Freidson is adamant in this interpretation of professionalization. "Not training as such, but only the issue of autonomy and control over training granted the occupation by an elite or public persuaded of its importance seems to be able to distinguish clearly among occupations," he argues. "And the process determining the outcome is essentially political and social rather than technical in character—a process in which power and persuasive rhetoric are of greater importance than the objective character of knowledge, training, and work." The nature of training, as well as the service ideal, ethical code, and body of abstract theory constitute a profession's "ideology, a deliberate rhetoric in a political process of lobbying, public relations, and other forms of persuasion to attain a desirable end—full control over its work."

The history of medicine, from this perspective, can be understood as a political process in which the specific reforms—however much they may increase the technical effectiveness of physicians—are also instruments of persuasion and symbols of legitimacy. The goals of reform leaders were to gain collective control for the profession over its working conditions and economics in order to establish a hierarchy of authority and power among healing occupations, to assure that physicians reign firmly at the top of the hierarchy, and to assure them as high incomes as possible in any given historical period.

Support for such interests would have to come from outside the profession. While efforts were made to win the credibility of "the public," leaders of the profession did not see their struggle as a grassroots campaign. Seeking a social and economic position above the majority of the population, they could at best hope for the acquiescence of the people. Active support would have to come from the already higher social classes. In the eighteenth century, practitioners had turned to gentlemen farmers and wealthy merchants in the state legislatures to protect their interests. In the nineteenth century a political rebellion from below demonstrated the insufficiency of merely legislated sanctions. Furthermore, political power increasingly rested in a new class in society—those capitalists who controlled great manufacturing and marketing enterprises. These were the men who, for good or bad, were changing the face of the nation. Around their enterprises grew the great cities. From their factories came the steel and machines that enabled the same men to unify the country commercially with railroads, products, and even armies. From their corporations came the demand for foreign resources and the products for foreign markets that were rapidly making America a world power. This was the ascending class in America at the end of the nineteenth century. Those groups in society who connected with their enterprises or their interests could rise with them.

It became clear to increasing numbers of physicians that the complete professionalization of medicine could come only when they developed an ideology and a practice that was consistent with the ideas and interests of socially and politically dominant groups in the society. It was desirable that everyone in society recognize their technical effectiveness, but it was essential that the classes and groups associated with the ascending social order believe in their efficacy. The development and increasing dominance of scientific medicine within the profession provided the virtually perfect material and ideological basis for an alliance of the medical profession with other professionals (mainly engineers and lawyers), corporate managers, and all ranks of the capitalist class. The medical profession discovered an ideology that was compatible with the world view of, and politically and economically useful to, the capitalist class and the emerging managerial and professional stratum.

**MEDICINE AS SCIENCE**

Medical research was flourishing in Germany and France during the nineteenth century, and even in the United States biologists and physicians made their contributions. In 1818 Valentine Mott, a New York physician, was among the first to attempt major arterial surgery near the heart. Other Americans also attempted new surgical procedures while some physicians contributed new understandings to internal medicine. The New York Academy of Medicine, founded in 1847, and the Pathological Society in Philadelphia promoted discussion of medical research and science.7

Few of the findings and developments in medical research were directly useful in improving medical practice. It is doubtful that many patients survived the new surgical techniques in the
abundance of aseptic practices. While the differentiation of diseases made observation more precise, the usual heroic treatments were just as likely to do the patient in as before.

Beginning in midcentury, medical research in Europe started producing more applicable findings. In 1858 Rudolf Virchow unveiled a general concept of disease based on the cellular structure of the body. From the findings of cell physiology, anatomy, and pathology, Pasteur, Koch, and other medical researchers developed new concepts and applications of bacteriology. In the last quarter of the century specialized German laboratories began to replace the more generalist botanists, biologists, and physicians. Their findings gave medical science a more reductionist and technically more effective turn.

Changes in American medical practice reflected the gradual acceptance of recent developments in Europe. Starting in the 1870s, American physicians flocked to the famous laboratories of German and Austrian universities for a year or more of study—if they were ambitious and could afford the expense of travel and living abroad without income. Between 1870 and the outbreak of World War I in 1914, about 15,000 American physicians studied medicine in Germany alone.

