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PHILANTHROPY, INSTITUTIONS, AND THE SEARCH FOR NATIONAL ORDER

Although unambiguously an affirmation of nationality, the Union's victory in the Civil War was regarded by Boston and its elite as an affirmation of its peculiar fitness for national leadership. Bostonians had spearheaded the anti-slavery movement: their Senator Sumner had been the leading voice in the Senate against the extension of slavery and Boston dollars had financed John Brown's guerilla activities in Kansas. Bostonians had taken the lead in organizing the United States Sanitary Commission, the private venture that had provided sanitary and medical services for the army during the war. Graduates of Harvard had served in numbers which far exceeded the national average -- and alumni had played conspicuously heroic roles as officers of black army regiments. At the war's end, Bostonians took the lead in organizing and financing the reconstruction of the conquered South.

Boston's elite did not merely claim that the unique character of its people entitled it to a leading role in the affairs of the nation. Asserting that character was a product of the region's institutions, they argued that the Union's victory was a vindication of the privatized civic culture -- the complex of schools, colleges, hospitals, libraries, and charities -- that they had created over the past half-century. And they urged the Boston model as a paradigm for the redemption both of the North and the South.

These were not idle boasts. In the decades following the Civil War, Bostonians would pursue an aggressive strategy to reorganize American cultural, social, political, and economic life. Their success was due not to any intrinsic economic advantages -- for, by the 1860s, both New York and Philadelphia had by-passed Boston as economic centers -- but to their extraordinary abilities as institution-builders.

The Bostonians early understood the necessity of organization. The city's post-Revolutionary economic leaders, coming as they did from a variety of lesser ports, had had to devise new means of pooling capital and sharing power in order to compete in

newly opened global markets. While such mechanisms as the corporation and the testamentary trust helped to forge families together into a class, other means, particularly the creation of charitable and cultural institutions helped both to assure continuity and unity of purpose in succeeding generations and to recruit talent and capital from ambitious new families. Institution-building was given additional impetus by political events, as the rise of the Jeffersonians and Jacksonians drove the elite from office and forced the development of alternative forms of power -- forms rooted in cultural and economic rather than electoral bases.

WEALTH AND THE PROBLEM OF LEADERSHIP

One of the central dilemmas of Boston's elite was its uncertainty about the legitimacy of its own claims to leadership. Democracy deprived American leadership groups of the hereditary legal status that ensured power to the English aristocracy and gentry, but provided no alternative, other than the need to continuously demonstrate commitment and competence. Past achievements meant nothing; every generation had to demonstrate its fitness to serve and to lead. While institutions seemed a likely way of reliably producing fit successors, they were not without their hazards -- especially tendencies to produce enervated, luxury-loving weaklings.

As early as the 1840s, anxieties on this score became evident in the writings of Boston scholars like Francis Parkman, whose chronicles of the decline of the Spanish empire seemed a warning to Bostonians. But no one expressed these worries more eloquently than Oliver Wendell Holmes, the physician-author best known for dubbing Boston "the hub of the solar system." A brilliant physician and professor in the Harvard Medical School, Holmes had written essays and doggerel since his undergraduate days. Suddenly, in the late 1850s, he began to write more sustained and more serious literary works. His first long work, *The Autocrat of the Breakfast Table*, is filled with anxious and ambivalent statements about the problem of class formation. The first chapter of the *Autocrat* seems to favor the idea of class cohesion, the erection of formal barriers to exclude the newly rich:

-Self-made men?-Well, yes. Of course everybody likes and respects self-made men. It is a great deal better to be made in that way than not to be made at all....

Your self-made man, whittled into shape with his own jack-knife, deserves more credit, if that is all, than the regular engine-turned article, shaped by the most approved pattern, and French polished by society and travel. But as to saying that one is every way the equal of the other, that is another matter. The right of strict social discrimination of all things and persons, according to their merits, native or acquired, is one of the most precious republican privileges. I take the liberty to exercise it, when I say, that, other things being equal, in most relations of life *I prefer a man of family.

What do I mean by a man of family? --O, I'll give you a general idea of what I mean....

Four or five generations of gentlemen and gentlewomen; among them a member of his Majesty's Council for the Province, a Governor or so, one or two Doctors of Divinity, a member of Congress, not later than the time of top-boots with tassels.

