi's innovation at Königsberg demonstrates, the scholarly values and pedagogical institutions developed by the humanities profoundly influenced the later organization and development of the sciences. On the other hand, both sets of disciplines owed their rapid growth within the universities and the quick acceptance of their new, research-directed values to certain institutional factors intrinsic to the university as a whole. These broader factors have, however, received only limited study within university historiography.

2. WISSENSCHAFT AND KONKURRENZ

Not surprisingly, the explanations which German historians have advanced for the growth of research during the *Vormärz* period have corresponded to the stages through which the historiography of the nineteenth century German universities has passed. Before World War I German historians commonly interpreted university history as the institutional realization of—or departure from—the idea of the university laid down by Humboldt, Schleiermacher, and others.⁴¹ Consequently they attributed the growth of research among the professors of the *Vormärz* era to the direct influence of Humboldtian

39. Lorey, pp. 71-80. Lorey traces the extension of the Königsberg methods throughout the university system.

40. Koch, 2.2, 839. The discussion is somewhat simplified, since a distinction must be made between the mathematics-physics seminars modeled directly upon the Königsberg seminar and Prussia's general science seminars. The latter retained some pedagogical emphasis and, unlike the former, did not flourish in subsequent decades.

41. Ringer, p. 82. These are the older "Mandarin" historians of whom Ringer speaks.

ideology. After World War I a new historical movement arose which applied sociological and economic analysis to the universities and their history; the work of Helmuth Plessner at Göttingen and of his students and associates is among the most distinguished of this school.⁴² Although this approach has rarely dealt with problems of scholarship such as the rise of research, it has directed attention to the role of competition and decentralization among the German universities in stimulating academics to intensive research and specialization. The influence of ideology and competition—*Wissenschaft* and *Konkurrenz*—constitute the two major theories advanced to explain the growth of professorial research.

The influence of ideology upon the subsequent development of professorial scholarship arose primarily from the insistence of Humboldt, Fichte, Schelling, and others that creativity and originality must play a greater role in the universities. As a central part of their new concept of the university, they urged that the creation of knowledge as well as its transmission must be considered the duty of the university.⁴³ Wilhelm von Humboldt, chief architect of the Prussian reforms, wrote that

because these institutions can achieve their purpose only if each confronts, insofar as possible, the pure idea of learning, so are solitude and freedom the principles predominating in their circle. But because human intellectual activity thrives only through cooperation, so the inner organization of these institutions must produce and sustain an uninterrupted and self-invigorating, yet unforced and unpredetermined cohesiveness, as well as a similarly unpredetermined cooperation.

It is furthermore a characteristic of these institutions of higher learning that they treat learning [*Wissenschaft*] as a problem ever unsolved, and that they therefore are continually carrying on research. . . .⁴⁴

42. Especially Helmuth Plessner, "Zur Soziologie der modernen Forschung und ihrer Organization in der deutschen Universität—Tradition und Ideologie," *Diessseits der Utopie* (Hamburg, 1966), pp. 121-143; Christian von Ferber, *Die Entwicklung des Lehrkörpers der deutschen Universitäten und Hochschulen, 1864-1954*, in *Untersuchungen zur Lage der deutschen Hochschullehrer*, ed. Helmuth Plessner (Göttingen, 1956), vol. 3; and Busch, *Privatdozenten*.

43. Schelling, *On University Studies*, pp. 26-28; Fichte, *The Vocation of the Scholar* (1794), p. 55; Fichte, *On the Nature of the Scholar and Its Manifestations* (Erlangen, 1805), trans. William Smith (London, 1845), p. 208.

44. Wilhelm von Humboldt, "Über die innere und äussere Organisation der höheren wissenschaftlichen Anstalten in Berlin (1810)," *Die Idee der deutschen Universität*, pp. 377-378.

This ideology emerged in the rhetoric and scholarship of Prussian scientists only after the humanists and philosophers had established it as the dominant ideology of the philosophical faculty. During the first few decades of the nineteenth century proponents of the new ideology often scorned the sciences, which still retained their eighteenth-century status as auxiliary studies with utilitarian emphasis. As humanists and philosophers came to dominate university affairs after 1810, they frequently challenged the sciences' status as *Wissenschaft*. They forced the sciences onto the defensive in a continuing struggle for prestige, students, and a voice in the counsels of the university.⁴⁵

In the course of this struggle the scientists began increasingly to couch their defenses in the dominant terminology of *Wissenschafts-ideologie*. They argued that the sciences, as well as the humanities, trained the intellect (*Geist*) and led to the refinement of the individual (*Bildung*).⁴⁶ Younger scientists emphasized "pure" science and rejected any utilitarian approach, which they, like their colleagues in the humanities, condemned as "bread-study" (*Brotstudium*). Whatever the secondary, material benefits of science, they argued, its cultivation was an end in itself. Carl Jacobi's letters to his brother bristle with defenses of that proposition. He reported to M. H. Jacobi in 1842, "I had the courage there [in Manchester] to assert that it is the honor of science [*Wissenschaft*] to be of no use, which provoked a powerful shaking of heads."⁴⁷ Speaking to traditionalists and humanists who scorned science's utilitarian connections and

45. General von Müffling wrote: "Ich habe bei der Gelegenheit recht kennen lernen, dass unsere deutschen Philologen eben so intolerant, wie die Jesuiten, sind, und dass eine wahre Verbrüderung Statt findet, die Mathematiker nicht aufkommen zu lassen." This and similar anecdotes upon this theme are collected in Luise Neumann, *Franz Neumann, Erinnerungsblätter von seiner Tochter* (Leipzig, 1904), pp. 242-243. At Berlin the conflict between the humanists and scientists was centered in the Academy of Science. See Adolf Harnack, *Geschichte der königlich preussischen Akademie der Wissenschaften zu Berlin*, 3 vols. (Berlin, 1900), I, 680-712.

46. Among many possible examples see G. J. Mulder, *Ueber den Werth und die Bedeutung der Naturwissenschaften für die Medicin*, trans. Jacob Moleschott (Heidelberg, 1844), pp. 31-32; Philipp Phoebus, *Ueber die Naturwissenschaften als Gegenstand des Studiums, des Unterrichts und der Prüfung angehender Aerzte* (Nordhausen, 1849), p. 2; and J. T. C. Ratzeburg, *Die Naturwissenschaften als Gegenstand des Unterrichts . . .* (Berlin, 1849), pp. 6-8.

47. Jacobi, *Briefwechsel*, p. 90; also p. 115.

impugned its place in the university, Franz Neumann answered in 1844: "True, its heritage is not old; true, it was born in the modern state, in the service of those arts and trades which attend only to the requirements and conveniences of the external life; that it does not deny. But through great, unceasing rigors it has emancipated itself and made itself a free man, has created for itself a realm in which reigns only the free force of intellect, and where independent thought and research alone obtain."⁴⁸

The new scientists adopted the belief that independent research served society not only by adding to the sum of learning but also by contributing to the moral and ethical development of the individual carrying on that research. Like their humanist colleagues before them, they employed that faith not only to justify intensive research activity in itself but also to elevate research to a pedagogical tool, an activity to be demanded even of men destined for strictly practical careers. Such training, du Bois-Reymond argued, offers a benefit "which accrues even to the mediocre mind, that, at least once in his life before the overwhelming attraction of practical studies seizes him, he has been compelled to one step over the threshold of pure learning and has felt the breath of its spirit; that at least once he has seen the truth sought, found, and cherished for its own sake."⁴⁹

The role of *Wissenschaftsideologie* within the sciences reflected its role in encouraging intensive professorial research throughout the university. It promoted a lofty, idealistic concept of the universities and also that absolute devotion to learning stereotypical of the German scholar ever since.⁵⁰ It lent historical and moral sanction to research activity and justified its employment as a pedagogical tool. Historians of the universities, intensely aware of this role and permeated by the Humboldtian categories, have gone further to maintain that this ideology transformed the approach to knowledge

48. Luise Neumann, p. 360.

49. Emil Heinrich du Bois-Reymond, *Reden*, ed. Estelle du Bois-Reymond (Leipzig, 1912), I, 356. A humanistic expression of this faith in *Wissenschaft* and research as the proper foundation for a practical career is found in Friedrich Bülow, "Wirken und Schicksale der deutschen Universitäten . . .," *Akademische Monatschrift*, 2 (1850), 15-16.