While most American doctors who studied in Europe returned to develop lucrative private practices, a few put their main energies into developing laboratory medical sciences in the United States. Carl Ludwig’s physiology institute in Leipzig produced several luminaries of America’s infant medical science. Henry Pickering Bowditch, one of Ludwig’s pupils, founded the country’s first experimental physiology department at Harvard University in 1871. William Henry Welch, another of Ludwig’s pupils, started America’s first pathology laboratory at Bellevue Hospital medical school in 1878.

Fifteen years later American medical science came of age with the opening of the Johns Hopkins medical school, modeled after the German university medical schools with a heavy emphasis on research in the basic medical sciences. At Hopkins, for the first time in the United States, the laboratory science faculty were to be full-time teachers and researchers, supported by salaries adequate to live on and unencumbered by the distractions of private practice. Virtually the entire Hopkins faculty was trained in Germany. Hopkins, and then Harvard, Yale, and Pennsylvania, became the indigenous producers of scientific medical faculty. As scientific medicine gained increasing acceptance, medical schools throughout the country vied for Hopkins graduates to add gleam to their lackluster local faculties.

Medical practice likewise began to change with the increased acceptance of medical science. Physicians began introducing into their work those scientific medical practices that were uncomplicated and acceptable to their patients and at least seemed effective in reducing suffering and ameliorating the symptoms of disease. The use of bleeding and calomel began falling off in the 1870s though many physicians continued to use them on a more limited basis as late as the 1920s.

Physicians who had the money to take an extra year’s study in Europe were able to build more prestigious practices than the ordinary American-trained doctor. Usually they would take themselves out of direct competition with the majority of physicians by specializing in gynecology, surgery, ophthalmology, or one of the other new branches of medicine. They quickly formed a new elite in the profession, with reputations that brought the middle and wealthy classes to their doors.

As the base of scientific medicine spread out to include more practitioners, the peaks of elite physicians rose even higher. They quickly found that “scientific medicine” not only seemed more effective than the heroics of old, it was also far more profitable. Professional leaders had tried numerous ways of uplifting the profession during the nineteenth century, but none of them had succeeded. It was medical science that provided the key to professional reform. Medical research yielded new tools of understanding and held out the hope of more effective techniques of prevention and treatment than orthodox medicine offered. But scientific medicine was utilized by professional leaders beyond merely increasing the technical effectiveness of their practice. It became as well the ideology of professionalization, used to gain support from the dominant groups associated with industrial capitalism, to cement the complete dominance of health care by the medical profession, and to raise the incomes and status of physicians as a group.

The obvious advantages to the profession notwithstanding, scientific medicine contained within it the seeds of ultimate destruction for the profession. The remainder of this chapter and
the rest of this study will examine how this dialectic played itself out—the benefits the profession derived from the adoption of scientific medicine, the contradictions inherent in this historical process that began to undermine the position of the medical profession, and the new forces and contradictions that are now emerging.

GAINING PUBLIC CONFIDENCE

Scientific medicine solved two broad problems the medical profession faced in the late nineteenth century: lack of public confidence in the effectiveness of their service and competition within the medical profession.

Rather than inspiring awe and confidence, the regular medical profession had won the public’s fear and ridicule. To win public support and patronage was the major task set by professional leaders during the nineteenth century. The AMA’s code of ethics sought to assure the lay public that doctors were ethical and competent and attempted to command the public to place their confidence in regular physicians. But no claims or commands were effective in the absence of convincing personal experience or persuasive propaganda that could substitute for personal experience.

While homeopathy, eclecticism, and osteopathy did not have as much public patronage as the regular profession, they had a strong base of support. They had a following, including many wealthy and influential people, who believed in their absolute effectiveness. Their practitioners were widely believed to be, relatively at least, as effective as and certainly less dangerous than most regular doctors. And they did not demand a monopoly of practice, a wise and practical political course given the disreputable condition of the profession and the almost universal reliance on home remedies for most minor acute and chronic ailments.

