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EDITORS’ CORRECTION:
On this page in the Winter 2004 issue of *Ohio Valley History*, the editors incorrectly associated the Thomas Jefferson Papers with the University of Virginia. In fact, the Thomas Jefferson Papers: Retirement Series is sponsored by the Thomas Jefferson Foundation, and it is housed in the Robert H. Smith International Center for Jefferson Studies, at Monticello, Charlottesville, Virginia. Our apologies.
If All the World Were Mechanics and Farmers: 
Democracy and the Formative Years of Land-Grant Colleges in America

Alan I. Marcus

"A n educated class should ever be regarded as a barbarism and a heathenism, an educated race the only Christian idea." "It is the mission of our free American Republic to educate not a clique or caste, but to educate the race in such a way as most effectually to prepare man, for his life-work—to educate the leaders, at least of the so-called industrial pursuits, in such a manner, and to such an extent as to stand alongside of those in the learned professions—not as talkers, debaters, but as efficient, educated workers." Written in 1857 by Freeman Grant Cary, editor of The Cincinnatus, a journal published in Hamilton County, Ohio, the statement addressed several issues of the day. It spoke to the idea of America as a civilization different than its predecessors, a new culture and society demanding a new man. It maintained that education must be made practical, to come to bear on work. It argued that educational privilege smacked of the barbaric European aristocracy—it certainly was not American, not even Christian—and advocated redress not by ending educational opportunities but—in light of perfectionism and progressive sentiment—by expanding them to others.

Cary's declaration should not be considered just the musings of a single individual. Approval in 1862 of the Morrill Land-Grant Act by the United States Congress testified to the centrality and ubiquity of this sort of mid-century American thinking. Its operational section granted a portion of the public lands to each state for the support of "at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." These institutions proved enduring. Roughly half of America's flagship public universities today designate themselves land-grant

Freeman G. Cary (1810-1888), Cincinnati Museum Center, Cincinnati Historical Society Library
universities or were designated as such in the past. They include such diverse entities as Cornell University, the Massachusetts Institute of Technology, the University of Arizona, the University of Kentucky, Rutgers University, Purdue University and Ohio State University. Historians have long hailed these peoples’ colleges as pioneers in science and technology, and in agriculture and engineering. So they were, but not in the ways we might think. In fact, these institutions lived up to their congressional mandates largely as characteristic mid-nineteenth century American institutions. How they came into being, what their advocates proposed, and how these plans came to be implemented help us understand their unique origins.

It should come as no surprise that agriculture was supposed to be represented in these institutions. Contemporaries maintained that four out of five Americans earned their livelihood as farmers, making agriculture the most important economic sector in nineteenth century America. But worn out farmland and abandoned farmsteads, especially in the eastern states, indicated that farming methods needed dramatic revision. Moreover, agriculture at mid-century was a business. The time was long past when an urban and urbane Daniel Drake could call himself a farmer, establish agricultural societies, and talk about turning the hills of southern Ohio into vineyards. Men like the Queen City’s Drake found refuge by about 1840 in the formation of horticultural and floricultural societies. There, persons not involved in the occupation of farming could dabble in planting things and thereby express their fondness for nature and its virtues. Renovating agricultural institutions, including colleges, to serve only those persons directly involved in agriculture, however, ought not suggest a diminution in the nation’s interest in farming generally. Nothing could be further from the truth. By the 1850s, over nine hundred agricultural societies dotted the landscape. Hundreds of agricultural newspapers discussed farm problems. And in 1852 Congress even chartered a United States Agricultural Society. This myriad of institutions functioned as an impressive political organization that in time became an adept and persistent lobbying force. The massive outpourings of sentiment in favor of farming manifested in speeches before these societies, while disorganized and sometimes contradictory, nonetheless provided huge visibility for the cause.