50. Fichte called the university "the most holy thing which the human race possesses . . . ; the University is the visible representation of the immortality of our race. . . ." (*Concerning the only Possible Disturbance of Academic Freedom. Rector address at Berlin, Oct. 19, 1811*, in Turnbull, pp. 262-265.)

within the universities. Friedrich Paulsen in his *Die deutschen Universitäten und das Universitätsstudium* wrote:

The 19th century first introduced the requirement of independent learned research: only he is effective as a teacher of science [*Wissenschaft*] who is himself actively productive in science. . . .

It was the era of the highest intellectual productivity that the German people have ever known, the era of Kant and Goethe, which found the courage to advance this view. Fichte and Schleiermacher first enunciated it decisively in their treatises written upon the occasion of the founding of Berlin University: upon whomever wishes to enter upon a scholarly career is the demand to be placed that he not merely have learned the knowledge at hand, but rather that he also be capable of producing knowledge out of his own independent activity. . . .

Under the dominion of this idea the German universities of the nineteenth century have developed into what they are today: the workshops and the forges of the intellectual life of our people.⁵¹

The rise of Humboldtian ideology obviously influenced profoundly not only the development of the universities, but also German culture as a whole. Its importance notwithstanding, however, the new ideology alone does not fully explain the growing stress upon professorial research during the *Vormärz* period. The genius of Germany's academic system did not lie in its ideology of research and originality alone. In its universities Germany created an institutional system in which the extrinsic rewards of honor, salary, and career reinforced ideological precepts. Several factors—the criteria of academic appointments, the seminars and laboratories, the rewards accorded to successful professors—gave institutional expression to the philosophy of *Wissenschaft* and creativity. The ideological explanation in its traditional form says little about how such a system was established or how it functioned. Without an adequate account of these factors, no historical explanation can be entirely satisfactory.

Furthermore, factors other than ideological ones largely determined how Germany's ideological precepts manifested themselves in the work of academics. The actual development of the universities

51. Paulsen, *Universitäten*, pp. 204-205.

often contradicted rather than corresponded to the precepts and directives of the Humboldtian program. The founders of that program envisioned a type of academic originality and research which served the ends of synthesis, not analysis. Research was to employ philosophic insight in order to return to a postulated grand unity of knowledge, the vision of which had long been lost by fragmented, empirical learning.⁵² In Humboldt's words the university was to strive, "first to derive everything from one original principle . . . , further to mold everything to one ideal . . . ," and "finally to unite this principle and that ideal into one idea."⁵³

Although it never rejected this scholarly ideal in theory, the tradition of research which actually developed in the universities stressed the elaboration of critical and analytic methods and resulted in the endless fragmentation of learning into disconnected specialties and subfields. German academics remained intensely aware of the contradiction between theory and practice, for well before midcentury it had become embarrassingly obvious that their ideology as practiced was leading further and further from the unity of knowledge which it postulated. By 1845 purists moaned that "the universities have disintegrated into as many institutes as there are disciplines taught, whose [mutual] ties are only of the most superficial kind. They are no longer universities, but only aggregates of special institutes. From this results the one-sidedness of the education which they afford to academic youth."⁵⁴ While regretting the fragmentation of learning, August Boeckh in 1850 noted how beneficial this process had been to scholarship: "This division and splintering has incontestably taken a decisive upperhand in our age, in which the celebrated principle of the division of labor has come into widespread currency in science. This has given rise to a mass, indeed we could say a flood, of monographic treatises, to be acquainted with all of which is difficult, but which certainly has contributed very much to the broadening of our knowledge."⁵⁵ The conflict between the historical ideal of philosophical synthesis and the historical reality of methodological analy-

52. Schelling, *On University Studies*, pp. 17-32.

53. Wilhelm von Humboldt, "Über die innere und äussere Organisation . . . ," *Idee*, p. 379.

54. Luise Neumann, pp. 360-361.

55. *Gesammelte kleine Schriften*, 2, 190-191.

sis continued to trouble academic theorists throughout the century.⁵⁶

Unlike the explanation based upon the influence of *Wissenschafts-ideologie*, the institutional factors of competition and decentralization among the universities have never been advanced within a detailed historical context to explain the emergence of research. They do, however, underlie several recent historical and sociological studies of the universities and constitute an important, suggestive hypothesis for explaining the development of these institutions.⁵⁷

In the sciences during the *Vormärz* era, competition between universities served mainly to propagate new research techniques within existing disciplines. After 1840, however, the same pressures initiated an accelerating process of subject fission as the universities elevated expanding subfields to full disciplines entitled to full professors. Joseph Ben-David has examined this process and its limitations in some detail, and his work has been convincingly confirmed by Awraham Zloczower's study of careers in physiology in the universities.⁵⁸ They have described how competitive pressures encouraged young academics to enter new, specialized areas and to develop them rapidly by means of intensive research. These academics then stood first in line for a full professorship in the eventual recognition of the subfield as a full discipline.⁵⁹ Through this process the competitive

56. Eduard Spranger, *Wandlungen im Wesen der Universität seit 100 Jahren* (Leipzig, 1913), pp. 23-24; Max Weber, "Wissenschaft als Beruf (1919)," *Gesammelte Aufsätze zur Wissenschaftslehre*, ed. Johannes Winckelmann, 3rd ed. (Tübingen, 1968), pp. 584-585, 589.

57. Warren O. Hagstrom, *The Scientific Community* (New York, 1965), pp. 36-40; Joseph Ben-David, "Scientific Productivity and Academic Organization in Nineteenth Century Medicine," *American Sociological Review*, 25 (1960), 828-843; Joseph Ben-David, "Scientific Growth: A Sociological View," *Minerva*, 2 (1963), 455-476.

58. Joseph Ben-David and Awraham Zloczower, "Universities and Academic Systems in Modern Societies," *European Journal of Sociology*, 3 (1962), 45-84; Awraham Zloczower, *Career Opportunities and the Growth of Scientific Discovery in 19th Century Germany with Special Reference to Physiology*, an unpublished master's thesis from the Hebrew University of Jerusalem.

59. The Ben-David-Zloczower thesis is concerned less with the origins of this dynamic of subject-fission than with its limitations. The thesis argues that each newly created discipline experienced a decline in vigor and scientific creativity as its limited number of chairs was filled and the front of specialization moved on to other subfields. Consequently the incentives which the universities could offer young scientists and the creativity of German science as a whole became heavily dependent upon the process of subject fission. That process slowed down after 1880, the thesis argues, largely because the new institute system tended to "bureaucratize" science instruction and research.

university system not only encouraged but obliged ambitious young academics to devote themselves to the search for knowledge.

Competition and decentralization accelerated the growth of research among professors during the *Vormärz* period; yet these factors, even in conjunction with the influence of Humboldtian ideology, do not fully explain that development. Far more important than the heightened intensity of competition during the *Vormärz* period was a notable shift from eighteenth- to nineteenth-century standards of competition. Gerlach Adolf von Münchhausen, chief founder of Göttingen University, identified the eighteenth-century standards: in establishing the university, he wrote in 1733, "it appears that the two most important considerations are: 1) to choose capable people who are able to attract a great number of students and 2) to persuade them to accept nominations at Göttingen. . . . It is important above all else that the juridical faculty be staffed with famous, excellent men, for this must lead to many rich, well-born people studying in Göttingen."⁶⁰ Münchhausen's precepts, as well as other lengthy, eighteenth-century studies on the management of universities, suggest the prevailing mercantilistic and pedagogical standards of competition.⁶¹ Universities competed over the numbers, wealth, and social position of their students; over the efficiency of the bureaucrats which they trained for the state; over the skill of their teachers; and over the reputation of their faculties, not in the eyes of a small community of specialists but of the general educated public.

After the reform period, as Prussia gradually retreated from her mercantilistic policy toward the universities, more esoteric or scientific criteria began to replace the older standards of competition. The university's fame as a center of learning and basic research came more and more to outweigh its fame as a pedagogical center or as a professional school. The new intensity of competition between universities accelerated the victory of these new competitive standards, but it did not initiate them or the new academic values on which they were founded.