Family portraits. The member of the Council, by Smibert. The great merchant-uncle, by Copley, full length, sitting in his arm-chair, in a velvet cap and flowered robe, with a globe by him, to show the range of his commercial transactions....

Books, too, with the names of old college-students in them, -family names;-you will find them at the head of their respective classes in the days when students took their rank on the catalogue from their parent's condition

No, my friends, I go (always all other things being equal) for the man who inherits family traditions and the cumulative humanities of at least four or five generations. Above all things, as a child, he should have tumbled about in a library. All men are afraid of books who have not handled them in infancy.... One may, it is true, have all the antecedents I have spoken of, and yet be a boor and a shabby fellow. One may have none of them and yet be fit for councils and courts. Then let them change places. Our social arrangement has this great beauty, that its strata shift up and down as they change specific gravity, without being clogged by layers of prescription. But still I insist on my democratic liberty of choice, and I go for the man with the gallery of family portraits against the man with the twenty-five daguerreotypes, unless I find out that the last is the better of the two.

This is a profoundly ambivalent statement. One wonders why Holmes resolved his preference in favor of the man of the family, and why he constantly repeats the refrain "all other things being equal." The sources of his ambivalence seem fairly clear. Holmes himself, like most of the "proper Bostonians" of his generation, had mixed origins: his father, although a learned man and a protege of Ezra Stiles, was from backcountry Connecticut and could boast no Smiberts or Copleys in his family gallery; his mother,

on the other hand, was from the ancient and very distinguished Wendell family of Boston and Portsmouth. Holmes, while nominally the possessor of the attributes of a man of family, must have been uneasy in his possession of them, knowing as he did that he owed his social status to a fortunate marriage. He could no more repudiate the virtues of the self-made man than he could repudiate his own paternity. But at the same time, he clearly wished to be able to draw out some sort of valid boundary between his social group and the world at large.

In a later essay in the *Autocrat*, Holmes resolved the problem in the other direction, suggesting that Boston's strength as a city depends upon its ability to tap the talent of the provinces, drawing the ambitious into its commercial, cultural, and social life:

Boston is just like other places of its size;-only perhaps, considering its excellent fish-market, paid fire department, superior monthly publications, and correct habit of spelling the English language, it has some right to look down on the mob of cities. I'll tell you, though, if you want to know it, what is the real offense of Boston. It drains a large watershed of intellect, and will not itself be drained. If it would only send away its first-rate men, instead of its second-rate ones, (no offence to the well-known exceptions, of which we are always proud,) we should be spared such epigrammatic remarks as that which the gentleman has quoted [that Boston State-House is the hub of the solar system]. There can never be a real metropolis in the country, until the biggest centre can drain the lesser ones of their talent and wealth.-I have observed, by the way, that the people who really live in two great cities are by no means so jealous of each other, as are those of smaller cities situated within the intellectual basin, or suction-range, of the large one, or the pretensions of any other. Don't you see why? Because their promising young author and rising lawyer and large capitalist have been drained off to the neighboring big city,-their prettiest girl has been exported to the same market; all their ambition points there, and all their thin gliding of glory comes from there. I hate little toad-eating cities.

Though arguing that the "man of family" is to be preferred (for what, Holmes never tell us), the greatness of Boston -- or any other city --, Holmes had to acknowledge, clearly depended on its ability to gather the intellectual and economic harvest of the regions surrounding it. But the problem of defining and maintaining the collective identity of Boston's emergent ruling class, accommodating -- and even aggressively recruiting -- the talented and ambitious, and socializing both the

"cumulative humanities" which framed the identity of his class, is, once again, unanswered.

In the next-to-last essay in the *Autocrat*, Holmes propounded the problem of class in its most troublesome form. Stepping away from the merely ascriptive aspects of long-term possession of wealth (portraits, distinguished ancestors, and the like), he sketched out, from a physician's standpoint, the concrete benefits that wealth conferred on its possessors:

We are forming an aristocracy, as you may observe, in this country, -- not a *gratia-Dei*, nor a *jure-divino* one, -- but a de-facto upper stratum of being, which floats over the turbid waves of common life like the iridescent film you may have seen spreading over the water about our wharves,-very splendid, though its origin may have been tar, tallow, train-oil, or other such unctuous commodities. I say, then, we are forming an aristocracy; and, transitory as its individual life often is, it maintains itself tolerably, as a whole. Of course, money is its corner-stone. But now observe this. Money kept for two or three generations transforms a race, -- I don't mean merely in manners and hereditary culture, but in blood and bone. Money buys air and sunshine, in which children grow up more kindly, of course, than in close, back streets; it buys country places to give them happy and healthy summers, good nursing, good doctoring, and the best cuts of beef and mutton.... As the young females of each successive season come on, the finest specimens among them, other things being equal, are apt to attract those who can afford the expensive luxury of beauty. The physical character of the next generation rises in consequence. It is plain that certain families have in this way acquired an elevated type of face and figure, and that in a small circle of city connections one may sometimes find models of both sexes which one of the rural counties would find hard to match from all its townships put together. Because there is a good deal of running down, of degeneration and waste of life, among the richer classes, you must not overlook the equally obvious fact I just spoke of, -- which in one or two generations more will be, I think, more patent than just now.

Beginning in commerce, the fact of wealth transforms lives, establishes more healthy conditions, institutionalizes a life style that is defined not only by good doctoring and good eating, but also by education, occupation, and marriage. Holmes was clearly unfolding for his readers the progressive elaboration of class institutions and behavioral patterns over time. With the passage of each generation, the characteristics and, implicitly, the institutions, of the class become more clearly defined. There arose the problem, as Holmes, the father of adolescent sons, well knew:

The weak point in our chryso-aristocracy is the same *I have alluded to in connection with cheap dandyism. Its thorough manhood, its high-caste gallantry, are not so manifest as the plate glass of its windows and the more or less legitimate heraldry of its coachpanels. It is very curious to observe of how small account military folds are held among our Northern people. Our young men must gild their spurs, but they need not win them. The equal division of property keeps the younger sons above the necessity of military service. Thus the army loses an element of refinement, and the moneyed upper class forgets what it is to count heroism among its virtues. Still I don't believe in any aristocracy without pluck as its backbone. Ours may show it when the time comes, if ever it does come.

Holmes wrote these words during the spring of 1858. His young men would very soon have a chance to "earn their spurs."

Doctor Holmes' meditations on the problem of stabilizing the wealthy and educated families of Boston into a class did not end with *The Autocrat of the Breakfast Table*. He continued to dwell on the subject in his first novel, *Elsie Venner*, which was serialized in the *Atlantic Monthly* in 1859 and 1860. Although he was still unable to resolve his ambivalence about the relation between ambition and tradition, he managed to define the problem more clearly and analytically. The first chapter of the novel is entitled "The Brahmin Caste of New England." In it he attempts to draw distinctions between the aristocracies of the old world, modern classes as defined by the possession of wealth, and the "Brahmin Caste of New England," which constituted the pool of education and breeding that occasionally overlapped with wealth and power.

Holmes dealt with aristocracy in a few words. "There is nothing in New England," he wrote, "corresponding at all to the feudal aristocracies of the Old World. "What is called an aristocracy in this country is," in Holmes' view, "merely the richest part of the community," some of whom were well-bred, others "only purse-proud and assuming." They are not an aristocracy, wrote Holmes, but a class. Class, for Holmes, was a very impermanent thing-the embodiment of the social problem with which he was attempting to grapple:

It is in the nature of large fortunes to diminish rapidly, when subdivided and distributed. A million is the unit of wealth, now and here in America. It splits into four handsome properties; each of these into four good inheritances; these, again, into scanty competences for four ancient maidens,-with whom it is best that the family should die out, unless it can begin again as its great-grandfather

did. Now a million is kind of golden cheese, which represents in a compendious form the summer's growth of a fat meadow of craft or commerce; and as this kind of meadow rarely bears more than one crop, it is pretty certain that sons and grandsons will not get another golden cheese out of it, whether they milk the same cows or turn in new ones. In other words, the millionocracy, considered in a large way, is not at all an affair of persons and families, but a perpetual fact of money with a variable human element.... Of course this trivial and fugitive fact of personal wealth does not create a permanent class, unless some special means are taken to arrest the process of disintegration in the third generation. This is so rarely done, at least successfully, that one need not live a very long life to see most of the rich families he knew in childhood more or less reduced, and the millions shifted into the hands of the country-boys who were sweeping stores and carrying parcels when the now decayed gentry were driving their chariots, eating their venison over silver chafing-dishes, drinking Madeira chilled in embossed coolers, wearing their hair in powder, and casing their legs in long boots with silken tassels.

