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Debate as Scientific Practice in Nineteenth-Century Paris: The Controversy Over the Microscope

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This article explores debate as a key scientific practice among the medical elite in nineteenth-century Paris, with an emphasis on academic debate and debate in the scientific/medical press. I use the debate over the microscope, which took place in the Paris Academy of Medicine in 1854–55 and concurrently in the medical press, to illustrate the role of debate as scientific practice. Focusing on the debate in the press, I show how medical journalists used the debate in the Academy to raise larger questions about the nature of science and medicine and to legitimate French microscopy. I suggest that debate was an important scientific practice in nineteenth-century Paris, not only owing to a longstanding belief that truth emerges through disputation but also depending on and exemplifying a shared masculine culture of honor.

> Medical disputes . . . are the inevitable accidents of scientific progress. They are like storms which purify the atmosphere; we must be resigned to them."
>
> Jean-Baptiste Bouillaud, 1836

Introduction. Debate as Scientific Practice in Nineteenth-Century Paris

This article focuses on debate as a key scientific practice among the medical elite in nineteenth-century Paris, with an emphasis on academic debate and debate in the scientific/medical press. By debate, I mean both public exchanges at the Academy of Medicine, which followed a prescribed format and allowed members to show off their rhetorical skills and polemical writings in medical journals, in this case the outlet for those non-members who could attend Academy meetings but not participate in them. The case study comes from Paris, still in the mid-nineteenth century the center

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of European science. Paris was undisputed as the European center of science and medicine up to the mid-1830s, but for many scientists, such as the German physiologist Emil du-Bois-Reymond, Paris still held this position at mid-century (Finkelstein 2003). No other city, no other academies besides the Paris Academy of Medicine and the Paris Academy of Sciences could claim as much.

We will use the debate over the microscope, which took place in the Paris Academy of Medicine in 1854–55 and concurrently in the medical press to explore the role of debate as scientific practice. In so doing, we shall examine the controversy over the microscope and show how physicians used this debate over the diagnostic utility of an instrument to raise larger issues about science and medicine at mid-century. We will investigate the function and value of debate for contemporaries and discuss its importance as a scientific practice.

We will begin by briefly exploring the early nineteenth-century French microscopy community, a topic I have dealt with in detail elsewhere (La Berge 1994). Next we focus on the microscope as a contested technology by reviewing the controversy within the Parisian microscopy community at mid-century that culminated in the debate over cancer and the microscope at the Academy of Medicine in 1854–55. I have earlier analyzed both these topics within the context of Paris clinical medicine (La Berge 1998). My focus in this article will be the wider debate, which took place in the medical press concurrently with the debate in the Academy. I will show how medical journalists used the debate in the Academy to raise larger questions about the nature of science and medicine at mid-century and to legitimate French microscopy. This article will examine the issues they discussed and then address the nature and purpose of academic debate. I will argue that debate, both in the Academy and in the scientific/medical press, was an important scientific practice in nineteenth-century Paris, not only owing to a longstanding belief that truth emerges through disputation but also depending on and exemplifying a shared masculine culture of honor (Nye 1993).

I. The Paris Microscopy Community

Although physicians, naturalists, and amateurs had used the microscope since the seventeenth century, physicians at the Paris School (Ackerknecht 1967; Hannaway and La Berge 1998) did not use the instrument until the 1830s.[1] Physicians did not employ the microscope for several reasons.

1. I use the term Paris School to refer to the Ecole clinique de Paris, the Paris Clinical School, or, as Erwin Ackerknecht called it, the Paris Hospital, a term encompassing the whole conglomerate of hospitals, teaching institutions, professional institutions, private

First, within the context of the dominant theories of disease causation, which emphasized environmental/climatic causes, the microscope offered little. Second, most French physicians subscribed to a philosophy of radical empiricism, which privileged the use of unaided senses in observation. Third, the available microscopes were hard to use, requiring considerable skill and training. Support technologies, such as fixing and staining, that would revolutionize microscopy after mid-century, were undeveloped. Neither physicians nor surgeons saw the microscope as a useful instrument, since it could not help them diagnose or treat disease.

According to nineteenth-century French physicians' accounts, two changes in the 1820s brought the microscope increased prominence in medical circles by the early 1830s. First, the pathological-anatomical orientation of French medicine with its search for local sites of disease opened the way for a consideration of the research potential of the microscope.[2] The belief that one could dissect body fluids, in addition to organs and tissues, to detect disease suggested that the microscope might become an important research tool for physicians. Second, the introduction of the new achromatic, compound microscopes in the 1820s increased the accuracy and reliability of the instrument. French naturalists were already using simple microscopes in their work, and some of them began to teach microscopy to colleagues, including physicians. These researchers developed improved methods of specimen preparation, and these technological and pedagogical developments, along with the conceptual orientation of pathological anatomy, provided a context in which by the 1830s microscopes became more attractive as research tools (La Berge 1994).

By the 1830s a few Parisian physicians started using the microscope for research. Alfred Donné used the instrument to examine body fluids; Pierre Rayer performed microscopical and chemical analyses of urine. But most physicians found the microscope difficult to use and weren't sure how it could help them. More widespread interest in medical microscopy dated from 1837, when a Belgian physician, Gottlieb Gluge, sent his microscopical work on tumors to the Academy of Sciences, and Donné began offering the first public microscopy course in Paris. Gluge's paper opened a debate on tumors, which lasted well into the 1850s, and Donné's course allowed physicians and medical students to learn to use the microscope. By the late 1830s physiologist and pharmacologist François Magendie was using the instrument as a teaching tool in his physiology classes, and phy-

courses, and of course the Paris Faculté de médecine. Physicians and surgeons holding important positions at the Paris School—and those aspiring to because of their education and professional networking—constituted the medical elite.

2. Pathological anatomy was the correlation of symptoms observed at the bedside with postmortem observations made with the naked eye.

sicians Gabriel Andral and Jules Gavarret were analyzing blood with the microscope. By the 1840s, in addition to Donné, there were three other microscopy teachers—all trained as physicians—in Paris: a German, Hermann Lebert, and two Hungarians, David Gruby and Louis Mandl. In addition to their teaching, all were active in medical research. These teachers and researchers, along with their students and the clinicians and surgeons with whom they collaborated, formed the Parisian microscopy community and began to develop their own professional point of view regarding the role of microscopy in Paris clinical medicine (La Berge1994, 1998).

By the early 1840s some Parisian physicians were using the microscope as an aid to diagnose diseases of the skin, blood, kidneys, and urogenital system. For example, Andral and Rayer used microscopical and chemical analysis to examine blood and urine. Donné discovered the parasitic protozoon that causes one common form of vaginal infection, thereby increasing diagnostic accuracy. He also identified the disorder characterized by an excess of white blood cells, which later became known as leukemia. David Gruby and veterinarian Onésime Delafond discovered plant and animal parasites that cause some skin and blood diseases in humans and animals. Clinicians and microscopists such as Andral, Rayer, Donné, Mandl, and Lebert sought to incorporate microscopy and a neohumoral approach into pathological anatomy. They argued that the microscope would promote progress in pathological-anatomy, which had first focused on the naked-eye examination of organs, then tissues, now body fluids and what physicians called globules or cells. Examination of body fluids required either chemical or microscopical analysis or both, and observers had to use microscopes to study globules or cells. Microscopists argued that the instrument was a natural extension of pathological anatomy and pathological physiology, requiring new skills but no major conceptual adjustments. Microscopical examination, they contended, fell well within the pathological-anatomical tradition that dominated Paris medicine (La Berge 1994, 1998).