60. "Nachträgliches Votum Münchhausens . . .," *Die Gründung der Universität Göttingen*, ed. Emil F. Rössler (Göttingen, 1855), pp. 33-34.

61. See Anon. [J. D. Michaelis], *Raisonnement über die protestantischen Universitäten in Deutschland*, 4 vols. (Frankfurt, 1768), 1, 1-97.

The new ideology and the new competitiveness within the universities went far to transform the professorate into a position based upon critical scholarship and individual research. But there is another major factor that influenced the transformation. It is the mechanism by which the new competitive-ideological values of research and specialization so quickly became the basis of appointments and promotions within the academic system.

3. THE APPOINTMENT OF PROFESSORS IN PRUSSIA

In any established university system professorial duties and values are defined and sustained largely through the criteria imposed upon young academics seeking appointment or promotion. In considering the important changes which occurred in professorial duties and values during the *Vormärz* period, it will, therefore, be useful to study changes in the procedures for professorial appointments and, in turn, the academic qualities which these procedures rewarded. Before examining Prussian university appointments, however, a consideration of the modern professorial post will provide a new framework for investigating the historical situation.

In the modern German university or in any university system significantly influenced by the German model, the professorship is characterized by its peculiar "dualistic" nature. The professor is a man of two loyalties, each with its corresponding activities and academic values. One loyalty looks toward the institution, and the values corresponding to it are pedagogical and collegiate. They idealize the professor who is a stimulating teacher, who fits well socially and intellectually with his colleagues, and who identifies with his institution and accepts his share of its tasks. The second loyalty, however, looks to the profession and primarily values research and other contributions to the academic's specialized, discipline-community beyond the university. The discipline as a whole and the community in particular establish the academic values connected with this professorial role. These values center around the struggle for reputation and recognition within the discipline-community, a struggle central not only to science but to all established academic fields.

Never entirely disjoint, these two academic roles interact most

closely in matters of salary, appointment, and promotion. The modern academic system expressly subordinates university-centered values to disciplinary criteria in assessing the individual's fitness for advancement. Although the professor ostensibly is paid for teaching and other university-centered functions, in practice the prestige which he holds (or promises to attain) within his professional community usually determines his "success" within the academic world. Caplow and McGee in *The Academic Marketplace* describe this peculiar arrangement:

For most members of the profession, the real strain in the academic role arises from the fact that they are, in essence, paid to do one job, whereas the worth of their services is evaluated on the basis of how well they do another. . . . Most professors contract to perform teaching services for their universities and are hired to perform those services. When they are evaluated, however, either as candidates for a vacant position, or as candidates for promotion, the evaluation is made principally in terms of their research contribution to their discipline.⁶²

One oversimplifies the dual role of the professor, however, in considering it to be merely the conflict of teaching and research which Caplow and McGee imply. It arises rather from conflicting loyalties, to institution and to discipline, and from the diverse, often incompatible academic values they entail. Nor is this description of American academia to be facilely generalized to other university systems; the modern German universities, for example, emphasize disciplinary criteria almost to the exclusion of collegiate ones. It does, however, describe that universal characteristic of the modern professorate which underlies its unparalleled efficiency as an instrument of science and scholarship: appointive procedures which subordinate institutional to disciplinary values. Through these procedures the university career provides material incentive to disciplinary attainment, just as through its teaching function it provides for the continuity of the discipline as well.

The historical development of the professor's post in Prussia can be considered in terms of this dual role characteristic of the modern professorship. Since appointive procedures which stress research and

62. Theodore Caplow and Reece J. McGee, *The Academic Marketplace* (New York, 1958), pp. 82-83.

disciplinary reputation sustain that dual role today, the historical origin of that dual role ought to be found at the point in time when disciplinary criteria begin to supplant collegiate ones in determining academic promotions. This section examines how professors were appointed in eighteenth-century Prussia and how the focus of authority for such appointments changed during the *Vormärz* period. The final section shows how the criteria imposed upon academics in the selection of professors were largely dictated by the group which controlled appointments. It demonstrates how the changes in appointive authority brought about corresponding changes in appointive criteria and how these ultimately affected the professorate in Prussia.

During the eighteenth century there existed no clear distribution of authority in filling vacancies within the German universities. By 1700 the territorial princes had generally usurped the universities' ancient corporate privilege of self-recruitment, though a few institutions and individual faculties retained that right throughout the eighteenth century. Many universities enjoyed the *Vorschlagsrecht*, the right to propose a list of candidates for a vacant post from which the prince or his delegate might make the final choice. In other cases the state might fail to consult the universities in any formal way at all. But even though the territorial princes imposed their favorites upon the eighteenth-century universities frequently and imperiously, on the whole the universities succeeded either in filling their professorial ranks with candidates of their own choosing or in implicitly defining those criteria which the appointees of others were obliged to satisfy.⁶³

The Prussian universities enjoyed somewhat less autonomy than other German institutions, and in particular they possessed no statutory right to nominate candidates; nevertheless, they retained considerable influence over appointments into their professorial ranks. Conrad Bornhak's study of the Prussian university administration before 1810 cites numerous cases preserved in ministerial records in which Prussian universities were called upon to propose candidates for vacant chairs. In the case of Königsberg University, which Berlin administered indirectly through the provincial government, the

63. Paulsen, *Universitäten*, pp. 101-106.

state left appointments almost entirely in local hands.⁶⁴ Bornhak concludes that “the participation of the university in the filling of vacant chairs was in no way extinguished and can be demonstrated during the whole century.”⁶⁵

The full professors of the local faculties maintained their influence over appointments and other local affairs partly by default of the state. Before 1810 the Berlin ministry never employed its power of appointment in a consistent policy to shape the universities, and it lacked the bureaucratic surveillance and control over the universities necessary to enforce such a policy had it existed. Throughout the eighteenth century, state power in the local university was vested in an official called the *Direktor*. This director, through whom the authorities maintained surveillance over local conditions and saw that orders from Berlin were carried out, was invariably a full professor of the faculty.⁶⁶ As such he possessed certain vested interests in university affairs and rarely scrupled to use his state influence to protect them. By often subordinating state power to one of several quarreling factions among the faculty, the director system only imbibited faculty feuds and acerbated intrigues for vacant posts.⁶⁷

Legal authority for appointments lay with the administrative heads of the universities called *Kuratoren*, men usually appointed by the king from the ranks of prominent Berlin bureaucrats. In their Berlin posts these men possessed only two sources of information about conditions in the local universities: correspondence with the director and other favorites and large-scale inspection tours or visitations. Both proved ineffectual; the curators remained generally out of touch with the local situation and intervened only occasionally in university affairs. The uniting of the various curators into a single council called the *Oberkuratorium* in 1747 remedied this situation somewhat. But although the *Oberkuratorium* functioned ostensibly as a centralized administrative body, in practice it was merely a subordinate council deep in the bureaucracy of the Justice Depart-

64. Von Selle, *Königsberg*, pp. 158-161; Bornhak, p. 180.

65. Bornhak, pp. 99-100.

66. Bornhak, pp. 176-178.

67. J. J. Moser's brief directorate at Frankfurt-an-der-Oder from 1736 to 1739 offered the most scandalous example of this effect. A prejudiced account is Johann Jacob Moser, *Lebensgeschichte* (1768), pp. 60-83.

ment. The real interests and responsibilities of its members lay elsewhere, a condition which contributed to the lack of initiative characteristic of Frederician university policy.⁶⁸

These inadequacies of the bureaucratic structure and of the personnel who staffed it vitiated Prussia's occasional attempts to regulate its universities. The curators rarely exercised personal initiative or judgment in selecting professors. In many appointments free of theological or legal controversy they simply acquiesced to the wishes of the local faculty or its dominant group, which then imposed its own appointive criteria upon candidates. When the curator did not acquiesce, the appointment was thrown open to intrigue, lobbying, and favoritism. Under these conditions no consistent criteria were employed.⁶⁹ By 1805 these administrative inadequacies in all areas of university affairs had become patently obvious and had evoked demands for reform. Ludwig Heinrich Jacob wrote in 1798:

The top university administrators know too little about the condition of the institutions they are to govern. They are usually ministers or *Geheimräte* who have had little opportunity in their lives to acquaint themselves with the universities in detail, men who lack a general overview of the sciences, their systematic interconnections, and a correct judgment about the importance of each individual part. They feel no special need to acquire such knowledge at their age. Usually the supervision of the universities is only a secondary responsibility (*Nebenfach*); another department where his colleagues can better judge him, where he has worked out a better routine and where his influence is greater interests and occupies the minister more. Hence he worries little about

68. Bornhak, pp. 179-188. Freiherr von Zedlitz' leadership of the *Oberkuratorium* proved a partial exception to this judgement, for Zedlitz exercised vigor and imagination both in controlling the universities and in appointing new professors. Most of his activities, however, were devoted to the secondary schools. See Friedrich Adolf Trendelenburg, "Friedrich der Grosse und sein Staatsminister Freiherr von Zedlitz," *Kleine Schriften Trendelenburgs* (Leipzig, 1871), I, 127-158.