Holmes, in pondering the problem of social stability, must have been reading de Tocqueville. For like the Doctor, the author of *Democracy in America* had traced the variability of wealth-holding to the law of inheritance:

When the equal partition of property is established by law, the intimate connection is destroyed between family feeling and the preservation of the paternal estate; the property ceases to represent the family; for, as it must inevitably be divided after one or two generations, it has evidently a constant tendency to diminish and must in the end be completely dispersed.

But where Tocqueville foresaw an absolute domination of the law of the marketplace over both property and culture, "a middling standard ... fixed in America for human knowledge," Holmes saw something else. He agreed with the Frenchman that "there is no class ... in America, in which the taste for intellectual pleasures is transmitted with hereditary fortune and leisure and by which the labors of the intellect are held in honor." That is, he recognized that the "taste for intellectual pleasures" was not necessarily transmitted with "hereditary fortune and leisure." But he was unwilling to concede that the guardianship of culture had to be joined to wealth and power. Instead, he referred implicitly to Tocqueville's discussion of the situation of culture during New England's earliest years. "I have stated in the preceding chapter," wrote de Tocqueville,

that great quality existed among the immigrants who settled on the shores of New England. Even the germs of aristocracy were never planted in that part of the Union. The only influence which obtained there was that of the intellect; the people became accustomed to revere certain names as representatives of knowledge and virtue. Some of their fellow citizens acquired a power over the

others that might truly have been called aristocratic if it had been capable of transmission from father to son.

Holmes also believed that the "influence of the intellect" was both a characteristic of certain families and existed more or less independently of the possession of power and wealth. indeed, its independence from power was, to a significant extent, the cause of its survival. This was the "Brahmin Caste of New England." "There is ... in New England," Holmes wrote,

an aristocracy, if you choose to call it so, which has a far greater character of permanence. It has grown to be a caste,-not in any odious sense,-but, by the repetition of the same influences, generation after generation, it has acquired a distinct organization and physiognomy. . . . There are races of scholars among us, in which aptitude for learning ... [is] congenital and hereditary. Their names are always on some college catalogue or other. They break out every generation or two in some learned labor which calls them up after they seem to have died out. At last some newer name takes their place, it may be,-but you enquire a little and you find it is the blood of the Edwardses or the Chauncys or the Ellerys or some of the old historic scholars, disguised under the altered name of a female descendant.

THE CIVIL WAR AND THE VINDICATION OF BOSTON'S ELITE

In the Ante Bellum era, the younger generation of Boston's emergent elite were beset by dilemmas. As readers of Emerson and the other Transcendentalists, they felt called to higher forms of service than those of their parents and grandparents -- who, in farming "the fat meadow of craft and commerce, had made the fortunes that paid for their prolonged educations, subsidized their Grand Tours of Europe, and established the trusts funds off of which they lived. Great things were expected of them, but American life in the 1850s seemed to offer few avenues for these would-be heros.

Historian George Frederickson has described their situation with great accuracy. Charles Russell Lowell, who addressed his 1854 Harvard valedictory oration to Emerson's "American Scholar," which called for a union of "man thinking" with a life of action, was typified his generation's frustrations: "How was he both to develop an inner life and play an 'heroic' role in the world? His problem was compounded by the fact that American seemed to deny heroic roles to members of Lowell's social class" (Frederickson 1965, 30). After four years of drifting and semi-invalidism, he went to

Iowa to work on one of the Boston-controlled western railroads -- "but in 1860, Lowell had still not found a vocation which combined self-culture with an active life" (30).

Lowell's cousin, Henry Lee Higginson, faced a similar predicament. After dropping out of Harvard and concluding that "trade was not satisfying to the inner man for a life-occupation," he drifted to Europe to study music (31). "He was desperate for a profession," Frederickson writes. "Emerson's demand for a high life had unfitted some young Brahmins for the 'natural' social roles, but had opened no alternatives" (31).

The Civil War resolved the elite's dilemma, combining as it did the highest of ideals -- saving the Union and emancipating the slaves -- with the promise of real action. Young Bostonians like Charles Russell Lowell, Henry Lee Higginson, Oliver Wendell Holmes, Jr., and Robert Gould Shaw flocked to the recruiting stations to volunteer their services. They not only fought heroically, they were leaders -- setting examples of bravery and sacrifice for their men.