There was, however, no consensus among the Parisian medical elite about the advantages of microscopical pathological anatomy and physiology. Physicians and surgeons debated whether microscopical observation of tumors, for example, revealed any more than naked-eye observation. Unless the microscope offered clear and agreed-upon benefits for the practice of medicine and surgery, many physicians and surgeons concluded that there was no compelling reason for them to use the instrument.

II. The Controversy over Cancer and the Microscope

By the 1840s the microscope was becoming a contested technology within the Parisian medical elite. Two main issues were controversial:

the nature of cancer—or malignant and benign tumors in general—and the use of the microscope to diagnose cancer. Related to both issues and impinging on them was microscopist Hermann Lebert's theory of the specific cancer cell. Physicians and surgeons debated these issues at the Academy of Medicine in 1843–44 (*Bull. de l'Acad. de méd.* 1843–44), and then in 1845 Lebert published his *Physiologie pathologique* (Lebert 1845) in which he proposed his theory of the specific cancer cell. Both the academic debate and the book broadened the controversy over cancer and the microscope. Physicians and surgeons became increasingly uncertain about the use of the instrument in the study of tumors, and a deep division developed within the Parisian medical elite. It was not clear to them how the microscope might be incorporated into pathological anatomy and clinical medicine without threatening the foundations of both and their practitioners.

The problem introduced by the microscope into the study of tumors involved their classification—a prerequisite for diagnosis. Would tumors be classified according to gross and microscopical structure or clinical observations? According to physician and microscopist Paul Broca (M.D. Paris, 1849), some clinicians and surgeons claimed there was no parallel between a tumor's anatomical characteristics as revealed by the microscope and its clinical characteristics, and they argued that microscopical findings were illusory. Broca, a student of Lebert, who became the leading Parisian spokesman for microscopy in the late 1840s and the 1850s, accounted for this disagreement over tumor classification in two ways. First, he conceded that the microscope complicated diagnosis and prognosis. Secondly, he admitted that the new microscopical approach required the use of an instrument that was difficult to handle and required its users to have special training. Later recalling the history of the controversy over the microscope, Broca commented: "Disrupting thus all habits, it could not count on the welcome that is ordinarily accorded to new views, in a profession where progressive men are in the majority" (Broca 1866, 1: x–xi).

In his *Physiologie pathologique,* Lebert proposed a classification based on microscopical pathological anatomy, an approach he saw as a continuation of traditional gross, i.e., naked-eye, pathological anatomy. But some physicians and surgeons opposed the new orientation, because they feared that accepting microscopical anatomy meant abandoning gross pathological anatomy for a new, unproved method that produced unreliable results. Recounting the history of this era, Broca claimed that the publication of Lebert's book brought on a deep division between surgeons who were willing to take pathological anatomy to the microscopical level and those who were not:

> As long as microscopy remained a speculative science, the surgeons welcomed it with a benevolent curiosity. . . . But when they were confronted with the practical application, when they saw that it was necessary to distinguish two types [of tumor] at the bedside, when they saw [clinical] diagnosis weakened daily by the findings of the microscope, then resistance began.
>
> At first they wanted to contest the exactitude of microscopical observations. You heard eminent professors . . . pretend that the microscope was a misleading instrument, and that with a little imagination you could see whatever your wanted to see. I was even obliged to devote part of my M.D. thesis (1849) to the refutation of this singular nonsense. Soon, however, it was necessary to change the language. They wanted to recognize that microscopical observation was exact, but they added that it was useless; that pathological tumors were characterized by their color, their consistency, their exterior structure, in short, by characteristics confirmed by naked-eye observation, and not at all by the molecular appearance of atoms that the microscope showed (Broca 1866, 1: 40).

Broca argued that these objections were valid, but maintained, as had Lebert, that naked-eye observation coincided with elementary differences revealed by the microscope. Like Lebert, Broca placed microscopy squarely within the tradition of pathological anatomy, in an effort to resolve the dispute and satisfy the dissidents (Broca 1852). His efforts failed, and the controversy over the microscope widened. Ironically, part of the reason skepticism increased was that microscope usage became more widespread among Parisian physicians and surgeons. Surgeon Alfred-Armand Velpeau, for example, dated 1847 as the beginning of the era when the microscope came into general use among the Parisian medical elite. Velpeau claimed that from that date he submitted all the tumors he removed to micrographers for microscopical examination (*Bull. de l'Acad. de Méd.* 1854, p. 30).

Yet while some physicians and surgeons were contesting the utility of the microscope for distinguishing malignant from benign tumors, doubts about the instrument in other areas of medical research and practice began to dissipate. For example, by the early 1850s most Parisian physicians and surgeons recognized the utility of the microscope for diagnosing skin diseases and examining body fluids for diagnostic purposes. Still controversial, however, was the microscope's usefulness in diagnosing cancerous tumors, an issue debated at the Surgical Society of Paris in 1852–53 and further analyzed in Velpeau's 1854 *Traité des maladies du sein* (Velpeau

1854). The whole controversy over cancer and the microscope, dating from the debate in the Academy of Medicine in 1843–44 and including the ensuing ten years of controversy, culminated in the 1854–55 debate at the Academy of Medicine and in the wider medical press. This debate brought into the open the main tensions between microscopists and clinicians and provided an opportunity for participants to raise larger questions about French science and medicine at mid-century (La Berge 1998).

III. The Debate at the Royal Academy of Medicine, 1854–55

The debate over cancer and the diagnostic utility of the microscope took place at the Academy of Medicine from October 1854 to January 1855 (*Bull. de l'Acad. de Méd.* 1854–55). At stake for Velpeau and others was the role of microscopy in Paris clinical medicine. The larger issue, embraced by all involved in the debate, was the current state and future direction of French medicine. Would French clinical medicine remain "faithful to its old traditions"[3] or would it move in the direction of scientific laboratory medicine, symbolized by the microscope and associated with a German approach? The debate, both in the Academy and in the medical press, took place within a larger ongoing debate over national styles of science and medicine—French and German—which began to appear in the medical literature in the 1840s. From the 1840s the "republic of microscopy"—the international microscopy community of the first half of the century—began to be challenged by and finally give way to a rising nationalistic fervor. The French, feeling threatened by German nationalism, adopted a defensive posture.[4]

Velpeau's student François Follin argued that Velpeau wanted the debate and found a pretext for it in order to bring into the open the questions that had obsessed the Parisian medical elite for ten years over cancer and the usefulness of the microscope in diagnosing cancer. Follin explained how Velpeau found a pretext for the debate. Dr. Pamard from Avignon sent a report to the Academy in which he claimed that a baby was cured by the removal of a cancerous tumor. Surgeons Velpeau and Robert disagreed as to whether cancer was curable or not. Further, Velpeau disputed the microscopists' claim that one could not diagnose cancer without determining its microscopical characteristics in advance. This disagreement set the stage for the two issues before the Academy: the

3. Hecht 1876, cited in Harvey 1998.

4. Increasing feelings of scientific inferiority were accompanied by a national discourse on degeneration and decline which dated from the 1850s. See Nye 1984 and Dowbiggin 1991. In the 1860s French physicians would defend their science and medicine by creating and claiming their own scientific heroes. For more on this, see La Berge and Hannaway 1998.

incurability of cancer and the value of the microscope in tumor diagnosis. So Velpeau, representing the original Paris School, (Ecole clinique de Paris) took on the group he called "the Young Paris School," the young clinicians François Follin, Aristide Verneuil, and Paul Broca, all students of Lebert, who practiced and promoted microscopy (Follin 1854, pp. 602–03).