69. University factions lobbied through the provincial assemblies in which they were represented; the church authorities, through the *Oberkonsistorium*. Under Frederick William I the theological faculty at Halle influenced most appointments of theological and philosophical faculty professors throughout the state, as did the prince's personal physician Eller for the medical faculties. There were even cases in which the size of a scholar's voluntary contribution to the *Rekrutenkasse* exercised a definite influence upon his subsequent career. (Bornhak, pp. 101-105.)

THE GROWTH OF PROFESSORIAL RESEARCH IN PRUSSIA

the universities and has no knowledge of the local situation. From this circumstance results the fact that the regulations and orders which are sent out from the residence to the academic senate are seldom carried out. Counterproposals are made, difficulties on the side of the universities pile up, and in the end everything usually remains the same.⁷⁰

In response to these criticisms and to its growing commitment to the universities, the Prussian government moved during the reform era to create a new bureaucratic structure through which to administer its universities. The reforms had brought successive reorganizations of the entire bureaucracy, and in each reorganization university administration received higher rank within the bureaucratic hierarchy. Finally in 1817 von Hardenberg accorded cabinet status to educational affairs as part of the newly created *Ministerium der geistlichen, Unterrichts-, und Medizinalangelegenheiten*, commonly called the *Kultusministerium*. The new minister, Karl Freiherr vom Stein zum Altenstein, assumed direct control of university affairs, thus centralizing university administration under one responsible official at the highest level of the Berlin government.⁷¹

"Reform" on the local level occurred as a result of the political reaction which marked the close of the Humboldtian era in Prussian education. A royal decree of 18 November 1819 established at each Prussian university a salaried official to censor publications and lectures, to prevent student associations, and to persecute liberal sentiment in accordance with the Karlsbad Decrees. Although conceived for a purpose antithetical to the principles of the earlier reforms, this bureaucratic innovation actually continued their thrust by vastly extending the state's administrative authority over the universities. The powers of these *Regierungsbevollmächtigte* went far beyond their original political purposes, and they replaced the curators and directors as the supreme representatives of the state in the local universities. Intensely resented by the faculties, these officials nevertheless played crucial parts in the development of the

70. Ludwig Heinrich Jacob, *Ueber die Universitäten in Deutschland, besonders in den königl. preussischen Staaten* (Berlin, 1798), pp. 22-24.

71. See Müsebeck, *Das preussische Kultusministerium*, passim. Also see Karl-Heinz Manegold, "Das 'Ministerium des Geistes'; Zur Organisation des ehemaligen preussischen Kultusministeriums," *Die deutsche Berufs- und Fachschule*, 63 (July, 1967), 512-524.

universities.⁷² Responsible only to the Minister of Education in Berlin, they constituted an important part of the powerful and efficient bureaucratic mechanism created during the reform period.

Prussia immediately began to utilize this new bureaucratic machinery in an explicit new policy aimed at reforming and molding the universities through aggressive, centralized control of all professorial appointments. The ministry in Berlin began to play a much more active role in evaluating and selecting professorial candidates than it had done in previous decades, and with growing frequency it refused to consult the local corporate faculties either directly or indirectly. As a result of this policy the authority to make or to influence appointments shifted gradually away from the corporate body of professors and the various lobbying groups toward the top figures of the Berlin ministry.

The actual origins of this policy lay in the various treatises on university reform written during the eighteenth century, all of which had insisted that the Prussian government, in practice as well as in theory, exercise a closer and more consistent control over university appointments. Only later during Wilhelm von Humboldt's fourteen-month leadership of Prussia's Department of Educational Affairs from February 1809 to June 1810 was this policy officially formulated. Despite the theories of academic freedom and cultural liberalism which he espoused, Humboldt centralized and extended state power over all aspects of Prussia's educational affairs. For the universities he insisted upon strict government control of appointments and government maintenance of competition.

The appointment of university professors must be reserved exclusively to the state, and it is certainly no good arrangement to allow the faculties any more influence in these matters than a reasonable, fair curatorial council will do of its own accord. For in the university antagonism and friction are wholesome and necessary, but the collisions that naturally arise between instructors in the course of their affairs can unintentionally distort their point of view. Furthermore the condi-

72. For the role of *Regierungsbevollmächtigte* at Berlin see Lenz, *Berlin*, 2.1, 101-116; at Bonn, Friedrich von Bezold, *Geschichte der rheinischen Friedrich-Wilhelms-Universität* (Bonn, 1920), pp. 127-137.

tion of the universities is too closely bound up with the direct interests of the state.⁷³

In the founding of Berlin University, Humboldt personally led the recruitment of professors for the new institution, thus setting a precedent for his followers.

Although his successor, Friedrich von Schuckmann, upheld Humboldt's insistence upon government control of all appointments, only under the long rule of Stein zum Altenstein over the Ministry of Education did professorial appointments become a virtual monopoly of the minister. Max Lenz, considering Altenstein's relationship with Berlin University, wrote:

The faculties had hardly anything to say about appointments; only very few instructors were appointed with their collaboration. Most were procured directly by the minister. . . . This practice corresponded to Humboldt's precepts, who, however, usually consulted with professors whom he knew well, like Schleiermacher, Savigny, and Reil. Schuckmann followed Humboldt in this respect. . . . Under Altenstein such consultations took place no more. Among the doctors he soon gained Rust as an acceptable adviser, and among the theologians he called upon Eylert or Strauss—all men who stood in direct official connection to him. Consultation with the philosophical faculty, on the other hand, was almost forgotten by the ministry after 1820. The minister alone became the source of all grace; whoever desired advancement was forced to turn to him.⁷⁴

The Prussian bureaucracy had many reasons for seizing control of university appointments in the early nineteenth century. It had always possessed the legal authority for such control, and after 1806 the administrative centralization made such control practically feasible as well. To exercise it seemed to be a natural extension of the bureaucratizing thrust of the whole reform movement. Perhaps more important, the Prussian bureaucracy emerged from the eighteenth century with a profound distrust of the corporate

73. Humboldt, "Über die innere und äussere Organisation . . .," *Idee*, p. 385. Numerous historians have written on the apparent paradox in Humboldt's liberal philosophy and his authoritarian approach to educational affairs. See René König, *Vom Wesen der deutschen Universität* (Berlin, 1935), pp. 162-166, 171-177; Spranger, *Reform des Bildungswesen*, pp. 86 ff., 107 ff., Lenz, *Berlin, I*, 195.

74. Lenz, *Berlin, 2.1*, 407.

faculties. The eighteenth-century universities abounded in minor scandals: professorial laziness, nepotism, academic monopolies, interminable faculty feuds, and teachers who winked at student violence and debauchery. The new bureaucrats who came to the fore during the reform era blamed the abuses on the universities' corporate intransigence. They were determined, as Humboldt indicated, to root out such abuses by controlling university affairs and appointments and by allowing the corporate faculties a minimal role at best.

Practiced in all the universities across Prussia, this policy of rigid ministerial control produced some unfortunate results. The utter dependence of academics upon the ministry often encouraged subservience and flattery. Also the ministry never hesitated to use its power in order to further controversial intellectual movements which enjoyed its support. Hegelianism became a virtual state philosophy in Prussia before 1830, and the ministry guaranteed its dominance by assuring Hegel's students a near monopoly over chairs of philosophy in Prussia.⁷⁵ On the whole, however, Altenstein's appointment policy proved extremely beneficial to scholarship within the universities. Particularly among the emerging philological, historical, and scientific disciplines of the philosophical faculty, Altenstein's ministry brought some of the most noted scholars of the century into Prussian chairs.