For the Harvard graduates who had died for the Union, Thomas Wentworth Higginson, Henry Lee's cousin, summarized the meaning of the war experience for his generation and class in his introduction to the *Harvard Memorial Biographies* (1866).

Thomas Wentworth Higginson, ed., *Harvard Memorial Biographies* (Cambridge: Sever and Francis, 1866), iii-vi.

THOSE of us whose fortunate lot it was to enlist in the army, during that magic epoch of adventure which has just passed by, will never again find in life a day of such strange excitement as that when they first put on uniform and went into camp. It was a day absolutely broken off from all that had gone before it. To say that it brought a sense of utter novelty, is nothing; the transformation seemed as perfect as if, by some suddenly revealed process, one had learned to swim in air, and were striking out for some new planet. The past was annihilated, the future was all. Now that dimly-visioned future has itself become a portion of the past; that new cycle of existence is ended; already its memories grow dim; and, after all that seeming metamorphosis, the survivors still find themselves with their feet upon the familiar earth, and pursue once more the quiet paths they left. The *aureole* is vanished from their lives, but it still lingers round the heads of the fallen. No time, no change, can restore them to the old ways, or take them from the enchanted sphere in which they henceforth dwell.

This is a series of memoirs of those graduates and former undergraduates of Harvard University who fell in battle [iv] during the recent war, or who died in consequence of services rendered in the contest. Former members of the Professional Schools of the University are not included. There are ninety-five of these memoirs, more than three quarters of which were prepared by Harvard graduates, and more than one quarter by graduates who have themselves served in the army. The work is, therefore, in a very thorough sense, a Harvard Memorial. Every memoir is here first published in its present form; and every memoir, with one exception is the most elaborate yet printed upon the subject which it treats. Each was written, so far as practicable, by the person who seemed best adapted to that particular task, through personal intimacy or kinship; and if the results sometimes seem inadequate, they are like those unavoidable failures of a military campaign, which have often cost more labor than its successes.

The work not being a history, but a collection of biographies, historic interest has been kept subordinate to the exhibition of personal character. "The best thing we have from history," said Goethe, "is the enthusiasm which it excites"; and any light here thrown on military movements is only an indirect result, the main object being simply the delineation of the men. It was felt that if they could be truly pictured, and if vague superlatives could be rigidly excluded, then there would be no monotony in the book,

since no two of these lives were in reality alike; and it would contain nothing superfluous, because the humblest of these lives was still given for our country at last.

If there is any one inference to be fairly drawn from these memoirs, as a whole, it is this: that there is no class of men in this republic from whom the response of patriotism [v] comes more promptly and surely than from its most highly educated class. All those delusions which pass current in Europe, dating back to De Tocqueville, in regard to some supposed torpor or alienation prevailing among cultivated Americans, should be swept away forever by this one book. The lives here narrated undoubtedly represent on the whole those classes, favored in worldly fortune, which would elsewhere form an aristocracy, --with only an admixture, such as all aristocracies now show, of what are called self-made men. It is surprising to notice how large is the proportion of Puritan and Revolutionary descent. Yet these young men threw themselves promptly and heartily into the war; and that not in recklessness or bravado, --not merely won by the dazzle of a uniform, or allured by the charm of personal power, or controlled even by "that last infirmity," ambition, --but evidently governed, above all things else, by solid conviction and the absolute law of conscience. To have established incontestably this one point, is worth the costly sacrifice which completed the demonstration.

And if there is another inference that may justly be deduced from these pages, it is this: that our system of collegiate education must be on the whole healthy and sound, when it sends forth a race of young men who are prepared, at the most sudden summons, to transfer their energies to a new and alien sphere, and to prove the worth of their training in wholly unexpected applications. So readily have the Harvard graduates done this, and with such noble and unquestioned success, that I do not see how any one can read these memoirs without being left with fresh confidence in our institutions, in the American people, and [vi] in human nature itself. Either there was a most rare and exceptional combination in the lives which Harvard University gave to the nation, or else --if they fairly represent their race and their time --then the work and the traditions of our fathers are safe in the hands of their descendants. The best monument that we can build to these our heroes, is to show that they have renewed our faith, and made nobler the years that are to come.