The Academy proposed two questions for debate: first, was the microscope useful for diagnosing cancer, and second, was cancer curable? Although both questions provoked vigorous debate, we will focus on the controversy over the microscope and the larger issues it provoked. The academicians constructed the debate according to a prescribed format by pitting one adversary against another and dividing the speakers up informally into pro- and anti-microscopy camps. Dividing Academy members into two opposing camps exemplified the military rhetoric employed in the debate, but did not reflect the reality of the controversy. In fact, no one declared himself an opponent of the microscope. The academicians' rhetoric suggests that by the mid-1850s, it was important within the Parisian medical elite for all to claim to be pro-microscope, even if questions remained.

Both Velpeau and physician Jean-Baptiste Bouillaud, who emerged as the principal critics of some aspects of microscopy, presented their microscopy credentials dating from the 1830s. Bouillaud, exhibiting his oratorical skills, declared himself "un ami du microscope," and described himself as a "microscophile." The first area of disagreement over the instrument was practical. While the academicians readily acknowledged most scientific applications of the microscope, they disputed its use in the diagnosis of cancer. And underlying this dispute was a disagreement over Lebert's specific cancer cell.

The principal speakers were Velpeau, head surgeon at the Charité hospital, a specialist in tumors of the breast, surgeons Robert and Malgaigne, and Bouillaud, pathological anatomist, specialist in diseases of the heart and brain. With the exception of the aged veterinarian Delafond, no microscopists participated in the debate at the Academy, because none were members. Most of the first generation of microscopists, the original Paris microscopy community, had left Paris: Donné moved to Montpellier to work in educational administration, and Lebert accepted a clinical post in Zurich. Gruby had abandoned microscopy research and teaching to devote himself full-time to private practice. Mandl was only peripherally involved, writing a letter to the Academy clarifying his position on the specific cancer cell (Mandl 1838–1857, 2: 357–58). In any case, none of the first generation had been members of the Academy. The second generation of microscopists, Lebert's students—Charles Robin, Broca, François Follin

and Aristide Verneuil—were too young to have been elected to the Academy (La Berge 1994, 1998).[5]

Broca, Follin, and Verneuil attended the debates, however, as reporters for major Parisian medical journals. Broca emerged as the leading spokesman for the second generation of clinician-microscopists. Although Lebert had defended both the microscope and his theory of the specific cancer cell before the Surgical Society of Paris in 1852, in 1854 he was not present at the Academy debate. And yet, Lebert's postulation of a specific cancer cell and his elevation of the cancer cell to an overarching system, along with his re-classification of tumors, became a main focus of attacks by Bouillaud and Velpeau.

Velpeau presented the principal arguments against using the microscope to diagnose cancer. He recalled that in the early days of medical microscopy (the 1830s), surgeons like him had hoped they might identify cancer by a microscopical analysis of the blood, making a pre-surgical diagnosis possible. These hopes had been dashed. Twenty years later, diagnosis was still impossible for internal cancers, and whether a tumor was cancerous or not could only be decided postmortem. Velpeau argued that microscopical examination was useful for pathology, but not for diagnosis. He pointed out that microscopists could examine specimens from tumors considered external, such as breast cancer and skin cancer, and make a diagnosis. But he asserted that diagnoses founded upon clinical—that is, naked-eye—observation of the patient, were superior to those based on microscopical examination of a tumor section. Furthermore, Velpeau, who had for fifteen years worked closely with Lebert and his students by furnishing them with specimens to examine under the microscope, argued that microscopists had made diagnostic errors and regularly disagreed with each other. Using the microscope, they had failed in some cases to recognize cancerous tumors and, conversely, they had found some benign tumors cancerous. Thus, Velpeau contended that he distrusted microscopical analysis of tumor sections and doubted that the microscope had any practical value for surgeons.

The second part of the dispute was directed at Lebert's theory of the specific cancer cell. Both Bouillaud and Velpeau attacked Lebert's theory, accusing its defenders of deducing observations from theory and arguing

5. Charles Robin, who received his M.D. from the Paris Faculty of Medicine in 1846, was a student of Lebert in the 1840s. Following a different career trajectory from the clinician-microscopists, he focused on laboratory science, in particular, histology. He was appointed to the Chair of Natural History at the Faculty of Medicine in 1849 and a Chair of Histology was created for him at the Faculty in 1862. He was not part of the debate over microscopy (Pouchet 1886).

that no observations supported it. Velpeau accused Lebert of creating yet another system—the usual charge levied against opponents of one's point of view. Like many of his colleagues, Velpeau made good rhetorical use of a generalized fear of medical systems. He argued that the observational, empirical approach of Paris clinical medicine had liberated medicine from philosophical systems, which were negatively associated with eighteenth-century philosophical medicine, German medicine, and the recent memories of Broussais' "physiological medicine" which had divided the Parisian medical elite earlier in the century (La Berge 2002). Velpeau's strongest charge was that Lebert, and his students, by importing a German philosophical approach, threatened the integrity of French clinical medicine. He reminded the audience that Parisian clinicians and surgeons were diagnosing cancer long before microscopists began examining tumor fragments. Nor, he asserted, could Lebert's theory of the specific cancer cell be supported by clinical evidence. Velpeau accused Lebert and his students of wanting to replace the well-established tradition of Paris clinical medicine with an as-yet unproved laboratory—that is, German—medicine.

Yet in the end, Velpeau conceded that microscopy might be incorporated into Paris clinical medicine and in a spirit of noblesse oblige welcomed the young microscopists into the clinic. Both clinical and microscopical observations should confirm each other, he suggested. Microscopy belonged in the clinic to be practiced by clinicians. Velpeau's reconciliation was critical, for it was important for all concerned that at the end of the debate the solidarity of Paris Medicine and its future direction be affirmed and defended. The clinic could appropriate and incorporate microscopy without losing its integrity. French medicine could remain French.

IV. The Debate in the Medical Press

In an 1855 letter to the *Gazette hebdomadaire de médecine et de chirurgie,* German physician-microscopist Rudolf Virchow pointed out that the debate over cancer and the microscope was taking place not only in the Academy of Medicine, but also in the medical press (Virchow 1855). Indeed that is where the microscopists had their say, along with medical journalists such as Jules Guérin and Louis Peisse. The principal commentators were the so-called Young Paris School, the "triumvirate" of Follin, Verneuil, and Broca. Each chronicled the debate for a major Parisian medical journal. All these commentaries were part of the wider debate going on in Paris.