In 1862, with the South in rebellion and therefore temporarily not repre-
sented in Congress, advocates of commercial agriculture hit the trifecta. In addition to the land-grant college act, Congress approved the Homestead Act and an act creating the United States Department of Agriculture. The Homestead Act granted farmsteads to persons willing to settle on public lands for five years and to improve the land they had claimed. And an act that created the United States Department of Agriculture made that agency responsible for collecting agricultural statistics and for performing routine tests on the viability of seeds and on the quality of fertilizers. These three acts vastly increased federal authority, a remarkable turn around for a Congress that had proved unable to settle the slavery issue for over a quarter of a century and had spent seventeen years debating whether it could even accept the Smithson bequest. In fact, the USDA was the first federal agency devoted entirely to a single occupational group. Congress's sudden willingness to help agriculture suggests that advocates of agriculture for the first time in American history formed a coherent occupational cohort and that the cohort needed assistance. With respect to college education for farmers, several states had already made that decision. While an epidemic of proprietary, for-profit agricultural schools received charters in the 1840s, state legislatures in the 1850s grew more circumspect and therefore ordinarily chartered and funded only one school per state. For example, New York's agricultural college began in 1853 and Pennsylvania's a year later; Michigan's agricultural college started in 1857; and the Iowa Agricultural College was established in 1858. In each instance, states provided these schools with scrip, land grants, endowments, or some other such revenue source, a strong indication that these schools were being built to last.

N o movement, similar in extent or intensity, however, existed for the mechanic arts. Certainly mechanics institutes had been around since the 1820s, and mechanics had agitated for the creation of common schools through the 1830s. But institutes were relatively few in number by the 1850s and without much political clout. While some maintained that the mechanics' educational situation was "familiarly talked over in our steamboats and rail-cars," little evidence remains to verify those statements. This was so in part because the number of persons who might call themselves mechanics in the 1850s was miniscule compared to those who identified themselves as
farmers. Moreover, mechanics lacked a web of trade newspapers and societies to effect political organization, unlike the advocates of mid-century agriculture. Indeed, every one of the mechanics' newspapers established prior to the 1850s had gone out of business before 1858. Finally, manufacturing was simply less important to the antebellum national economy than agriculture. Therefore, farmers and their supporters rarely included mechanics in efforts to lobby for federal-funded colleges.

Advocates for American agriculture argued that the nation's agricultural problems could not be solved merely by opening the doors of the nation's colleges to the sons of farmers. They demanded a new kind of education. Singling out Harvard University, Princeton University, and Dartmouth College, these men and women maintained that the programs and emphases at the nation's elite institutions—as well as curricula in four hundred or so similar institutions—had become "too contracted, too exclusive, and too stereotyped." These schools simply produced the next generation of lawyers, doctors and clergy, and "by the nature of their arrangements, do wholly ignore all sympathy and association with labor." "Modeled after those of Europe, their tendency is to conserve their advantages for a class who, bidding farewell to all agricultural and mechanical pursuits, henceforward direct their whole energies to the acquirement of a standing among a literary and professional aristocracy. Allied by interest to a class which ignores labor, they cease to sympathize with the people from whom they have emerged, and despising the utilitarian mass, treat every effort to realize the harmonious development of mankind as a Utopian dream." 10

At these literary colleges, students studied the classics, learning Greek and Latin in order to read Cicero, Ovid, Virgil, Plato and Aristotle. Mastering those two languages provided students a measure of mental discipline, but the thoughts and arguments of the ancient authors also fostered moral management, teaching them the appropriate values for civilized life. Together they seemed uniquely suited to define the learned man. Yet some partisans of the new education dismissed even the moral management argument and contended instead that the moral lessons learned in literary schools should be considered woefully out of date. Historically, one such partisan argued, there has been "always a tendency to prefer the species of literature which favors ancient prejudices, and where the tendency is very strong, the only effect of great learning will be to supply the materials which may corroborate old errors and confirm old superstitions. Such is the unmistakable tendency of the classical literature, almost exclusively pursued
in our older institutions, introduced early into our country, and now generally upheld by those who are at the head of them.” Colleges, this author concluded, were havens for “abstract notions, antiquated dogma, conservatism, and impenetrable ignorance.”

This type of learning, agricultural advocates argued, should be considered out of step with mid-century America. The American Revolution, according to one critic, “ran deep into the forms of social order, and civil authority . . . but this revolution . . . reached not to the higher literary institutions. They still remain . . . as they had existed in the morbid monasticism of the old world; with but little difference and amelioration.” Persistence of this literary college tradition hampered the nation’s progress. Mid-century America needed a new education for its new man. “American Statesmanship [requires] that each class may be placed in a position which would enable it to develop a literature of its own, and acquire a mental as well as moral discipline in conjunction with its own occupations, interests and pursuits; in short, to adopt such a course in relation to this greatest of all pursuits as has been fully recognized and successfully acted upon, with regard to some four or five of the varied pursuits of men.”