Harvard's Memorial Hall. Built as a monument to Harvard graduates who died fighting for the Union.

The impact of the war on the generation of upper crust young men coming to maturity in the 1850s and 60s was dramatic. They found their callings in serving their country -- and they drew from this service lessons about how high purposes could be combined with mundane callings in business and the professions. The war gave their class a sense of collective purpose which played itself out in the real world of economic and political struggle -- and institution-building. A few weeks before he fell on the battlefield, Charles Russell Lowell wrote to Henry Higginson that he had "outgrown all foolish ambitions" and was now "content to become a 'useful citizen.'" "A useful citizen," he continued, "is a mighty unpretending hero. But we are not going to have any country very long unless such heroism is developed" (173). Higginson, Frederickson writes,

treasured the letter and was fond of quoting from it in later life as a kind of personal creed. As Higginson's biographer has indicated, Lowell's description of

"useful citizenship" is "essential to an understanding of the controlling motive of Higginson's later life. Specifically, it made it easier for him to give up his musical ambitions and to accept a place in the family business. The concept of the "useful citizen" helped the former Emersonian idealist to become the civic-minded State Street banker who would show his respect for the artistic life in a peculiarly institutional way by founding the Boston Symphony Orchestra (173).

Higginson's cousin, Thomas Wentworth, followed his generation in turning away from the contemplative life. "Two years of army life," he wrote in his autobiography, had so checked the desire for active literary pursuits. . . that I should actually have been contented not to return to them. I should have liked better to do something that involved the charge and government of men, as for instance in the position of agent of a large mill or a railway enterprise. This mood of mind was really identical with that which led some volunteer officers to enter the regular army, and others to take up cotton-raising at the South (1899, 269).

Attracted to lives of action and service, Higginson's generation of blue bloods plunged into the rough and tumble of American business and took leading roles in transforming the economy from one based small firms serving local and regional markets to one which, based on large, professionally-managed bureaucratized enterprises, served national and world markets.

"FIGHTING THE WILDERNESS, PHYSICAL AND MORAL": CHARLES W. ELIOT AND THE EMERGENCE OF THE PRIVATE UNIVERSITY



In the winter of 1869, a series of articles began to appear in the *Atlantic Monthly* under the title, "The New Education." Its basic premises were boldly stated: "The American people are fighting the wilderness, physical and moral, on the one hand, and on the other are struggling to work out the awful problem of self-government. For this fight they must be trained and armed." The struggle, as the author saw it, required a new kind of fighter -- not the ingenious Yankee who could turn his hand to anything, but the trained expert, who combined specialized knowledge with administrative skills -- for the task of these men was nothing less than the transformation of the United States into an industrial power. The United States already possessed the population and the resources to turn it into a leading industrial power. But these energies needed focus and direction. Fulfilling America's promise required a comprehensive educational system, to recruit and train technicians and administrators, to foster basic and applied research in the social and natural sciences, and to propagate common values capable of unifying the immense diversity of American life.

As things stood, the author believed, the nation was not prepared to do this. American higher education, the author asserted, was in a deplorable condition. The colleges were hardly worthy of comment. With their prescribed classical curricula, they were failed institutions in which "a large number of professors trained in the existing methods hold firm possession, and transmit the traditions they inherited." The technical schools were little better. Though innovative to the extent that they attempted "to organize a system of education based chiefly upon the pure and applied sciences, the living European languages, and mathematics, they suffered from incoherent goals and low standards.

The author of "The New Education," Charles W. Eliot, proposed to reshape both the structure and substance of American higher education. Mathematics and the sciences, modern languages and literature, and history and the social sciences would be integrated into the undergraduate curriculum. An elective system would provide unlimited choice of fields of study, permitting students to discover and develop their specialized interests and abilities. Professional schools would be up-graded and new research-oriented programs of graduate study would be developed. Most important of all, the new education would foster much closer ties between the university and the worlds of business and government. These ties were crucial because education alone could not provide the full range of skills needed for professional or managerial competence.

Eliot's concern in "The New Education" was not curriculum, but the ultimate utility of education. A college education could enable a student to make intelligent choices, but should not attempt to provide specialized vocational or technical training. Although technical training should be more explicitly vocational, it should also include instruction in history, languages, political economy, as well as providing a broad knowledge of science and mathematics. Only by differentiating the two levels of the educational process and making each as comprehensive as possible, could higher education hope to prepare students to cope with the rapid pace of technological, economic, and political change. A truly useful education, in Eliot's view, included a commitment to public service, specialized training, and a capacity to change and adapt.