The account of François Follin, Velpeau's medical student, appeared in the *Archives générales de médecine,* beginning in November 1854. The report

of Aristide Verneuil, Agrégé at the Faculty of Medicine,[6] was published in the *Gazette hebdomadaire de médecine et de chirurgie* beginning on 13 October 1854. Both Follin and Verneuil began their coverage and analysis of the debate by briefly reviewing the history of medical microscopy in France (Follin 1854, p. 601; Verneuil 1854, pp. 934–935). Broca reported on the debate for the *Moniteur des hôpitaux.* Broca's situation differed from that of Follin and Verneuil, since he had been chronicling the introduction of and controversy over medical microscopy in France since 1849, first in his M.D. thesis and then in his 350-page essay on cancer, which won the Academy of Medicine's Prix Portal.[7] (Broca 1852) He would later provide a fuller account of the history of medical microscopy in France in his two-volume *Traité des tumeurs* (Broca 1866).

Physician and orthopedist Jules Guérin (1801–1886), editor of the *Gazette médicale de Paris,* wrote a series of articles on the debate for that journal. On a number of issues his analysis diverged from that of the microscopists, thus enriching our study of the debate. Medical journalist Louis Peisse, one of the most astute observers of the Paris medical scene, was a contributor to Guérin's *Gazette médicale de Paris,* in which he wrote a regular column, "Feuilleton." His analysis of the microscopy debate appeared in the *Gazette médicale de Paris* concurrently with that of Guérin.[8]

This wider debate in the press is of great interest to science studiers, since these medical journalists used the Academy debate on cancer and the microscope as an opportunity to raise larger questions about science and medicine at mid-century. They addressed specific issues such as the importance of pathological anatomy in French medicine, the current state of science, the professional position of microscopy and its role at the Paris School, a comparison and analysis of French and German microscopy, including a discussion of cell theory, the relation of medical science to medical practice, the nature of science and scientific progress, and the function of consensus and disagreement in science. Just as in the Academy debate,

6. Agrégés were assistant professors who could then compete for clinical or surgical positions at the Faculty of Medicine when they became available.

7. The Prix Portal was a prize for the best essay on an assigned topic in pathological anatomy. The funds had been contributed by Antoine Portal (1742–1832), the founder of the Academy of Medicine and its first permanent president. On the Prix Portal and other prizes offered by the Academy of Medicine, see Weisz (1995, pp. 98–100).

8. Parts of his two articles dealing with the debate were later published in his two-volume work, *La médecine et les médecins,* published in 1857. That work contained many of his columns that had appeared in the *Gazette médicale de Paris.* However, in the case of the microscopy debate, his coverage in the journal was more thorough, so we shall rely on the two journal articles.

in the wider debate in the press the comparison of French and German medicine and a defense of French medicine constrained and underlay the medical journalists' analyses. Their commentaries, in their own words, provide valuable analyses of science and medicine at mid-century.

Our commentators agreed that the dominant orientation of French medicine was pathological anatomy. Assessing French medicine at mid-century, Broca was clear about its principal approach: " . . . pathological anatomy reigns today without dispute in all the schools . . . " (Broca 1854, p. 986). He used the example of pathological anatomy to convey his understanding of what made an area of investigation a science and what conditions allowed a research area to be widely appreciated. According to Broca, pathological anatomy did not qualify as science: " . . . pathological anatomy has not yet deserved the name of science. It has generalized nothing; it has uttered no principle and has not been the point of departure of any doctrine; but also it has not offended anybody. That is why it has enjoyed general esteem" (Broca 1854, p. 985). Thus for Broca science was a form of knowledge that had reached generalizations, that had principles and that functioned as a catalyst for a particular doctrine. And he added, suggesting a socio/cultural dimension, that pathological anatomy had not offended and for that reason—rather than because it could lay claim to being a science—it enjoyed general esteem.

Verneuil, while recognizing the dominance of pathological anatomy, emphasized its limits: "However, the field of pathological anatomy has its limits. And who denies it? Who, then, among us pretends to recognize, in the present day and by [using] the senses, viruses, miasms, pure dynamic troubles? Nobody" (Verneuil 1854, p. 1071). What Verneuil meant was that physicians' use of the senses of touch, smell, and especially vision, had not made possible the recognition of viruses, miasms and physiological phenomena. Hence, naked-eye observation, as practiced by pathological anatomists, was limited, narrow in orientation. Guérin agreed with Verneuil, contending that pathological-anatomy had worn itself out, had reached, as Ackerknecht would put it, a "dead end" (Ackerknecht 1967). What was needed, Guérin suggested, was a new orientation, an etiological approach. Researchers ought to move from describing disease to finding its cause: "There would, however, perhaps be a means of extricating [ourselves] from this impasse where partisans and adversaries of the microscope exhaust themselves in sterile efforts. We are going to try to indicate this method: it is etiological research substituted for anatomical examination" (Guérin 1854, p. 672). Guérin asserted that the anatomical approach inaugurated by Xavier Bichat early in the century, which had eschewed causality in favor of description and correlation, exemplified by pathologi-

cal anatomy, the pride of the Paris School in the first half of the nineteenth century, was in need of reinvigoration, of a new orientation. That orientation would not be just the addition of microscopy to pathological anatomy; rather he called for a new frontier focusing on disease causation.

In his consideration of microscopy practiced within the context of pathological anatomy, Guérin characterized the current state of science: "the scientific tendency of our epoch, above all concerning medicine, is to materialize observation . . . *Matter* and *the senses* [his italics], such is the most general expression of contemporary scientific research." Within this context he discussed the microscopists' efforts to understand cancer: "Don't we have the most illustrious confirmation in the efforts attempted with the microscope for the determination of cancer? Our immediate predecessors, that is to say, the pathological anatomical school, regarded matter with the naked eye, they dissected it with the aid of the scalpel; the micrographers look at it under the lens, they dissect it on the stage of the microscope" (Guérin 1854, p. 671). Guérin wondered if the microscopists were really doing anything new. Weren't they doing the same thing as pathological anatomists, but on a different level? "Isn't it the same research procedure, with this difference that instead of examining only a *small fragment* [his italics] externally, the anatomical-pathological school looked at the *whole thing* [his italics] from the inside and outside?" And what, in fact, had the pathological anatomical approach accomplished? In a serious indictment of the current state of pathological anatomy and of the Paris School more generally, he queried: "Now what has this school produced, which has had so much influence and repercussion? One orator said it in the last session [at the Academy]: nothing or almost nothing . . . That meant, it seems to us, that the path where these elite minds lost their way was not that of real progress." He portrayed the microscopists as proceeding along the same worn-out, non-progressive path as the pathological anatomists, asking: "Now what are those they call the Young Paris School doing, if not following their immediate predecessors the anatomo-pathological school, with this difference, we repeat, that they look at organic molecules instead of the whole organ, and they use the microscope in place of the naked eye." Thus Guérin, unlike the microcopists, predicted little progress for microscopy practiced within the context of pathological anatomy: "One can thus predict, without departing from rigorous induction, that pathological anatomy continued by the microscope will not end up richer or [provide] more certain results than those obtained by pathological anatomy which used the naked eye exclusively" (Guérin 1854, p. 671 for all above quotes).