The ministry attained its monopoly over appointments not through any new legal powers but rather through the vigor of its personnel and the efficiency of the bureaucracy. Ostensibly the *Vorschlagsrecht* of both Berlin and Bonn, legally recognized in Prussia through the respective statutes of these new institutions, provided these universities a voice in appointments by guaranteeing their right to propose candidates. In practice, however, the ministry still frequently failed to consult the universities about vacancies; or, when it did receive their nominations, it often disregarded them and appointed its own candidate. After the death of Altenstein in 1840 the Bonn faculty angrily protested to the new minister Eichhorn "that many things would have developed differently or more favorably at our university if, in earlier times, the faculties' right of

75. Varrentrapp provides a lengthy discussion of the ministry's relationship to Hegel, pp. 433-443.

nomination, guaranteed by the statutes, had been less frequently ignored.”⁷⁶ Eichhorn, however, quickly adopted a policy of appointments more imperious than Altenstein’s, especially in the particularly sensitive theological and juridical faculties.⁷⁷ The controversies which Eichhorn’s appointments provoked raged until the Revolution of 1848, in which recognition of their *Vorschlagsrecht* constituted a major university demand.⁷⁸

4. THE NEW PROFESSORS AND THE OLD

Both before and after the Prussian reforms many factors helped to determine the academic criteria imposed upon professorial candidates, but the direct needs and interests of the group controlling these appointments played the major role. During the eighteenth century the Prussian universities themselves defined the general criteria used for appointments, either through direct control of promotions or through their influence and advice in these matters. Not surprisingly, they insisted upon qualities in academics directly beneficial to their local corporate interests; unlike modern appointive procedures, eighteenth-century ones valued institutional over disciplinary criteria in assessing potential academics.

Critics and reformers of the eighteenth-century universities—and there were many—have left thorough, if occasionally biased, descriptions of these procedures and their results. Although generally admitting that faculty-controlled appointments promoted solidarity within the university corporation, reformers invariably condemned these appointments as damaging to scholarship. Critics insisted that they encouraged professorial monopolies and restricted the healthy competition necessary to vigorous intellectual life. J. C. Hoffbauer, in writing of the Prussian universities in 1800, urged that

every instructor ought to enjoy the fullest independence from every other. . . . In my opinion all relationships which make an instructor dependent on the interests of others in any manner must be banned. . . . I know of cases in which younger instructors have oriented their choice

76. Quoted in Bezold, *Bonn*, p. 295.

77. Lenz, *Berlin*, 2.2, 12-20.

78. Lenz, *Berlin*, 2.2, 163-164; Karl Griewank, *Deutsche Studenten und Universitäten in der Revolution von 1848* (Weimar, 1949), pp. 52-53 ff.

of lectures, however unwillingly, in accordance with the wishes of their seniors in order not to displease them, because they hoped either for further advancement through their recommendation or for other sorts of advantages arising from their favor. . . . Everyone who seeks advancement in the university knows that it depends upon whether the faculty will recommend him or not. . . . Often everything hangs upon the will of one individual, to whose vote the other members of the faculty conform more than they should.⁷⁹

Reformers observed that institutional concerns dominated appointive procedures. They argued that the criteria upon which professors evaluated candidates looked more to their social and corporate acceptability than to their skill in their particular discipline. Christoph Martin Wieland complained bitterly of the University of Erfurt that

all along the philosophical faculty, instead of concentrating at all times and to the best of its ability on the best possible choice, has let itself be led by completely false premises; it has notoriously concerned itself more with its relatives and personal friends, more with religious, fraternal, or collegiate relationships and the like in the selection of its new members than with true learned capability. Out of this practice has arisen not only a mass of quarrels, but also—understandably—the circumstance that it was only a fortunate coincidence when a really skillful man ever found his way to a teaching post.⁸⁰

In addition to these university-centered criteria based upon “religious, fraternal, or collegiate relationships,” the universities demanded candidates with sufficient learning in their field to teach successfully. Usually they hoped for the author of a treatise or text with some literary reputation. Beyond this, however, disciplinary criteria played little role in appointments. Already mature and well-defined discipline-communities had arisen in branches of science and in classical philology by 1790. But although a few Prussian professors worked actively in extending the sciences and participated in these young communities, no such activity had yet become incumbent upon the academic. While this activity was honored and

79. *Über die Perioden der Erziehung* (Leipzig, 1800), pp. 182-184. Hoffbauer was professor of philosophy at Halle.

80. Wilhelm Stieda, *Erfurter Universitätsreformpläne im 18. Jahrhundert* (Erfurt, 1934), p. 227.

occasionally rewarded, few men considered it an intrinsic part of the professor's duty and few argued that it could or ought to be required of all academics.⁸¹ Indeed the full faculty, dominated by professors of theology and law, usually lacked the ability to judge candidates in specific fields upon disciplinary grounds, and was certainly unprepared to judge specialized research within these fields. A contemporary noted that

because a professor does not teach all the sciences and consequently does not need to understand them, so-called scholars can be guilty of still greater misjudgments about professors. Let us assume, for example, that a university has only one professor of mathematics and that this chair is to be filled. Then among the men who will make the appointment there are no real professional mathematicians; what, then, makes their judgement particularly accurate in comparison with that of others? The same case can occur in many other fields. [Such circumstances promote] . . . only too often the most common personal considerations which in no way further learning.⁸²

This emphasis upon institutional criteria by no means contradicted the university's yearning for famous professors. On the contrary reform treatises usually urged professors to publish in order to attain a literary reputation and to enhance the reputation and attractiveness of their universities. The Prussian government also made a few, largely ineffective attempts to require publication of its professors. J. J. Moser, while director of Frankfurt-an-Oder, reported to Berlin in 1737 that the local professors were unknown in the scholarly world because they published nothing. His report

81. Eighteenth-century ideas about the duties of the professor and the relationship of the university to the advancement of learning spanned a wide range of opinion, the disagreements having been caused partly by the criticism of the universities late in the century. Spokesmen for the universities at Göttingen, who led the counterattack against their critics, began after 1790 to recognize the general responsibility of the universities to expand learning whenever possible as well as to transmit it. See Ernst Brandes, *Ueber den gegenwärtigen Zustand der Universität Göttingen* (Göttingen, 1802), pp. 16-20, 159-161. In Prussia, on the other hand, the climate of opinion seemed to have favored just the opposite view: that the shortcomings of the universities arose from their neglect of pedagogy and that reform must be in the direction of a more *schulmässig* institution. See Jacob, *Ueber die Universitäten*, p. 254. The Prussian government shared this preference for pedagogy and a suspicion of professorial scholarship up to the beginning of the Humboldt ministry. See Bornhak, p. 147.

82. Wieland, quoted in Stieda, pp. 153-154.

resulted in a command to the collective faculty to begin writing. Similar reports came from Halle during the 1768 visitation of Geheimer Tribunalrat Steck, and the state in the same year commanded the Halle faculty to begin to publish in order to ensure the reputation of that institution.⁸³

Such emphasis upon publication, however, must be distinguished from the nineteenth-century movement toward a "publish or perish" policy. Not only was the pressure to publish much less, but also the aim and nature of publication was quite different. Eighteenth-century publication aimed at establishing literary reputation within the eyes of the general learned public, not literary reputation within a small group of specialists gained through original contributions from one's research. The Prussian government made this quite clear to its professors. Frederick William I ordered the Halle professoriate to neglect esoteric treatises and to concentrate on more widely available works of practical interest to the common man.⁸⁴ Geheimer Tribunalrat Steck, who criticised the Halle professors in 1768 for their failure to publish, asserted in his visitation to Frankfurt-ander-Oder in 1770 that the business of the universities was not discovery but the "service of the state and the enlightenment of the nation." As late as 1802 a decree of the government to Halle University argued that the purpose of the university was not the "Erweiterung der Wissenschaft," but rather teaching, which, the decree asserted, would lead indirectly to discovery.⁸⁵ In keeping with such a conception of professorial publication and with the often-cited encyclopedic and pedagogical tendencies of the age, professors devoted much of their efforts to textbooks, handbooks, and compendia. Unlike the nineteenth century, the eighteenth regarded such works as creative in their own right, as central to the professor's literary activity.⁸⁶ The eighteenth-century universities differed from the

83. Bornhak, p. 148.

84. Bornhak, p. 129.

85. Bornhak, p. 147.

86. Hoffbauer, for example, defended the proliferation of textbooks in Prussia. He argued that such literary work encouraged professors to organize their learning and offered the public a basis on which to judge them. Writing even a mediocre text, he claimed, demands more knowledge and diligence than the "anderweitige Behandlung eines wissenschaftlichen Gegenstandes, im mehrern Bänden. . . . Aus diesen Gründen wäre es vielleicht zu wünschen, dass jeder Docent nur über eigne Lehrbücher lese." (Hoffbauer, p. 180.)

nineteenth not so much in that they emphasized scholarship and publication less, but that they emphasized a very different kind of scholarship pursued for distinctly different reasons.