Hence, classical studies seemed ill suited for agriculture, and other means would have to be found if farmers were to develop the moral and mental discipline requisite for their unique stations in life. For mental discipline, the modern languages, by which contemporaries meant German and French, often found favor. A product of the modern age and therefore unspoiled by ancient claptrap, the regimen and routine provided by memorizing modern languages functioned as “that rigid intellectual drill, in the school of discipline, that would give nerve and vigor, solidity and depth, to the mind, and thus make it an engine of power, to accomplish whatever it wills to do.” Even more popular than modern languages, according to some mid-century American commentators, was science, a benison to both moral and mental discipline. Its methods disciplined the mind and its matter disciplined the sentiments. Together modern languages and science would prove a transforming experience for the industrial classes.

To mid-century Americans, science was not a matter of specialized knowledge but a means to pursue that knowledge and, just as important, understanding. It was the modern, and therefore non-partisan, method to achieve enlightenment and progress, a dependable, concrete, logical, regularized approach to any problem or issue. Science began without a priori
assumptions—diametrically opposite to the teachings of Aristotle and other Greeks—and potentially resulted in the creation of new categories and relationships between things. It was a technique for conducting closely reasoned inquiries and as such, it could be applied to any sphere of life. The methods of science, then, should be germane to farming, industrial production, child rearing and anything else. And, after 1845, the promise that every person in America might gain access to this kind of learning became a prominent expression of how America's destiny could be fulfilled. The application of the scientific method by citizens of every rank in society would characterize this new man, the American. Science was to become the civilizing and characteristic force of democracy, producing a behavioral type borne of this method, willing to disregard the passion of faction, and to concentrate on the nation's greater good. "Science appeals only to the intellect and the judgment," wrote Freeman Grant Cary, "and its influence must therefore be elevating to every mind that pursues it." "If science studies," Cary continued, "were placed on the same footing in all our colleges with classical, and as high honors conferred upon attainments in them, a revolution would be wrought in our country as extensive as it would be important, and would be accompanied with social changes of which we have but little conception. Then education would present an object useful and common to all, and the different classes would be inspired to higher attainments than they can be at the present time."14

Should American farmers become adept in the methods of science the impact would be profound. Agriculture would cease to be "a mere business routine [and] become a source of mental improvement of high intellectual enjoyment." And that would result in an "American farmer . . . not a mere plowman." "Mastery of profound science" might also enable farmers to achieve "the capability and dignity of a statesman." In mid-nineteenth century America, "intellect rules the nation and directs its affairs." Moreover, failure to teach the methods of science to farmers could produce catastrophic consequences. Agriculturists "must sink in society and occupy a degraded condition, while intellect and intelligence will fill its highest seat."15 No less a revolution in farm practice would occur as result of an application of the scientific method to agriculture. For one thing, modern farmers found themselves swamped—even overwhelmed—with data. Farmers from all across the United States sent their observations to agricultural societies and published their ruminations in agricultural periodicals. And while an author's reputation might serve as a basis to distinguish among conflicting and often bizarre claims found in agricultural journals, that sort of information provided only a modicum of guidance. The problem, therefore, lay not in creating new knowledge, but in determining which facts could be considered true and relevant. Here, science could be useful as a means to adjudicate that situation, and therefore after 1850 scientific method seemed synonymous with progress.
The methods of science held the immediate promise of transforming farming, farmers and even American life as a whole, not simply resolving a single agricultural issue. Commentator after commentator found “the state of Agricultural knowledge at the present time . . . characterized by an accumulation of facts, all unclassified and unarranged, like brick and stone piled around the site of a great edifice, ready to be arranged into a spacious building.” What remained to be done was to inculcate in farmers the methods of science so that each could become the “master-builder, equal to the task of putting together the discordant parts and construct from them a symmetrical whole.”