The medical journalists focused on the role of microscopy and the professional position of the microscopists within Paris medicine. Broca real-

ized that in order to give the microscopists legitimacy,[9] it was important to establish filiation with the Paris School. Hence, he challenged Velpeau's charge that the microscopists constituted a new school: "It is the case that the clinical micrographers do not constitute a new School, and that the Young Paris School, as M. Velpeau calls us, is only the legitimate daughter of the anatomical School to which belong most of our masters" (Broca 1854, p. 1110). Broca emphasized that the micrographers sought acceptance from their colleagues and the public: "the constant goal of our efforts, is to succeed in convincing everybody that we are perfectly orthodox members of the great School of Laennec and Morgagni" (Broca 1854, p. 1111). He contended that the micrographers considered microscopy an extension of pathological anatomy. "The Young Paris School, full of deference . . . has entered without hesitation the path which was open to it . . . by exploring a new small area of pathological anatomy it would do useful work . . . " (Broca 1854, p. 986). But Broca vowed that if their colleagues continued to reject the microscopists as outside the dominant orientation of Paris medicine, then they had no choice but to establish their independence: "so long as the microscope is systematically repulsed by the official representatives of science and by the heads of the anatomical School, the men who cultivate pathological histology will be obliged to resign themselves to making a separate School" (Broca 1854, p. 1111).

The French-German discourse assumed a major importance in the medical journalists' analysis. They used German medical microscopy as a way of delimiting and defining French microscopy. Whatever was German was "the other," what the French were not. Verneuil used methodology as a "way in" to contrast French and German microscopy, suggesting that the distinguishing feature and the principal attribute of French microscopy—and indeed of French medicine more generally—was its methodology, which he characterized as: "Observation . . . without hypothesis." He pointed out that "the [French] micrographers have acquired many new notions, corrected several errors and explained practical facts up to now *without theory*" [my emphasis] (Verneuil 1854, p. 935). Verneuil argued that French researchers were a-theoretical and observational by contrast with the Germans who were both theorists and systematizers. Cell theory was a German invention, he claimed, and most French surgeons and micrographers rejected it, "since this unfortunate cell cannot find refuge as a distinct species, either in the camp of the surgeons, or in that of the rare micrographers whose voice is heard in the Academy" (Verneuil 1854, p. 1039).

9. On microscopists' earlier efforts to achieve legitimacy, see La Berge (1994, 1998).

Broca explained how he saw the difference between the French and German schools of microscopy:

> Pure micrographers exist only in Germany. The French School, on the contrary, of whom we can consider M. Lebert as the founder, has always allied the microscope with the scalpel, and pathological anatomy with the clinic. This is even the cause of dissidences which exist between us and the German observers . . . The micrographers are divided into two schools: the German School and the French School, or moreover the School of pure micrographers and that of clinician micrographers (Broca, 1854, 946–47).

Broca described how the micrographers at the Paris School pursued an integrated approach of pathological anatomy, the clinic, and the microscope and how, by using this method, "they found . . . [that]these microscopical characteristics coincide with characteristics visible to the naked eye" (Broca, 1854, pp. 946–47). The French approach was clearly superior.

Broca attributed the main disagreements between German and French micrographers not to methodology, as had Verneuil, but rather to cell theory, which French investigators had considered, Broca claimed, but then, with few exceptions, dismissed: "The cell theory only glittered among us with a momentary brightness. But Germany which gave birth to it, is still under its influence. . . . this is the principal cause of the divergences which exist between the German and the French micrographers. Blinded by their unitary theories, our neighbors across the Rhine do not accept the specificity of diverse cells" (Broca 1854, p. 986). The cell theory, then, according to Verneuil and Broca, was at the root of the main disagreements between the French and German schools of microscopy. Follin, for his part, tried to solve the problem by boldly announcing the death of the cell theory: "Today the cell theory has had its day, and German and French micrographers agree in recognizing its insufficiency." (Follin 1855, 1: 108)

Cell theory provided the context for the disagreement over Lebert's theory of the specific cancer cell. Broca noted that many German and English micrographers rejected Lebert's theory (Broca 1854, p. 1074). But while most European microscopists denied the existence of a specific cancer cell, Lebert and his students defended it. Velpeau also rejected the specific cancer cell, and the argument over it was a key feature of the debate in the Academy, where Velpeau made the following point: "You want to diagnose cancer with your cell, but this specific cell does not exist; and the proof is that in Germany and in England where there is no lack of micrographers they have not found it . . . " (Broca 1854, p. 1174).

Louis Peisse took a different approach from that of the microscopists,

satirizing both the cancer cell and the microscopists: "As many observers, as many responses. To what has the microscopical study of cancer led after ten years of the research of twenty investigators? To the invention of the most problematic Cell and which, supposing it [were] real, would be theoretically of a very mediocre importance and of practically no utility." For Peisse, not only did pathological anatomy have its limits, as Guérin and Verneuil had suggested, but so did microscopy: "It is not to do wrong to the microscope to limit its legitimate use to a certain order of research" (Peisse 1857, 1:184). But at the same time Peisse recognized that microscopy was à la mode. In spite of the controversy over the instrument, he maintained that the microscope cut a pretty figure on the stage of contemporary science: "It is in style (because there are also styles in scientific processes and methods) and shares the favor which chemistry enjoys at this hour." Microscopy was in style, according to Peisse, because it strengthened the privileged position of science. Using microscopy as an opportunity to discuss his ideas about the nature of science, he proclaimed:

> Science is always a bit formal . . . it always keeps its distance from the *profanum vulgus,* and would not want its methods of investigation, its logic, its experiments, to be confounded with popular reasoning and knowledge. The microscope has something of the *occult* [his italics] which flatters this tendency; its real difficulties, which discourage the largest number [of investigators], give it an air of mystery which inspires curiosity and deference (Peisse 1857, 1: 185).

Ignoring popular microscopy and focusing on both science and microscopy as an enterprise for the elite, Peisse took science to mean elite, expert knowledge. Socially, science was a restricted club into which one had to be initiated. The microscope fit into Peisse's understanding of science since he saw it as occupying a privileged position. Not everyone could use it; it required special skills. Drawing an analogy between microscopy and alchemy, he commented that the instrument seemed to him secretive, mysterious, only available to a few initiates.

The medical journalists disagreed about the relationship of medical science, by which they meant medical research, to medical practice, or clinical medicine, and in which area the microscope might be most useful. At the Academy of Medicine, Malgaigne had distinguished between science and practice by maintaining that the microscope was useful for medical science but not for the practice of medicine. All the commentators denied this distinction, arguing that the two could not be separated: medical practice was an integral part of medical science. The microscopists opposed such a distinction, for if they accepted it, then their work could be

relegated to the laboratory (what few there were) and the applicability of the instrument to clinical medicine could be denied. Broca expounded upon the issue: "But what is practice if not the application of science? And what is science, if it is not the governor of practice? Is there a scientific discovery of any importance which does not soon become useful to practitioners by the consequences that they deduce from it . . . practice follows science as the shadow follows the body . . . To change science is to change practice" (Broca 1854, p. 1058). Guérin, for his part, dismissed any attempt to separate science from practice, using the example of diagnosis to make his point. He denied that one method of observation was any more scientific than another, asserting:

> . . . in any case we must refrain from attributing to the first [the microscope] the privilege of furnishing s*cientific*[his italics] diagnosis . . . leaving exclusively to the second [naked eye] the duty of *practical* [his italics] diagnosis. We have perhaps not understood the extent of this distinction on which one of the orators heard in the last session very much insisted; for us, in fact, there is only one diagnosis which is at the same time scientific and practical, it is true diagnosis; and all the methods proposed for conducting it are equally scientific (Guérin 1854, p. 671).