For the regular profession to win in their competition with the other medical sects, they needed first of all to gain absolutely and relatively in public confidence. Scientific medicine provided the basis for a concerted and successful campaign to win this public support. The effort never depended on the common folk of America. The campaign for acceptance of scientific medicine was aimed at the wealthy and powerful in society and the new “middle” classes. Both of these groups owed their privileged positions to the intensive industrialization that began with the Civil War. They were particularly attracted to a kind of medicine that shared their industrial culture, their values, their world outlook, and their ideologies. “Scientific management” analyzed the labor process in production into its constituent elements and reorganized them under management’s control and for management’s profits. In a similar vein, “scientific medicine” analyzed the body into its parts, subjected the parts to the control of scientific doctors, and thereby kept the bodies healthier and more efficient.

The germ theory of disease was especially attractive to both the regular profession and these new industrial and corporate elites. The germ theory emphasized discrete, specific, and external causal agents of disease. It gave encouragement to the idea of specific therapies to cure specific pathological conditions. The payoff for the medical practitioners would be increased technical effectiveness and improved standing in the eyes of the public. That was not the foremost concern of either influential capitalists or medical researchers. These men (there were hardly any women in their ranks) saw in scientific medicine the possibility of preventing diseases through technological intervention that identified the offending organism and its means of contagion, and attacked the organism at the source or used it to create an immune response within the body. Disease was thus seen as an engineering problem, surmountable with sufficient talent and resources. To the medical researchers the germ theory and discoveries in bacteriology confirmed the value of their craft and assured increased support for their work. For capitalists, bacteriological investigations and the application of the findings opened the possibility of reducing the toll that disease took of society’s resources.

The forerunners of scientific medicine, along with practitioners in other medical sects, had already greatly improved the classification of diseases. European physicians had long dominated the field of medical discovery although now and then an American made a contribution. In 1836 William Gerhardt, a physician at Philadelphia Hospital, clinically differentiated typhoid from typhus. But there was little practical benefit from such classifications when no therapy was forthcoming to cure the
condition. Bleeding, purging, blistering, and tonics were the standard bag of tricks available to regular physicians. Homoeopaths and eclectics, along with lay healers, used a wide assortment of herbs, and many claimed high rates of cures. By the 1880s the regular profession still had only a few drugs that were widely recognized to be curative: Quinine could save the victim of malaria, mercury could cure syphilis, and digitalis was often successful in treating heart disorders. 

The field of disease prevention was somewhat more successful. In the eighteenth century wealthy Europeans and Americans adopted the practice of variolation, a somewhat dangerous inoculation against smallpox used in the East for centuries. In 1798 Edward Jenner introduced inoculation with cowpox that was effective and somewhat safer than variolation.

By the time of the third major cholera epidemic in the United States in 1866, the notion that cholera was a specific and contagious disease had finally won near-unanimous support from the medical profession, joining the already strong popular belief in its contagion. Medical support for cleaning up the accumulated filth in American cities won the backing of the business class and helped prevent the spread of cholera and the high death rates that had characterized the previous epidemics. The success of this preventive effort was credited to sanitary engineering and brought increased support for sanitation programs.

Despite the scant results, leading practitioners and the new class of medical researchers sustained their faith in the eventual success of medical science. The major breakthroughs came from Europe in the 1880s and 1890s. In 1883 and 1884 Edwin Klebs and Friedrich Loeffler isolated the germ involved in diphtheria, a major killer in the nineteenth century. Emil von Behring and his coworkers produced a diphtheria antitoxin in the early 1890s, which although of little significance in reducing the death toll from diphtheria, supported the belief that deadly epidemics that were borne with resignation could in fact be prevented by understanding their causes.

These and other discoveries in the 1880s and 1890s were lauded around the world. Medical science benefited with new respect and political and financial support. Success indeed paved the road to fortune. The German government provided laboratories for Robert Koch and Paul Ehrlich. In France popular contributions supplied a research institute for Louis Pasteur. In England and Japan private philanthropy paid for new medical research institutes.