The eighteenth-century stress upon institutional criteria in appointments resulted largely from the fact that these criteria were defined primarily by the local universities. During the early nineteenth century, as the previous discussion showed, the state began to exercise more consistent control over the universities and their professorial appointments. By 1825 the minister of education had attained a virtual monopoly over such appointments, and he rarely deigned to consult the local corporate faculties. This policy began as part of a general program of administrative centralization and was intended to correct certain corporate abuses; the policy was certainly not addressed, at least initially, to the reform of scholarship.

The decisive shift in appointive power in the reform era brought about a corresponding shift in appointive criteria which profoundly affected Prussian scholarship and ultimately the nature of the professorial post. The officials of the Ministry of Education, Altenstein and his vigorous advisor Johannes Schulze, paid little attention to the fraternal, collegiate, and pedagogical values which eighteenth-century appointments had stressed. Indeed, they had no way of judging these factors, for the ministry usually knew its appointees only through their publications. Instead ministerial decisions laid greatest stress upon the originality and the depth of a candidate's scholarship and publications. The ministry demanded that the candidate possess or promise quickly to attain a reputation within the relevant discipline-community in Germany. It relied almost exclusively upon the specialists within those communities for advice about candidates and almost totally neglected the full faculty involved.

By deciding appointments in these ways, the ministry encouraged disciplinary criteria of value to the broader community of scientists over institutional criteria of value to the local community of professors. In place of literature addressed to the general learned public, the state promoted literature bearing the results of research and addressed to other contributors in the field. This insistence upon disciplinary criteria gradually established these as decisive in professorial appointments. The change established the dualistic profes-

sorate in Prussia and with it research as an integral part of the academic's life and work.

The gradual shift in appointive power toward the state naturally brought new academic criteria in its wake; various historical factors influenced the state's decision to emphasize rigid disciplinary criteria rather than pedagogical or utilitarian ones. On the one hand the chief figures of the Ministry of Education felt deep personal allegiance to the *Wissenschaftsideologie*, which unequivocally rejected pedagogical or utilitarian views of the professor's role. Although a retiring and indecisive man, Altenstein had nevertheless been a fervent admirer of Fichte, and he shared Fichte's desire for a new national education based upon creativity and philosophic synthesis.⁸⁷ In philosophical appointments he therefore favored idealists like Hegel and his disciples; in philology and history he favored men who had envinced their creativity in their judgment and their critical method. Schulze had been trained in F. A. Wolf's philological seminar, and he retained the neohellenist, rather elitest outlook of German philology with its emphasis upon rigor and critical method.⁸⁸ Wolf's techniques had been rapidly changing the nature and standards of Prussian classical scholarship since 1795, and Schulze used his office to further that scholarly movement in which he himself had been trained. The critical, analytic tendencies of the new philology clashed sharply with the philosophic program of a grand synthesis of learning. Nevertheless, the state sponsored both. After 1830 the critical outlook of the new philology largely replaced the philosophical tradition; before 1830 both coexisted in a fruitful if uneasy equilibrium.

In part the ministry insisted upon disciplinary distinction among its professors because the relationship of the universities to the state had changed. Before 1806 the universities served Prussia in two ways: through training bureaucrats and professional men and through their mercantilistic function of bringing money into the state. After 1806 the universities certainly continued to train bureau-

87. Varrentrapp, pp. 272-275; Lenz, *Berlin*, 2.1, 3-10; Schulze's personal assessment of Altenstein's personality and accomplishments is in Johannes Schulze, "Beiträge zur Geschichte des Ministeriums der Unterrichtsangelegenheiten von 1818 bis 1840 und zur Charakteristik des verewigten Ministers Freiherrn v. Altenstein." (Müsebeck, pp. 293-307.)

88. Varrentrapp, pp. 26-44, 71-79.

crats and professional men; indeed, Altenstein expected his new appointive policy to improve professional education in the higher faculties. The universities' mercantilistic function gradually disappeared, however, to be replaced by another, more fundamental one. The universities came to be regarded by the state as showplaces of Prussian intellect and the chief foci of German culture. As such they were to be groomed and maintained as national symbols. This new role for the universities can be dated almost precisely from the founding of Berlin University, when that institution became the phoenixlike symbol of Prussia's resistance to Napoleon. Prussians patriotically contrasted their universities to the French system of schools and academies which had rejected the university model. As national showplaces the universities required scholars of European reputation, not teachers or bureaucratic favorites. Altenstein and Schulze set out to recruit such scholars whenever possible.

In carrying out this policy Altenstein and Schulze employed a candidate's publications as the basis of his promotion. Professors submitted their new publications to the ministry for review, and these treatises received careful attention despite their increasingly esoteric natures.⁸⁹ Schulze defended this close attention to professors' publications, noting that these practices "have contributed not a little to establishing and maintaining a beneficial relationship between the minister and the authors in question. At home and abroad they have brought the ministry the reputation of honoring every learned endeavor in accordance with its merit, of recognizing and encouraging subordinate talent, and of knowing how to find the correct criteria for judging literary works."⁹⁰ Schulze used publications as the basis of an outspoken "publish or perish" policy. He would make no one a professor, he insisted, until "he has written a solid book, a work which one can display and reap honor from, a work one can stand on."⁹¹

Still another aspect of the ministry's direct, personal approach to

89. Altenstein's letters to Johannes Müller, for example, are intelligent and perceptive, and they reveal a close acquaintance both with Müller's publications and with the state of Prussian physiology. Manfred Stürzbecher, "Aus dem Briefwechsel des Physiologen Johannes Müller mit dem Preussischen Kultusministerium," *Janus*, 49 (1960), 273-284.

90. Quoted in Varrentrapp, pp. 488-489.

91. Quoted in Varrentrapp, p. 488.

university administration was its pronounced tendency to favor with financial support and quick promotion young scholars whose early work had particularly impressed it. Although this favoritism led often to inequities, it did encourage many young men to enter and to pursue scientific and professorial careers. Among the scientists whose early labors the ministry financed were Eilhard Mitscherlich, Ludwig Ferdinand Moser, Georg Friedrich Pohl, Franz Neumann, Heinrich Dove, Enno Dirksen, C. G. J. Jacobi, Friedrich J. Richelot, Julius Plücker, Ludwig Adolph Sohnke, Peter Gustav Lejeune-Dirichlet, Jacob Steiner, and Martin Ohm.⁹² Schulze's greatest find proved to be Johannes Müller, who had attended the Koblenz gymnasium from 1816 to 1818 while Schulze was director there, and who considered Schulze his "long time patron."⁹³

Continuing Wilhelm von Humboldt's policy, the Altenstein ministry regarded an intelligent policy of appointments as "the first and most difficult task in the administration of the German university."⁹⁴ The ministry went beyond Humboldt, however, to employ its appointive power as a tool to shape the universities as it thought best. Although the ministry used this tool most effectively in the philological and historical disciplines, it also brought significant results in the sciences, medicine, and mathematics. In 1826, for example, the ministry moved to counteract the provincial isolation of Königsberg University and to encourage the sciences there. It took the unprecedented step of offering two hundred thaler each to three *Privatdozenten*—Franz Neumann, Heinrich Dove, and C. G. J. Jacobi—as incentive to go to Königsberg to teach.⁹⁵ The appointments established Königsberg as the center of Prussian science and mathematics throughout the *Vormärz* era.