In their consideration of the nature of science, the medical journalists accepted without question the notion that science was progressive, and discussed the role of the microscope in that progress. Guérin suggested that the microscope had contributed to scientific progress, but in an indirect way: "Here is how the microscope has aided this progress; it has provoked it, but it is in spite of itself and in some way to defend itself from it, that clinical observation has achieved it [progress]. Doesn't science offer numerous examples of this indirect contribution of errors and systems to true progress . . . Thus with the microscope it has provoked progress but it itself has not made progress . . . " (Guérin 1854, p. 686).

Instruments, theories, systems, errors—all might promote scientific progress, according to Broca and Guérin. Verneuil concurred with Guérin on the role of error in scientific progress, arguing that even an erroneous theory, such as the cell theory, could promote progress: " . . . in spite of its errors, it [the cell theory] has mapped out a new route, with an immense future, but which ought to be rectified on more than one point" (Verneuil 1855, p. 50).

Given their task to write about the ongoing Academy debate, our commentators explored the role of consensus and disagreement in establishing scientific truth. On the one hand, physicians and scientists believed that

truth emerged through disputation; that was an important part of the academic tradition. On the other hand, Velpeau, for good rhetorical reasons, argued for the importance of consensus, implying that scientific truth required consensus: One would know scientific truth when consensus had been reached. This way of looking at things implied that truth was social: if scientists and physicians agreed, then a theory must be true. Hence, in the Academy debate, Velpeau accused the microscopists of disagreeing among themselves, of not presenting a united front. The implication was that they were not good scientists, and there must be something missing in both their theory and their practice if they regularly disagreed. Broca vehemently defended the microscopists against such charges by arguing that disagreement was an integral part of science: "Make it so all agree! In order to do that it would be necessary to renounce science." He quoted Montaigne who had claimed that it was the nature of science to be divisive: "science by its very nature generates altercation and division . . . never will two men judge the same thing the same way and it is impossible to have two opinions exactly the same not only in various men but in the same man at different times"(Broca 1854, p. 1170).[10]

Broca argued that not only was disagreement a central feature of the scientific enterprise, so was resistance to new ideas. Indeed, Broca elevated resistance in science to a law, claiming that resistance was the moving force of science. That was how science worked, he explained. Proponents of new ideas and techniques challenged entrenched interest groups, and therefore, it was to be expected that those who felt threatened would resist innovations. And it was all to the good, because resistance promoted scientific progress:

> In order for a thing as clear and as simple [as the microscope] to have raised such disputes it must be that a very powerful cause acted on such eminent and numerous men who became adversaries of the microscope. This cause . . . is the law of resistance by virtue of which an order of things attacked, defends itself against what is attacking it. In science, in literature, in politics, in administration, every innovation of any importance displaces interests and gives rise to resistance. Ought we complain? No, we must be happy. The struggle which always inflames in a such a case stops and extinguishes new doctrines when they rest on error; it assures on the contrary the durable triumph of those who bear the truth in their flanks: [the struggle is a] precious safeguard which moderates revo-

10. Broca gives the citation as Montaigne, livre III, ch. 13, de l'Expérience.

> lutions, and which, while making progress less rapid, renders it in return more certain, since it protects it against its own excesses! (Broca 1854, p. 985).

Thus Broca defended the position that truth emerged through disputation and argued that disagreement and resistance promoted progress, moving science ever closer to truth and certainty. Not only were debates important for scientific progress and for arriving at truth, but it was good that scientists disagreed among themselves, for controversy promoted scientific progress. Skilled rhetorician that he was, Broca turned Velpeau's criticism of the microscopists to his advantage.

We have seen how the debate in the Academy provoked a wider debate in the medical press and have explored some of the issues addressed by the medical journalists. To summarize, all the medical journalists recognized the continued dominance of the pathological-anatomical approach in French medicine, but two, Guérin and Verneuil, thought this orientation had worn itself out. Guérin maintained that pathological anatomy did not address the etiology of disease, which he saw as the new frontier in medicine.[11] The members of the so-called Young Paris School used the debate in the press as a way to advance their own agenda: to achieve legitimacy for their microscopical endeavors by claiming they were just a continuation of the original Paris School. For Broca and Follin the goal was to incorporate microscopy into the dominant pathological anatomical tradition. Only Verneuil, siding with Guérin, sensed that there might be a new frontier ahead.

The comparison of French and German medicine figured prominently in the debate in the press. The medical journalists emphasized that French microscopy, by contrast with German, functioned within the clinic. The French microscopists asserted that they had a new vision of clinical medicine enriched by a scientific laboratory approach exemplified by the microscope. This was Lebert's position to which they all subscribed. Addressing methodological differences, our commentators accused the Germans of being systems builders, of starting with the a priori cell and then deducing everything else from it. By contrast, the medical journalists found French medicine superior, portraying it as primarily empirical, that is, a-theoretical.

The medical journalists resisted Malgaigne's suggestion that medical science be separated from medical practice and that the microscope be declared useful for medical science but not for the practice of medicine.

11. Recall that when Bichat inaugurated pathological anatomy, he eschewed the search for causes, relying instead on description and correlation. On Bichat's a-causal approach, see Foucault 1994 [1963].

Rather the microscopists saw science and practice as inseparable. To argue otherwise would have undermined their position, because to obtain legitimacy, the microscopists had to show that medical science was an integral part of medical practice. In the final analysis, the wider debate in the medical press allowed the commentators to express their opinions on a host of medical, scientific, and professional issues, to advance their own careers, and at the same time, to provide a forum for the larger extra-academic discussion about science and medicine at mid-century.

V. The Nature and Purpose of Academic Debate

The thirteen-session debate at the Academy of Medicine, one of the longest between 1820 and 1860 (Weisz 1995), consisted of twenty-two full speeches, several shorter responses, and numerous articles in journals and newspapers. Key speakers spoke two or three times. Velpeau gave four orations. Our medical journalists attended the sessions, expanded the debate, and provided a running commentary in the medical press. The debate gave participants an opportunity to examine academic debate itself. Both Broca and Bouillaud discussed the nature and purpose of academic debate. Broca provided an analysis of the debate both in the Academy and in the medical press:

> After having entirely filled thirteen sessions—after having made the eloquence of the orators and the ink of the journalists gush forth, instigated twenty-two orations in order, several short speeches, and countless articles—after having moved some, impassioned others, interested everybody, and fixed for four months, the attention of scientific Europe on the Academy of Medicine—the discussion on cancer has finally ended. It was time, moreover, because already for several sessions all the arguments, on both sides, were exhausted.
>
> Thus as you would expect, the principal champions remained faithful until the end to the flag that they had at first defended. One of our colleagues from the press exclaimed the other day in stating like us this result: 'What good are such long debates, since each keeps his own opinion?' This was to lose sight of the role and goal of academic discussions. These great scientific tournaments are in no way destined to modify the opinions of those who participate. Their utility is more general and more lofty. They serve to establish, at a given moment, the state of science on certain difficult questions; they vulgarize the results of contemporary work and put the public which judges the moves in a position to have an opinion on subjects abandoned up to then to the research of a small number

> of investigators. They provoke new studies, arouse the courage of workers, revive the zeal of the indifferent. Finally, they remain in history as precious guideposts which mark successive stages of progress—that is to say that they are useful both in the present and in the future (Broca 1855, p. 73).