In the United States private and government support for medical research lagged behind these other countries. Veterinary medicine received help from the Department of Agriculture to stem epidemics that were wiping out livestock investments. Government officials and philanthropists saw little value in researching human disease, as Richard Shryock notes, “partly because of the nature of medical science prior to 1885 and partly because human welfare brought no direct financial return. Hogs did.” Discoveries of the 1880s and 1890s, however, held out the promise that as science uncovered the germs that caused the great pestilences, further investigation would provide not only cures but methods for guarding against infection and for preventing the spread of epidemics. These expectations guided the lives of medical researchers, but they were also spreading rapidly among the middle classes and those who owned and managed America’s new industrial empires.

Medical science rescued the medical profession, in particular the practitioners, from the widespread lack of confidence in their effectiveness. These few but significant discoveries, mostly in bacteriology, increased the belief in the technical effectiveness of the profession as a whole. The actual impact of progress against infectious disease was not nearly so great as its proponents claimed. The arsenal of effective weapons against diseases did not increase spectacularly, but its limited advances did provide the basis for persuading the public that scientific medicine reflected on all members of the profession—practitioners as well as researchers—who had been trained in the theory and methods of scientific medical research.

The slight increase in the effectiveness of the new medicine was embellished in propaganda by the profession and the media. From the 1890s on, popular magazines and newspapers joined the leading medical journals in praising the accomplishments and prophesying the future success of medical science. Articles ridiculing “Popular Medical Fallacies” and extolling the “Triumphs of Modern Medicine” and the “War Against Disease” appeared in many popular magazines as well as professional journals. They portrayed medicine as an “exact science” and the
physician as an inquiring and skeptical scientist who avoids "hasty jumping at conclusions or too-ready dependence upon formulae."

The increased credibility of medicine was important in convincing the public that doctors with scientific medical training had an expertise worth paying for. If doctors could do little more for a patient than an herbal healer or a patent medicine, there was not much point in people wasting their money on expensive doctors' fees. Scientific medicine wrapped the modern doctor in an aura of therapeutic effectiveness, and the limited improvements gave support to that aura. Furthermore, the technical expertise associated with scientific medicine helped to mystify the role and work of the physician more effectively than did older notions of the etiology of disease, unpleasant remedies, and transparent codes of "ethics." Scientific medicine thereby supported the claims of the profession for a monopoly of control over all healing methods. These benefits provided the basis for other gains and were effective in undermining sectarian medicine, midwifery, and other forms of competition.

In seeking to destroy its competitors' hold on the medical marketplace, the regular profession proffered scientific medicine as more effective than "medicine as art" and "sectarian medicine" and "quacks." Not only was it more effective, it was, as each sect before it had claimed, the only truly valid medicine. Scientific medicine was held up as the nonsectarian medical theory and practice—the only one based not on dogma but on verifiable truths. As the only valid medicine, it should be granted a monopoly of practice; "none but men and women who have an interest in scientific medicine" should be allowed to join any county medical society. But making the claim was not equivalent to having it accepted.

Folk medicine was still widely used in the United States, particularly in the countryside but also in the cities. Every family had its traditional remedies that were part of the family lore, believed in and passed down from generation to generation. Generally, the young woman's own family's remedies prevailed in her new family. Some of the remedies undoubtedly acted as placebos, but many were certainly effective in providing relief and even cures. Such traditions were effective obstacles to the acceptance of scientific medicine.

Most practitioners were also very pragmatic, developing a repertoire of skills and utilizing some new techniques that seemed effective and readily accepted by their patients. These country and city doctors were not much impressed by medical science. They saw it as a tool enabling them to heal more effectively when its claims worked and when its techniques did not require a whole new method of practice.