Although his methods were pragmatic, Eliot's ultimate goal, like those of the secularized puritanism of the Boston elite, was a spiritual one. The spiritual desideratum was not otherworldly. It was embedded in the material world and consisted of measurable progress of the human spirit towards mastery of human intelligence over nature -- the "moral and spiritual wilderness." While this mastery depended on each individual fully realizing his capacities, it was ultimately a collective achievement and the product of institutions which established the conditions both for individual and collective achievement. Like the Union victory in the Civil War, triumph over the moral and physical wilderness and the establishment of mastery required a joining of industrial and cultural forces.

Who did Eliot see as his audience as he enunciated these themes? On whom was he calling as he sought to place education in the service of progress? Most immediately, his audience was undoubtedly the Harvard Fellows and Overseers, whom he hoped would give his candidacy serious consideration. And these were overwhelmingly either businessmen or lawyers closely connected to business interests. More generally -- although he began his essays by asking the question, "What can I do with my boy?" -- he also seems to have been addressing a public of businessmen rather than a general public. For the essays are almost exclusively concerned with the utility of the higher learning in the context of business and with the place of business in American civilization.

That Eliot should have addressed his remarks to a business audience is hardly surprising given his own background, for Eliot was unquestionably a product of a business culture. His father, Samuel Atkins Eliot (17 -18), was one of Boston's leading business philanthropists, who served as Treasurer of Harvard for eleven years, as president of the Boston Academy of Music, as well as being Mayor of Boston and a member of Congress. Charles W. Eliot's paternal grandfather, Samuel Eliot (1739-1820), had been an extraordinarily successful merchant in partnership with the Amorys. On his death, he left an estate valued at \$1.2 million. Eliot's maternal grandfather, Theodore Lyman (1755-18__) had come from York, Maine to Boston as a

penniless boy, but by the end of his life had accumulated a huge fortune. A contemporary wrote of him, "He was a man of strong mind and bad passions. Such men are not scrupulous in the choice of means to effect their purposes. Shylock could sacrifice to revenge." Though a hard man commercially, "his benevolence was most extraordinary," according to another contemporary. He was one of Horace Mann's chief financial supporters. His son, Eliot's Uncle George, was also an extensive trader and president of the Boston and Lowell Railroad. His daughter, Eliot's Aunt Sarah, married Samuel P. Sears, son of the millionaire merchant-industrialist David Sears, who was counted one of Boston's richest men. Although one of Eliot's maternal aunts married the Harvard reformer and publisher, George Ticknor, the others maintained the family's business connections: one married Benjamin Guild, whose family had made a fortune in real estate speculation; the other married Edmund Dwight, a leading Boston financier whose father had been one of the most extensive textile manufacturers in western Massachusetts. Eliot was, in sum, a typical product of the Boston elite, which had succeeded in combining business, philanthropic, and cultural interests -- but in which business and the business sensibility (as well as business control of institutions) always remained dominant.

In other times, Charles W. Eliot would have undoubtedly gone directly from Harvard (whence he graduated in 1853) into one or another of his family's business firms. But neither his family's circumstances nor the prevailing child-rearing practices of upper class Boston in this period required such a move. Instead, he was placed in the uncomfortable position of having to decide for himself what he wanted to be. After months of indecision, he finally wrote a letter to his mother in which he announced and justified his choice of a calling:

DEAR MOTHER, -- I have chosen the profession of a student and teacher of science, and it is you who should first know my choice, and understand the grounds of my decision. I shall try to write out here the pith of all the thought which I have given to the subject for the last year and a half, and to show you the steps which led me to this conclusion.

"To do all to the glory of God" should be the ruling motive of a Christian's life.

Man glorifies God, 1st by being useful, 2nd by being happy. Before choosing the profession of a scientific scholar, I asked an answered two questions,-- 1st -- is that profession a useful one? 2nd -- could I be happy therein?