Thus in answer to his colleague's question: "What good are such long debates, since each keeps his own opinion?" Broca made four main points: First, he suggested that such long debates served "to establish . . . the state of science on certain difficult questions." Debates gave participants both in the academy and in the press a way to assess the current state of science and medicine: where have we been? Where are we now? And where are we going? This evaluation was not just about French science and medicine, although that was the most important, but also included a comparison with German science and medicine, specifically with regard to microscopy and its theoretical framework—or lack thereof.

Secondly, debates "vulgarize[d] the results of contemporary work and put the public . . . in a position to have an opinion on subjects abandoned up to then to the research of a small number of investigators." In other words, debates popularized scientific/medical issues in such a way that the [educated/literate] public could ruminate about the issues and form an opinion on them. This goal was didactic, educating this public on some of the main issues of contemporary medical/scientific research. Thus debates served a public didactic function.

Third, debates "provoke new studies, arouse the courage of workers, revive the zeal of the indifferent." In other words, debates provided excitement, entertainment, publicity. They reinvigorated curiosity and challenged the apathetic. Publicity was key, because medico-scientific workers—not only the support staff of the medical elite, but physicians outside the medical elite, outside Paris—could be encouraged to understand what scientific issues and problems were important, controversial, and newsworthy.

Fourth, the debates "remain in history as precious guideposts which mark successive stages of progress—that is to say that they are useful both in the present and in the future." This goal was reminiscent of that of the editors of the *Encyclopédie,* who saw their work as creating a sanctuary for future readers, who claimed that they were writing for posterity (d'Alembert 1995 [1751], pp. 121, 127–28). Thus debates contributed to the vast storehouse of knowledge that would be available for future readers, to help them understand the main issues and approaches of an era. This point exemplified nineteenth-century French physicians' strong belief in scientific progress. As heirs of the French Enlightenment, progress

was a key feature of the nineteenth-century French positivist program, and published debates would serve to demonstrate the progress that had been made.

Bouillaud, for his part, agreed with Broca, contending that the purpose of academic debate was to provide a forum from which to enlighten the other members of the Academy and the public. The goal was to present the problem to two medical juries: first, a professional medical one, the members of the Academy; and second, the public. But no one should expect either jury to decide on a winner. In most debates there would be no closure, but issues would be aired, the Academy and the public would be informed and then left to decide for themselves (*Bull. de l'Acad. de Méd.,* 1854–55, p. 314).

Thus for Bouillaud, debate functioned at two levels: intra and extra-academic. The medical press was an extension of the Academy, consisting for the most part of physicians and scientists. But who was this public? For both Broca and Bouillaud the public seems to have been both the larger scientific/medical public in Europe and North America and the educated/literate public who followed scientific issues. But the goal, according to Bouillaud, was not to reach a firm decision on which side won. Closure was neither expected nor desired. The aim was to provide information and publicity and then let the members of the Academy, the press, and the larger public decide for themselves.

Historian of medicine George Weisz has analyzed the genre of academic debate in the Academy of Medicine by looking at major debates that took place in the 1830s and the 1850s (Weisz 1995). Weisz reminds us that underlying the belief in the debating process was the conviction that scientific truth emerged through disputation. He also suggests that academicians had good pragmatic reasons for avoiding definitive judgments: such judgments were too restrictive and could damage the authority and reputation of the academy. For example, what if the academy reached a conclusion that later proved to be wrong, or ignored something that turned out to be important? It clearly served the Academy's purposes better to take no official stand. The academicians were also concerned about the exercise of power. As the most prestigious medical assembly in France—indeed in Europe—decisions could have far-reaching effects. Like the Academy of Sciences, the Academy of Medicine served as a jury of peers (functioning through appointed committees) to judge medical/surgical innovations of both a theoretical and practical nature. For example, in a recent article we learn that du Bois-Reymond traveled from Berlin to Paris in 1849 to present his physiological research to the Academy of Sciences (Finkelstein 2003). And Weisz has described how new surgical/therapeutic procedures were demonstrated at the Academy of

Medicine for approval from its members (Weisz 1995). Although it is not clear how much power the Academy actually wielded with its long-winded debates, members believed their opinions to be influential and therefore preferred to be conservative. Finally, one of the main functions of academic debate was the dissemination of scientific and medical knowledge. The reports of academic debates were widely diffused among professionals and widely reported in the French medical press and in Parisian daily newspapers as well as in the larger European scientific/medical press.

VI. Debate as Scientific Practice

The minutes and proceedings from nineteenth-century French medical and scientific societies, such as the Academy of Medicine, and ensuing debates and discussions in the medical/scientific press show that debate was a key scientific practice among the medical elite in nineteenth-century Paris. Debating important issues constituted one of the regular activities of physicians and scientists. In addition to laboratories, hospitals, dissections rooms, and anatomy amphitheaters, professional societies and academies and the scientific/medical press were important sites for the practice of science. Both the Academy of Medicine and the medical press, which grew dramatically in the first half of the nineteenth century, provided forums for practicing science—rhetorical displays, airing of differences, controversies. If we historians of science and medicine have failed to emphasize debate as scientific practice, it may be because what was considered scientific practice changed from the nineteenth to the twentieth century. Weisz shows how academic debate declined in importance by the early twentieth century when such rhetorical displays were no longer considered scientific. For example, in the 1920s, Academy of Medicine member Anatole Chauffard described what science needed: "More Facts and Less Words" (Weisz 1995, p. 82). Peisse was right when he claimed that science has its styles and customs just like other aspects of our culture. In twentieth-century France, academic debate, which had figured so prominently in the nineteenth century, was no longer à la mode.

Why was debate an important scientific practice in the nineteenth century? First, we can agree that it was a continuation of a longstanding Western tradition of debate and exposition, of the display of rhetorical skills (French 1994, pp. 58–59). But I would like to suggest a second way of looking at these debates. Broca characterized academic debates as "great scientific tournaments." I think, like science itself, these debates, these "scientific tournaments" were an integral part of nineteenth-century French élite male culture. Nineteenth-century French science was a masculine endeavor. Debating, part of the male code of honor (Nye 1993), was verbal jousting. Debate was dueling by other means. Military rhetoric

dominated, as several of our commentators pointed out (e.g., Peisse 1854, p. 750).[12] Debate, whether in an academic setting or in the press, was an indoor sport. In addition, the prominence of scientific debate suggests that an important aspect of the nineteenth-century scientific endeavor was play, or sport. Rhetorical and oratorical skills involved playing with words, playing with audiences, and playing with ideas in a way agreed upon and understood by the participants in a shared cultural experience. This emphasis on play is evident if you read the whole debate on cancer and the microscope or other debates.[13] Broca exhibited his playful side in his article on the "triad," where he played with words and academicians.

The "triad" article appeared in the *Moniteur des hôpitaux* on January 16, 1855, after the next-to-last (the twelfth) meeting at the Academy devoted to the debate over cancer and the microscope. In this article Broca had fun with the mystical Platonic number "three." He began by stating that the Academy and the press had heard *three* [all his italics] orators, the *third* lecture of Leblanc, the *third* of Delafond, the *third* of Velpeau. He elaborated, continuing his theme: Leblanc had presented *three* remarks, Delafond had developed *three* theories, Delafond's talk had been *three* times longer than Leblanc's. The speech of Velpeau promised to be *three* times longer than Delafond's. Such was the balance sheet, which ended the *third* month of the discussion. And he commented, tongue in cheek: "The number *three* multiplies with a remarkable tenacity." He noted that one could call it superstition, but joked that he believed a little in the triangular influence of this sacramental number. He concluded humorously by calling on shared medical wisdom, that the discussion was on the verge of its supreme crisis [a reference to the Hippocratic notion of the crisis, the point at which the patient either begins to recover or dies]. If the discussion continued beyond one more session, Broca jokingly warned, "we will renounce neoplatonic philosophy forever" (Broca 1855, p. 49).