But scientific method should not be confused with technical skill. Checking on the viability of seeds, identifying agents to kill crop-gobbling insects, or measuring the quantity of nitrogen in fertilizer must be considered the product of training and practical experience, not careful independent thought. Moreover, although the scientific method did not free farmers from fieldwork, it did, however, promise to give work in the field new meaning, as a place to produce both crops and knowledge. In this framework, manual labor became an application of the methods of science to the occupation of the agriculturist, in short, the work of the farmer in the field accomplished in a rational, efficient, and sensible way.

Farmers, however, were not the only ones who underwent a fundamental redefinition in the middle of the nineteenth century. Indeed, a close examination of the efforts of mechanic arts activists indicates that they too embarked upon a program of scientific and educational reform that ran nearly parallel to efforts of agricultural reformers. That similitude was suggestive. It implied that proponents of agriculture and of the mechanic arts both had tapped a common thread within mid-century American culture. Put more baldly, both the agricultural and mechanic arts communities argued separately to the same end precisely because they started with similar assumptions about the nature of mid-century American life. So while agriculture wagged the legislative dog and emerged as the force behind land-grant colleges, inclusion of the mechanic arts in these new colleges and universities became a likely, almost necessary outcome. This was so, at least in part, because the term “mechanic” in the 1850s meant something considerably different than it had in the 1820s and 1830s.

In the earlier period, the word “mechanic” had signified nothing more than a man of ingenuity and native intelligence. A mechanic was nature’s nobleman, the product of democracy’s promise, and as such, the term included a vast segment of the population, including the ubiquitous Daniel Drake who called himself a mechanic on numerous occasions. By the 1840s and certainly in the 1850s, however, that understanding had disappeared. The term “mechanic” had emerged as an occupational category, and became the collective designation for people who created or maintained machinery for a
living. Mechanics thereafter came to be characterized not by their personal behavior and character, but by their skill and practice of the mechanic arts. Indeed, designating mechanics an occupational group purged virtually anyone from that identification who did not earn a livelihood by working directly with machines, while at the same time this new definition of "mechanic" linked together persons of diverse socio-economic statuses.

Like the redefinition of "farmer," transformation of the idea of "mechanic" rendered long established institutions anachronistic. Mechanics institutes in the 1820s and 1830s had been institutions that facilitated the development of self-culture. These were places where persons could listen to discourses on a great number of subjects—the wisdom of God evinced in rain was a popular theme—and so to improve themselves. By the 1840s, these institutions reorganized their activities around a more circumscribed program and curriculum. In the case of the venerable Franklin Institute in Philadelphia, for example, meetings and discussions centered on technical problems, especially to do with steam engines, encountered by people who built or repaired machinery. To bring this more limited technical knowledge to a broader audience, mechanic's institutes established a new form of popular learning—the exhibition. Here the goal focused less on placing creators of machinery before the gaze of users and purchasers of machinery, as in a commercial fair, but rather on establishing a museum-like forum for viewing the latest technology and technologies' products. Contemporaries found these new exhibitions exciting and persuasive. Each device in an exhibit demonstrated to all who attended the wisdom and possibilities of science as a method, and the benefits of using such a method of understanding in creating a machine or structure.

To men and women who patronized exhibitions in the 1850s, each venue became a repository of scientific principles and their applications to practical ends. Like a museum or zoo, observers could study the specimens—here the objects in an exhibit. In short, viewers learned about the underpinnings of the physical world and the possibilities of manipulating that world advantageously—in a word, technology, the application of thought rationally applied to practical activities, the very definition of the mechanic arts. Alfred Ely Beach, an inventor of some note whose work appeared at the Crystal Palace Exhibition in London and who served as co-editor of Scientific American, summed up the matter neatly in 1858. "In viewing the miniature construction and operation of the most intricate piece of machinery, the untutored mind is enabled to grasp and comprehend its nature and operation, and
appreciate its benefit, and the ingenuity and skill expended in its production, and to thus acquire a knowledge which would be difficult to convey through the more slow, tedious and (to many) distasteful processes, laid down in books.” In the late 1850s, citizens “in several of our principal cities” began the “very laudable effort . . . to establish, under various names, depositories where models, drawings, and specimens of valuable or novel inventions, may be made accessible to the public” year-round. “Perpetual” exhibitions would “advance the interests of the public, by the instruction and entertainment” more effectively than their more ephemeral counterparts. They would emerge as the “great public teacher, cultivating the general intellect, refining the general taste, and awakening in every mind a desire to drink deeper” of the fountain of knowledge. Freeman Hunt, editor of *Hunt’s Magazine*, put it more simply when he wrote: A permanent exhibition “is to the scientific what a library is to the literary.”