Very often the appointments of the ministry met much opposition, especially when they opposed vested interests and aimed clearly at altering the scientific makeup of the university. In the 1830's the

92. Schulze himself provides this list in his "Beiträge zur Geschichte des Ministeriums . . .," p. 302.

93. See the various letters of Müller to Schulze from 1830 to 1831 printed in Lenz, *Berlin*, 4, 529-531.

94. Schulze, in Varrentrapp, p. 486.

95. On the growth of science at Königsberg and the 1826 appointments see Hans Prutz, *Die königliche Albertus-Universität zu Königsberg i. Pr. im neunzehnten Jahrhundert* (Königsberg, 1894), pp. 152-173.

ministry set out to reform the Berlin medical faculty, which had become dominated by clinicians and practitioners.⁹⁶ The ministry desired to introduce a more scientific and theoretical approach to medicine, and it seized its first opportunity to do so after the death of the anatomist-physiologist Rudolphi. Although the medical faculty urged that no successor to Rudolphi's post be appointed and that his teaching duties (and his salary) be divided among the other full professors, the ministry, supported by the philosophical faculty, summoned Johannes Müller from Bonn in 1833 to fill the vacancy.⁹⁷ Müller's student Henle wrote enthusiastically of his call: "The high officials hope from him a violent shake-up in academic life, particularly in the study of medicine, formerly so indolent and mechanical here. His colleagues and especially his rivals feel his superiority and resign themselves to it, at least outwardly. His subordinates and the young instructors, who depend on him in part, cannot sufficiently praise his modesty, friendliness, and civility."⁹⁸ Because Altenstein had ignored the wishes of the medical faculty, Müller's appointment provoked indignation in Berlin, particularly among the numerous professors in the conservative party who held simultaneous, influential posts within the state medical administration.

Following his appointment Müller introduced a vigorous experimental activity in physiology and became the leader of the faculty's reform party which opposed the empirical, clinical approach to medicine. The final victory of the reform party occurred in 1839 when Müller and his followers compelled the faculty to nominate the clinical theoretician Johann Lucas Schönlein.⁹⁹ Although Altenstein hesitated to propose Schönlein to Frederick William III because of his suspect political background, Schulze persuaded both king and minister to call Schönlein to Berlin.¹⁰⁰ The reform of the Berlin medical faculty, accomplished largely through the controversial appointments of Müller and Schönlein, opened the way for the scientific work of Müller's students during the 1840's.

96. Lenz, *Berlin*, 2.1, 462-465.

97. Gottfried Koller, *Das Leben des Biologen Johannes Müller, 1801-1858* (Stuttgart, 1958), pp. 96-104.

98. Friedrich Merkel, *Jacob Henle. Ein deutsches Gelehrtenleben* (Braunschweig, 1891), pp. 102-103.

99. Lenz, *Berlin*, 2.1, 470-472.

100. Varrentrapp, pp. 469 ff.

As discipline-centered criteria replaced institution-centered criteria in university appointments, the various specialist-communities determined precisely what disciplinary standards would be imposed. Reluctant to consult the local faculties, the ministry looked more and more to the circle of specialists within a candidate's field for evaluation of his work and advice on the appointment. Such discipline communities had existed in the eighteenth century. Within their own circle they had developed well before 1800 new academic values which stressed intensive, specialized research and which existed alongside the older and more encyclopedic concept of scholarship prevailing in the universities. As these small communities became the chief advisers to the ministry, they were able, through the state, to impose their methods and standards of scholarship upon the entire university. By 1830 a candidate's reputation within his circle of specialists largely determined his academic success. In this way the extrinsic rewards of career and salary became harnessed to the intrinsic rewards of scholarly recognition and interaction, providing an additional powerful incentive to careers in scholarship and research.

Especially in mathematics and physics, areas in which they distrusted their personal competency, Altenstein and Schulze both looked to the respective scientific groups for advice.¹⁰¹ Jacobi's promotion to professor at Königsberg suggests the growing dependence of scientists upon the scholarly community. Having been appointed to Königsberg as a salaried *Privatdozent* in 1826, Jacobi wrote to Altenstein on 27 October 1827, requesting promotion and announcing that since arriving in Königsberg he had "won through brilliant

101. During the *Vormärz* period the ministry gradually established regular channels of contact with the various scientific communities. One such channel was Alexander von Humboldt, who after his return from Paris in 1828 became the chief mediating link between the state and its scientists. See Kurt-R. Biermann, "Über die Forderung deutscher Mathematiker durch Alexander von Humboldt," *Alexander von Humboldt, Gedenkschrift zur 100. Wiederkehr seines Todestages* (Berlin, 1959), pp. 81-159; Gerhard Dunken, "Alexander von Humboldt und der Plan der Gründung einer höheren technischen Lehranstalt in Berlin," *Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin. Mathematisch-Naturwissenschaftliche Reihe*, 8 (1858/59), 131-133. Another important mediator between the ministry and the Prussian scientific communities in mathematics and physics was A. L. Crelle, editor of the *Journal für die reine und angewandte Mathematik*. See Kurt-R. Biermann, "Urteile A. L. Crelles über seine Autoren," *Journal für die reine und angewandte Mathematik*, 203 (1959), 216-220.

discoveries a not insignificant reputation in the scholarly world, as Herr Hofrat Gauss in Göttingen and Herr Professor Bessel here will gladly attest to the ministry. . . ."¹⁰² After making inquiries with these mathematicians, the ministry granted the promotion on 16 January 1828.

Jacobi's promotion also illustrates the particular interest of the ministry in a candidate's Parisian reputation. Jacobi wrote later that his promotion had been decided by the recognition of his work by Legendre in Paris.¹⁰³ Jacobi had been in contact with the French mathematician over his elliptical functions, and Legendre had praised his work before the Parisian Academy in November 1827. Reprinted in various German journals and newspapers, Legendre's remarks had come to the attention of the ministry and had ensured Jacobi's advancement.¹⁰⁴ Concerning the ministry's respect for a foreign reputation, Alexander von Humboldt remarked that "in Germany one impresses a few great personages only through the reflection of one's reputation abroad."¹⁰⁵ Humboldt himself became the ministry's principal tool in assessing the Parisian reputation of scientists. In this manner the ministry's appointment policy stimulated the importation of French scientific methods and theories into northern Germany.

Only after bitter, repeated conflicts all during the *Vormärz* period did disciplinary values gradually replace institutional concerns as the principal criteria in professorial appointments. Many of Altenstein's most famous and most controversial appointments resulted in the clash of disciplinary and collegiate issues in the local universities. Shortly after Jacobi's arrival at Königsberg, Bessel had written to Gauss that "he has made almost all here his enemy because upon arriving he said something disagreeable to each one: he assured the born Königsbergers that he considered his present location an exile; to the philosophers he praised Hegel, to the philologists, Boeckh, everything in a manner for which no one will

102. Leo Koenigsberger, *Carl Gustav Jacob Jacobi* (Leipzig, 1904), pp. 55-56.

103. Koenigsberger, *Jacobi*, p. 57.

104. Koenigsberger, *Jacobi*, p. 44; Jacobi, *Briefwechsel*, pp. 5-6.

105. Kurt-R. Biermann, "Alexander von Humboldts wissenschaftsorganisatorisches Programm bei der Übersiedlung nach Berlin," *Monatsberichte der deutschen Akademie der Wissenschaften zu Berlin. Mitteilungen aus Mathematik, Naturwissenschaft, Medizin, und Technik*, 10 (1968), 144.

pardon him.”¹⁰⁶ Consequently when Altenstein called upon the Königsberg faculty to advise upon Jacobi’s promotion, it freely admitted the distinction of his mathematical achievements, yet recommended that the promotion be denied because of the “unsuitable manner in which he expressed himself concerning the university and its teachers.” The curator also noted Jacobi’s unpopularity resulting from his refusal to associate with any instructors except Bessel, Lobeck, and the younger *Privatdozenten*.¹⁰⁷

This clash between Jacobi and the Königsberg faculty had no basis in scientific issues, although by influencing Jacobi’s future its outcome might well have affected the development of mathematics in Prussia. Collegiate, not disciplinary, issues underlay the hostility, for whatever the validity of its sentiments, the faculty considered Jacobi personally unsatisfactory as a colleague with whom to live and work. Had the ministry valued collegiate criteria, or had the faculty’s influence been as strong as it had been during the previous century, Jacobi would certainly have remained a *Privatdozent*. In reality such concerns, however important to the faculty, meant nothing to Altenstein when compared to Jacobi’s burgeoning reputation abroad, and he quickly promoted the irascible mathematician. Such victories of disciplinary over collegiate criteria gradually established the former as the undisputed bases of professorial appointments.