Robert Pusey, a Kentucky country doctor who practiced in the 1870s and 1880s, used the clinical thermometer, assorted specula, and a syringe. Occasionally, he used the stethoscope although he preferred to place his ear to the patient's chest. With this simple method he could hear and distinguish most conditions as well as his scientifically trained son could with a stethoscope. He used judgments based on practice, read up on cases in the more concrete and concise medical texts, and distrusted journal articles. The older Dr. Pusey vaguely accepted bacteriology, especially as an explanation for infections causing pus but not generally for infectious diseases. He sometimes used calomel, made and sold his own drugs, did not use patent medicines, and often prescribed strychnine and arsenic as tonics. He practiced surgery in which he used chloroform as an anesthetic and asepsis when the knowledge and techniques became available to him."

The propaganda for scientific medicine was sure to be effective, but it would take time. John Shaw Billings, a leading medical reformer in the late nineteenth century, observed that doctors whose practices were not interfered with by quacks were indifferent to reforms while those in need of larger practices were more indignant about such competitors. Many quacks had effected cures where science had failed, Billings admitted. But rather than giving him pause in his rejection of any but scientific medical methods, Billings saw it as a tactical problem of persuading the American public that it is in their interests to suppress quackery. The remarkable achievements of medical science were being brought to the public, but, Billings cautioned, "it is necessary to go slowly and allow such evidence to accumulate."

The reformers believed scientific medicine would increase the technical effectiveness of the medical profession, and they promoted it as the only effective therapeutic method. Through propaganda they hoped to undermine public resistance to its use,
increase the public demand for it, and thereby force practitioners to join the new "nonsectarian" medicine.

REDUCING COMPETITION

As scientific medicine won public and professional credibility, it also solved the second and fundamentally more serious problem facing the profession in the nineteenth century: competition.

Plagued by competition among numerous medical sects, between practitioners and medical school faculty, and within the "crowded" ranks of regular practitioners themselves, the profession was saved from its own internal competitive struggles by the triumph of scientific medicine. First, the technical requirements of teaching scientific medicine provided several advantages for the profession's elite. Second, scientific medicine forged new unity in the interests of elite practitioners and medical school faculty. Third, as it gained increasingly widespread legitimacy, scientific medicine undermined the major medical sects. It thereby imposed unity among those sects in their subordination to the dominant forces in the profession. And, finally, medical science made possible specialization which was largely a response to competition within medicine. The overall impact of scientific medicine within the profession was to legitimize control by elite practitioners and medical school faculty.

TECHNICAL REQUIREMENTS OF SCIENTIFIC MEDICAL EDUCATION

THE NEW ACADEMICIANS

Making the doctor the purveyor of a broad range of skills within a context of mystified knowledge required extensive and esoteric training. Nineteenth-century medical reformers envisioned the physician as a bedside scientist. Medical practitioners must think and talk like scientists. They must be trained in anatomy, physiology, bacteriology, pathology, pharmacology, and the physical sciences. They must think of health and disease, not holistically as general relationships between bodily systems or between the person and the environment, but in terms of the micro-concepts of physiology and anatomy, bacteriology and cell pathology. These sciences and their reductionist concepts were gradually recognized in the late nineteenth century as the foundations of medical education.

The medical schools of the last century were staffed by practitioners, often very talented men who were heavy on the "art" but less expert on the "science." Increasingly, laboratory science courses were taken away from the local practitioner and given to physicians with special training in the laboratory sciences. The new academic physicians who preferred these laboratory sciences over medical practice prospered with the increased demand for more faculty with training in these fields. Those who could afford to spend a year or two studying in Germany or Austria after medical school had secure, if not lucrative, academic careers awaiting them on their return.