That sort of profound understanding of the principle undergirding the mechanical arts was critical to the mid-century definition of mechanic. Without a formalized, regularized set of assumptions and parameters, the mechanic arts would be arbitrary, not suitable for the exciting new age in America. Mechanics would be drones, no better than peasants. Nor was mere technical competence acceptable. Emphasizing method over content produced a new mid-century American, a mechanic on par with doctors, lawyers and the like; it created character. Hunt put it this way: “The physician who attempts the cure of a patient, without regard to the principles of that science which governs his profession, even though he may occasionally effect an apparent restoration to health, does not honor his calling,” he protested. “The lawyer, overlooking the science of jurisprudence may succeed in gaining his cause, but cannot be said to reflect honor on his profession.” And so it was with the mechanic, who “may erect a house; but unless it conforms to architectural proportions and correct finish, he has no claim to be entitled a mechanic.” To Beach, “the increase of wages is the least and lowest of the rich rewards” of conducting one’s work according to a formal approach. In working in a scientific way, “The whole being is enlarged and exalted; the scope of view is widened; the objects of interest are increased; the subjects of thought are multiplied; life is more filled with emotion; and man is raised in the scale of creation.”

The editors of *Scientific American* claimed that a mere close study of the articles, reports and letters appearing in their periodical—ones that demonstrated the principles of science—could produce similar changes in individuals. But most educational reformers sought a more complete and permanent means of educating engineers and technicians. They almost always cited European precedents for their recommendations, and the Ecole Centrale in Paris and the “industrial universities” of the German states seemed particularly apt models.
Both required students to master theoretical principles and to apply them in practical instances. Even, however, as these critics called for governmental action to create what they termed polytechnic schools, they also acknowledged that schools purportedly built along these lines had been established earlier in America, specifically Harvard University’s Lawrence Scientific School and Yale University’s Sheffield School. But, they argued, these institutions had failed to create a practical scientific and technical curriculum, largely because both had fallen under the sway of classical departments in their respective universities and so never fulfilled their critical educational mission.\(^{23}\)

Harvard and Yale were not alone in falling into such error. Indeed, on the eve of the Civil War, Alfred Ely Beach argued with a straight face and without acknowledging hyperbole that “how much Latin and Greek shall be taught in our colleges is a question of more importance, perhaps, to the well-being of the republic, than is any of the political questions that are agitating the community.” In his opinion, classical studies should be considered both elitist and frivolous, catering only to “the sons of the rich, those who have plenty of money, and whose time is of no pecuniary value.” Certainly, he admitted, clerics needed some competence in the ancient languages in order to read scripture, but since “progressive science is the prominent characteristic of the present age,” studying classical languages “would be a waste of time” for “lawyers, engineers, merchants and mechanics.” But the problem extended far beyond the languages per se. Greek and Roman thought itself was tragically flawed, unsuitable for this “era of transition in which we behold the customs of centuries overthrown and the conditions of social life modified and changed in a thousand ways.” No longer were all things worth knowing “locked up in the writings of old Greek and Old Latin authors.” In fact, the precepts of Greece and Rome should be considered antithetical to rational learning. “The gods whom they worshipped had no existence except in their own imagination; their history consisted to a large extant of incredible fables; their total knowledge of the universe was of the most superficial, meager, and unreliable character; and a very large part of all that they believed was a mass of delusions.” Such distortions of reality could hardly imbue students with the mental discipline or moral management...
required for success in mid-nineteenth century America.  

Polytechnic schools would be different. "The living languages" would be favored because they held all "the knowledge which men now require to fit them for the occupations of life." Courses of study must concentrate on "the principles of science and art applicable to production, preparatory to their being afterwards practically followed out of the operations of the factory and workshop." Colleges of this sort would transform mechanics, and graduates trained at such institutions would have "a mind well stored with knowledge of the arts and sciences, and the power to converse readily upon general subjects." The result would be breathtaking. "Educated mechanics shine in public life, and particularly in legislative bodies, much more brilliantly than mere book scholars, whose ideas of practical life are purely theoretical." Freeman Hunt argued a similar case less grandiosely. "A young mechanic should learn to be a good draughtsman; his mind should be imbued with sound scientific information; he should be posted up in the progress of science; and he should be able to write and express his opinions freely and correctly. He should have a manly ambition to be intelligent in all that relates to his profession; for those who have no such ambition never can rise to be good mechanics or good citizens."  