The same confrontation of values can be seen in another of Altenstein’s famous appointments made, as was frequently the case, against the wishes of the faculty involved. Around 1820 the young physiologist Evangelista Purkinje attracted the notice of Goethe, Alexander von Humboldt, and Schulze for his treatise, *Beiträge zur Kenntniss des Sehens in subjectiver Hinsicht*. In 1821 the chair of physiology at Breslau became vacant, and the faculty nominated Gruithuisen for the post with the recommendation of the curator Neumann. The ministry, however, ignored the nomination and appointed the little-known Purkinje.¹⁰⁸

Purkinje’s subsequent career at Breslau was marked by continued

106. Koenigsberger, *Jacobi*, p. 27.

107. Koenigsberger, *Jacobi*, p. 56.

108. “Johannes Evangelista P. Purkinje,” *Allgemeine Deutsche Biographie* (Leipzig, 1888), 26, 717-718.

state support for the purchase of instruments, the prosecution of his researches into microscopic anatomy, and finally the founding of the Breslau physiological institute. Purkinje's relationship with the local faculty, however, began quite poorly. As in Jacobi's case, Purkinje's difficulties with the faculty reflected no confrontation over scientific issues. His colleagues generally applauded and supported his personal research as well as his pioneering efforts to teach physiology through experiments and demonstrations.¹⁰⁹ They objected, however, to Purkinje's inadequacy as a lecturer. The anatomist Otto complained in a report to the ministry in 1825 that Purkinje's courses attracted only handfuls of students, that his German was faulty and difficult to understand, and that his lectures confused students through their abstractness. In order to remedy these problems, Otto recommended that Purkinje be compelled to lecture in Latin and from a relatively elementary textbook. The curator Neumann suggested that Purkinje's efforts be supplemented by appointing the botanist Treviranus to give additional physiology lectures.¹¹⁰

The ministry, however, did not share the pedagogical concern foremost in the minds of the faculty. Schulze's reply to Otto's report not only refused to appoint a second physiologist but also instructed the curator to express to Purkinje the minister's special satisfaction with his research and experimental demonstrations. The minister felt sure, Schulze said, that Purkinje would eventually accustom himself to lecturing.¹¹¹ Through its decision the ministry again subordinated institutional to disciplinary values, even though in Purkinje's case the former involved the sensitive issue of effective teaching.

By the days of Helmholtz and Clausius in the 1840's the "dual nature" of the professorate had become a fact of academic life in Prussia; disciplinary reputation had become not only the accepted

109. When Purkinje began to accompany his physiology lectures with experimental demonstrations in 1824, the anatomist Otto, later Purkinje's opponent, provided laboratory space in the anatomy building. The *Prosektor* in anatomy Sehrig assisted Purkinje. The curator Neumann helped secure funds from the state to finance the demonstrations. (*ADB*, 26, 718-719.)

110. Hürthle, "Die Gründung des physiologischen Instituts in Breslau durch Joh. Ev. Purkinje . . .," *Allgemeine Medicinische Central-Zeitung*, 77 (2 January 1908), 72-73; Henry J. John, *Jan Evangelista Purkyně, Czech Scientist and Patriot, 1787-1869* (Philadelphia, 1959), p. 21.

111. *ADB*, 26, 719-720.

basis of promotion but also the standard of university competition. The letters of du Bois-Reymond and Karl Ludwig from midcentury illustrate the new professional outlook of that self-conscious generation of German scientists. Research and the publication of results dominated the activities of these men, relegating to insignificance the writing of textbooks, the publishing of compendia, and even the teaching of more elementary topics. Although much of even Johannes Müller's fame had been based upon his *Handbuch der Physiologie des Menschen*, in 1849 Karl Ludwig dismissed the writing of textbooks as "Dilettantenarbeit," and du Bois-Reymond sympathized with his "reluctance to give up your own research for the sake of a mere compilation (*Sammelwerk*)."¹¹² Not only did these men look upon achievement through specialized research as the single proper road to the professorship, but they also regarded it as prerequisite to effective teaching as well. Du Bois-Reymond wrote to Ludwig in 1849:

I would unconditionally prefer as a teacher the one-sided scholar who is nevertheless outstanding in his subject to the roundly educated man who has never really achieved anything. For the first—and this appears to me to be the main thing in teaching—will be permeated more deeply by the spirit (*Geist*) and the method of science (*Wissenschaft*) than the second, and will be better able to communicate them.¹¹³

The acceptance of these new professorial values was attested to most eloquently by the protests they provoked. They were met by bitter, sometimes pathetic pleas for a return to a simpler university oriented toward teaching and professional training in which rank had privilege and *Privatdozenten* kept their place. Old Ernst Bischoff, who had been a professor of Johannes Müller's at Bonn, angrily wrote in 1842: "The purpose of the university on the whole, however, is: teaching—the intellectual equipping of sages and leaders in the life of the state . . . in the three academic branches of the civil service. . . . According to such a concept teaching, not research into all higher knowledge, is recognized as the purpose and task of the German university."¹¹⁴ With passion and hyperbole

112. Du Bois-Reymond and Ludwig, *Briefwechsel*, pp. 36, 43.

113. Du Bois-Reymond and Ludwig, *Briefwechsel*, p. 42.

114. C. H. Ernst Bischoff, *Einiges, was den deutschen Universitäten Noth thut*, 2 vols. (Bonn, 1842, 1848), 1, 2.

Bischoff attacked appointment procedures which based promotions upon the results of a candidate's research rather than upon his teaching skill, his maturity, or his experience. No one, he claimed, could indulge in research without neglecting his pedagogical obligations. The "whirl of a premature, muddled literary officiousness" leads the professor "to deprive his teaching post of the best part of his intellectual means and achievement and to devote it to those confused, multifarious strivings after research and literary production characteristic of our time."¹¹⁵

His greatest scorn Bischoff reserved for the state-imposed principle of *Lehrfreiheit*—the right of every *Privatdozent* and junior professor to offer lectures in competition with full professors. This pernicious practice, Bischoff claimed, had not only deprived professors of their livelihoods and subverted every pedagogical value but had also introduced into the universities great numbers of arrogant, incompetent young men who justified their shallow pretensions and impotence as teachers with high-sounding but empty appeals to *Wissenschaft* and *Forschung*. The growth of their numbers was "one main source—if not the first and most important—of the deep confusion in academic studies today, as indeed of the entire university life."¹¹⁶

Such protests could not stem the new movement within the universities, however; they could only attest to its pervasiveness. By 1840 the new conception of the professorate which regarded research and disciplinary prestige as the supreme professorial values had permeated all the universities of Prussia. Viewed in historical perspective, obviously many factors, most of them introduced during the Prussian reform period, caused the spread and final victory of the movement. The *Wissenschaftsideologie* with its dynamic concept of learning and its emphasis upon creativity gave the new movement an ethical and epistemological basis. The triumphs of critical scholarship in classical and Germanic philology provided a disciplinary model. The critical, analytic tendencies inherent in this scholarly tradition largely dissipated the emphasis upon philosophical synthesis characteristic of the early *Wissenschaftsideologie*. Finally competition within and among the universities ensured that the new

115. Bischoff, *I*, 3-5.

116. Bischoff, *2*, 19.

professorial values, once established, would rapidly be propagated throughout the university system.

As this study has emphasized, however, the state's new, aggressive control of professorial appointments acted as a third, equally important stimulus to the rise of the new professors. It became the specific institutional mechanism through which the new scholarly values—induced partly by ideological and competitive pressures—came so quickly to dominate the universities. More important, the state's appointment policy promoted these values directly. By stressing disciplinary criteria over the collegiate and pedagogical concerns of direct interest to the local, corporate university, the state gradually established the disciplinary criteria as accepted professorial norms. These scholarly values introduced and sustained the dualistic professorial role in Prussia and with it the emergence of the Prussian university as a center of research.