Broca singled out, exemplified, and exploited the role of play (sport) and humor in science. If you read his articles for the *Moniteur des hôpitaux,* and if you read the debate recorded in the *Bulletin de l'Académie,* play emerges as a constant theme. We don't have to deny the seriousness of the questions being discussed to recognize how much fun the academics and medical journalists were having peacocking, strutting their stuff. Broca, in a letter written to his mother explained that play had a practical goal as well:

12. Indeed, military rhetoric figures prominently in our contemporary discussions of disease and other biological processes. See, for example, Martin 1994.

13. See, for example, the 1836 debate on medical statistics; *Bull. de l'Acad. roy. de méd.* 1836–37, pp. 662–806. This debate is discussed in detail in La Berge (forthcoming).

> You have no doubt then found, dear mother, that my last academic articles were a bit too revealing, it's true; I did it intentionally, because the speeches succeeded and repeated each other without new ideas, because each wanted to speak last and would ask [to speak] again after the others, because finally the discussion seemed uselessly to perpetuate itself. The only way of putting an end to these parades was to make fun of them. I did it with some success, and many academicians congratulated me on it. The fact is that when I did my article on the triad, there were still five or six orators signed up, and at the following session, they announced they would give up their turns, rightly assuming that we could have fun at their expense in the press. We have carried off a veritable victory, public opinion and the neutral academicians are for us. Velpeau, who provoked the brawl, has strongly repented for it and is not mad (Broca 1886, II, 391–92).

Broca's letter to his mother illustrates not only the notion of intra and extra-academic debate as boys' games, but also the power plays involved. The academicians held the power: theirs was a closed club to which one had to be elected. The Academy of Medicine was the ultimate "old boys' club" (Weisz 1995). But as we have seen, the press—in this case the medical journalists—could exert a certain amount of power, could have a constraining effect upon what happened in the Academy. The press could and did impose certain rules on the game. Medical journalists could function as gatekeepers, referees, disciplining the "scientific tournaments" within the Academy from their vantage point outside the Academy.

How did debates end, and how did this one end? Broca rephrased the original question to suit the needs of the microscopists, echoing a point Velpeau had made earlier. The question asked was: is the microscope useful for diagnosing cancer? The consensus among the surgeons participating in the debate was "no." But if the question was re-stated as "is the microscope useful for pathology?" then the answer was "yes." For Broca, the utility of the instrument was confirmed, and even well before the end of the debate, seizing a rhetorical advantage, Broca proclaimed the triumph of microscopy:

> Thus, then, the cause of the microscope has definitively triumphed. All the orators of the Academy, all the writers for the press are now unanimous on this point, and proclaim, vying with one another, that the microscope is an instrument of progress . . . Such is the current state of mind, and when we compare these testimonies . . . with what was happening in France scarcely five or six years ago we

> cannot avoid stating [that] in this regard an immense change in public opinion has occurred. There was scarcely then in all Paris but five or six microscopes used for the study of pathological anatomy. We gladly were considered like a little sect of the enlightened; . . . Today, on the contrary, . . . they loudly proclaim that the microscope has rendered great services to science, and they have added that it will give still more as if to encourage us to persevere . . . our cause has been won (Broca, 1854, pp. 1073–74).

And in his article on the thirteenth and final session of the debate (January 25, 1855) Broca declared: " . . . we can say from now on that great progress has been accomplished. The microscope is no longer the instrument of the curious, it is the instrument of scientists. It has received its academic baptism. Cells and nuclei have acquired right of domicile in official science in the same way as have fibers and membranes. It's a whole revolution! (Broca 1855, p. 73).

Broca was too hasty in declaring an end to the debate. His final—or so he thought—articles appeared in the *Moniteur des hôpitaux* on the 23rd and 25th of January, 1855. The debate at the Academy may have concluded, but the debate in the press unexpectedly continued. On March 8, 1855 Broca took up his pen again to respond to the latest salvo—this one from across the Rhine (Broca 1855, pp. 225–231). On February 16, the *Gazette hebdomadaire* published a latter from Rudolf Virchow, dated 7 February 1855 (Virchow 1855). Broca reviewed the main contents of Virchow's letter, entitled "Opinion sur la valeur du microscope," in which Virchow introduced his theory of cellular pathology. With this theory, Virchow rejected the specific cancer cell to which Lebert and the French microscopy school subscribed. Broca tried to save Lebert's theory by suggesting that Virchow rejected only the specificity of the *origin* [my italics] of cells, but not the specificity of their *form* [my italics]. Again, just as in the Academy debate, Broca found a way to turn the discussion to his advantage by concluding: "Having never asked of the microscope anything but the form of the elements and the characters appropriate to distinguish them one from another, we were fully satisfied with M. Virchow's declaration" (Broca 1855, p. 231).

The debate in the Academy also had an official resolution. Rather then render a judgment, which, as we have seen, was not the way the Academy functioned, the academicians decided to sponsor an essay contest on the two questions originally posed for debate. Professor Michel of the Faculté de Médecine in Strasbourg won the prize with his essay, "Du microscope et de ses applications à l'anatomie pathologique, au diagnostic et au

traitement des maladies," which was published in the *Mémoires de l'Académie de Médecine* in 1856 (Michel 1856).

Conclusion

I have argued that debate both in the academies and in the scientific/medical press was an important scientific practice among the medical elite in nineteenth-century Paris. We have looked in some detail at the controversy over cancer and the microscope to illustrate and exemplify the practice of debate. I have also emphasized the notion of debate as sport—the boys' club atmosphere that participants were comfortable with—the shared masculine elite culture of science and medicine and the playfulness that characterized debates in the academies and in the press. Sport and playfulness do not, however, detract from the seriousness of the issues these physicians and medical journalists tackled. In addition to laboratories and anatomy amphitheatres, lecture halls and hospitals, academies and the press were important sites for the practice of science and medicine, where agreed-upon rules prevailed and disputes could be aired in a manner understood by all participants. As we have seen in this case about cancer and the microscope, these debates provided a forum in which participants could take up larger issues of the day—especially a consideration of national styles of science and medicine with particular focus on competing French v. German approaches. If historians neglect the role of debate as scientific practice, we get only a partial view of what our actors were doing and thinking on a day-to-day basis. Emphasizing and analyzing the centrality of debate as scientific practice in nineteenth-century Paris enriches our understanding of nineteenth-century French science and medicine.

And as Broca recounts in his letters, after professional meetings, members would often continue on to a banquet or elegant dinner at the Grand Véfour at the Place du Palais-Royal (Broca 1886, 2: 241–42).[14] The restaurant is still there, still serving excellent meals. You can go dine there and get a sense of the mid-nineteenth century elite male culture in which these physicians practiced their science and medicine.

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14. The particular story he told took place in 1851 after a meeting of the Anatomical Society of Paris, of which Broca was a member. His letters suggest that, in addition to debates, social events figured prominently in the practice of science and medicine in mid-nineteenth-century Paris.

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