In 1893 Johns Hopkins became the first medical school in the United States to employ these laboratory men full time and to pay them salaries that enabled them to devote all their time and energy to research and teaching. The new full-time organization of the laboratory science faculty was hailed as a great advance for American medical education. It was quickly adopted by other elite schools and gradually became the norm emulated by the average institution. Although the laboratory science faculty gave up private practice incomes of $10,000 a year and more in return for salaries of $3,000 or $4,000, there were more than enough people to fill the demand. 44

Some of the giants of medical reform, like William H. Welch, loathed medical practice, feared the insecurity of competition among private practitioners, and longed for the opportunity to pursue medical research without the diversions of maintaining a private clientele. Before going off to Europe in 1876 to advance his medical science skills, Welch confided to his sister his fears of trying to set up "by hook or by crook a patronage of some kind." Echoing the pipe dreams of most medical graduates, Welch observed, "it is much finer to hold a chair in a medical college, and to have a salary... and to be sought by patients instead of seeking them." His studies abroad would give him a jump on his competitors: "If by absorbing a little German lore I can get a little
start of a few thousand rivals and thereby reduce my competitors
to a few hundred more or less, it is a good point to tally.\textsuperscript{43}

The emphasis on scientific medicine thus created unprece-
dented job opportunities for physicians qua medical scientists. As
positions expanded, a core of professionals developed who were
more dedicated than ever to seeing medicine as science complete-
ly displace medicine as art. These medical scientists' interests and
identification were bound up solely with medical schools and
not with private practice. As the vanguard of the profession's
successful strategy and the recipients of millions of dollars in
capital investments in medical research and education, the new
medical academicians became the symbol of the new profession.
In the 1890s, for the first time in the United States, the medical
profession came to exalt the scientist over the practitioner.\textsuperscript{44}
Despite their more modest, middle-class incomes, the scientists
were the new elite in the profession.

The faculty at the most prestigious schools won their profes-
sional reputations on the basis of their research contributions to
their fields. The best reputations attracted the best students and
the wealthiest patients. In 1903 William Halsted, a famous sur-
geon on the Johns Hopkins faculty, got $10,000 for an appen-
dectomy, and his colleague, Howard Kelly, charged $20,000 for a
major operation.\textsuperscript{45} Unlike the old-time medical faculties, whose
material interests were enhanced by student fees and referrals
from their many former students, the new academicians' mate-
rial interests were tied to the promotion of medical science. It
was in their interests to raise the standards of medical schools
and to make scientific medicine the only acceptable theory and
practice.

The predominant type of medical school, owned by the
faculty and existing on student fees, prospered as long as
enrollments could be kept high and costs low. However, practi-
tioners would prosper only if the production of physicians was
decreased, reducing competition within the profession. This
conflict of economic interests had divided elite practitioners from
medical school faculty throughout the nineteenth century. The
ascendancy of scientific medicine transformed the old conflict
into the basis for an alliance between the scientific medical
faculties and elite practitioners.

The interests of the new medical scientists in medical educa-
tion were thus tied to the dominance of scientific medicine and
not to large numbers of students or even large numbers of
medical schools. They joined the elite practitioners as the leaders
of reform in the profession. Together they gained control of the
AMA at the turn of the century and completely reorganized it to
make the AMA the profession's instrument of political action as
we know it today and to use it and the leading medical schools to
alter completely the technical, economic, and social forces within
the medical profession.

The technical requirements of developing and teaching sci-
extific medicine sharpened the distinction between laboratory
science faculty and practitioners, provided new and expanding
job opportunities for medical scientists, and hoisted them to elite
and influential positions within the profession. At the same time
these developments provided the basis for the alliance between
these new elite faculty and the elite practitioners, giving them
sufficient power to take control of the profession and transform
it.

"FEWER AND BETTER"

As a professional consensus developed around scientific
medicine, the scientific medical faculty and elite practitioners
agreed upon "objective" criteria for judging medical schools. The
needs of scientific medical education were pretty clear cut. If
students are to be trained as medical scientists, they need to be
taught the biological and physical sciences, and they need to be
taught how to apply the principles they learn in those sciences to
the diseases of real people. Experience as well as common sense
argued for laboratory courses in the sciences and hospital
experience for the clinical application of those sciences: Learning
how is at least as important as learning about.

The technical requirements of teaching scientific medicine
suggest fairly clear criteria for judging medical schools. If the
premise of training scientists is accepted, then any worthy
medical program must have adequate laboratory facilities, clinical
teaching facilities, and well-trained laboratory and clinical
faculty.

While the criteria of what is "adequate" might be (and were)