Several of these polytechnic colleges opened to serve the industrial classes before passage of the Morrill Land-Grant Act. The Polytechnic College of Pennsylvania admitted its first student in 1854, while the People's College of New York began a year earlier. Like the early state-supported agricultural colleges, these polytechnic institutions were harbingers of the immediate future, foreshadowing the land-grant movement that created state-supported agricultural and technical colleges and universities in the late nineteenth century. But, perhaps surprisingly, virtually all of the farmers and mechanics colleges created before or after passage of the Morrill Act were organized around a strong literary or classical core, and courses in agriculture and the mechanic arts were subordinated to that core. This suggests that advocates of agricultural and technical education who opposed classical studies reacted more to their elitist exclusivity than to the content and substance of the ancient texts themselves. As one observer wrote, "one of the fundamental objects of all education [is] forming a habit of investigating thoroughly what comes before the mind." Apparently, he thought the classics could still provide mental discipline even in a new world dominated by scientific and applied knowledge. Another said it more simply.
Along with agriculture and mechanic arts, we include a full classical curriculum because “there is no royal road to knowledge.”

In the 1850s and 1860s, a dominant model for educating farmers and mechanics had emerged. Agriculture and mechanic arts would be offered in the new technical colleges and universities as courses, rather than as courses of study. Classical studies served as the central parts of the curriculum, albeit sometimes with modern languages substituted for their ancient counterparts along with various excursions into scientific methodology and mathematics. Agricultural courses, meanwhile, often became nothing more than exercises in applying the lessons of science to a college’s experimental field. And, mechanic arts usually meant a course in drafting or drawing, but sometimes also encompassed work in a shop in order that students might practice utilizing scientific methods in fabricating marketable products. At these new colleges, noted an adherent, “the student will not only read the lofty verse of Vergil’s [sic] ‘Georgics,’ but will reduce his rules to practice while following the ‘trailing-footed’ oxen spoken of by Homer. The Differential and Integral Calculus will commingle with the ring of the anvil and the whir of the machine shop. The mechanic’s toil will be diversified by the Histories of Tacitus or the eloquence of Cicero and Demosthenes.”

The heyday of this new agricultural and mechanical education extended only into the 1870s. By that time, another new education was being advocated, one that excluded farmers and mechanics from the methods of science entirely. In this version of technical education, knowledge became the province of scientists and engineers who taught college students and trained extension agents. Farmers and mechanics found themselves reduced to practicing what scientists and engineers preached. The mid-nineteenth century notion that several proud occupational groups might share the same methods of producing knowledge and transmitting it to the next generation disappeared. That idea was replaced by a hierarchy of occupations in which the producers of knowledge became valued over consumers of that knowledge, especially farmers and mechanics who applied technical knowledge on a daily basis to practical problems on the farm and in factories throughout the United States. Farmers and mechanics, America’s yeomen in the middle of the nineteenth century, valued for their competence and independence, the fruits of America’s republican promise, had become a dependent class, subordinated to engineers and professors who now controlled the production and distribution of technical knowledge, and to the corporations and universities that employed those new masters of the mechanic arts.

2. 12 United States Statutes at Large 503 (1862).

3. The National Association of State Universities and Land-Grant Colleges website contains much material on the present activities of land-grant institutions. See http://www.nasulgc.org


18. On early nineteenth century understandings of what a mechanic was supposed to be, as well as evidence of the decline of mechanics before 1850, see Sinclair, *Philadelphia's Philosopher Mechanics* and Spraul-Schmidt, "Ohio Mechanic's Institute." On the point of what members of the Franklin Institute did, peruse the *Journal of the Franklin Institute* after 1840 or see Bruce Sinclair, "Science, Technology, and the Franklin Institute," in Olson and Brown, eds., *The Pursuit of Knowledge*, 194-207.