The scientific man is useful as a teacher. I need not describe a teacher's influence nor analyze the means of his usefulness; his calling is especially honored in this community, and is especially needful, rather it is absolutely necessary in this republican country. The physical resources of this country have been developed with marvellous rapidity; millions till its soil, millions are busy with its trade, millions labor in its workshops, but only a few thousands keep its schools, only a few hundreds direct its Colleges. The very maintenance of our free institutions depends on the education of the people. Surely he holds an honorable and responsible post, who labors in the cause of education, to diffuse that knowledge, and to stimulate the intellectual progress of the people, which alone can make safe the possession of national power and wealth, which alone can successfully contend against the monstrous vices which follow in the train of liberty and luxury. . . . A successful teacher is a good and useful citizen.

Science offers to her successful votaries a wide and honorable reputation as a reward for faithful service. Now fame is not the bread and meat which sustains life, but it is an agreeable dessert. . . . And what a splendid opening, what a magnificent field for young American science! New Colleges springing up everywhere, government expeditions by land and water, mines and factories, all requiring scientific aid, and very few scientific men to meet all this demand. The scientific men of America will make their mark within the next fifty years, and the young man who starts now with a determination to be a good teacher and a thorough scholar stands more than a fair chance of becoming distinguished. . . .

More interesting than the fact that Eliot chose science over business is the fact that he did so without any explicit or implicit disparagement of business. He did not, as so many of his contemporaries, suggest that choosing the counting house meant opting for mere money-grubbing. Indeed, one of his major justifications for becoming a scientist was the fact that science was useful to business and that both together were requisites for the fulfillment of the promise of American life. Further, it is worth noting that the branch of science he choose to enter was that which -- next to engineering -- had the most important industrial applications: chemistry.

In spite of his high ambitions and his obvious scientific talents, the first fifteen years of Eliot's career were less than auspicious. He was appointed Tutor in Mathematics at Harvard in the fall of 1854 and promoted to Assistant Professor of Mathematics and Chemistry in 1858. He taught competently, wrote some technical

pieces on chemical impurities in industrial metals, and busied himself with schemes for the reform of Harvard's Lawrence Scientific School. But his real goal, appointment to the Rumford Professorship of Chemistry, eluded him. This was a particularly bitter blow because of a change in his family's economic circumstances -- the failure of his father in the Panic of 1857. Eliot had to face the fact that "he had nothing to look to but his teacher's salary and a legacy left to him by his grandfather Lyman." After a bitter struggle over the Rumford chair, Eliot left Harvard in 1863. His friends assumed that he would "be obliged to cut chemistry and go into business in order to earn a livelihood for his family." But he did not. Instead, he used his grandfather's legacy and a small borrowed sum to spend the next two years travelling in Europe, studying the educational systems of the Old World.

Eliot's approach to investigating European education was unusual. He did not confine his attention to educational institutions, but explored the role of education in every aspect of national life. In France, for example, he questioned "doctors, landladies, servants, and tradespeople over matters that might have appeared to be far removed from his educational inquiries." As he wrote to his mother in April of 1864:

What then is to be learned here France has contributed greatly to the rapid development of physical science within the last 80 years -- she has brought forth of great men, a few, and of moderate men, a great number. French chemists, physicists, naturalists, doctors, surgeons, have done great things, and France has applied in her industries the discoveries of her savants. Why has this come about? What is there in the temper and organization of the nation which produces these admirable effects? . . . One may speculate about the causes, if he pleases, but one can see the effects. Its institutions of education characterize a people as well or better than any other group of institutions. From these institutions, well understood, you may learn whether a nation is aristocratic or republican, bound or free, old or new, lively or stagnant, whether the professions and industries are free or hampered. . . . I believe I have learned what kind of an education a French laborer, shopkeeper, merchant, lawyer, doctor, professor, engineer, mid-wife, school-master, school-marm, apothecary may be expected to have received. . .

When Eliot visited schools, he took an interest in every aspect of institutional operation, from curriculum and methods of instruction through physical arrangements and custodial services. But his particular concern was with the relation between education and economic growth:

I have given special attention to the schools here provided for the education of young men for those arts and trades which require some knowledge of scientific principles and their applications, the schools which turn out master workmen, superintendents, and designers for the numerous French industries which demand taste, skill, and special technical instruction. Such schools we need at home. I can't but think that a thorough knowledge of what France has found useful for the development of her resources, may someday enable me to be of use to my country. At this moment, it is humiliating to read the figures which exhibit the increasing importations of all sorts of manufactured goods into America. Especially will it be the interest of Massachusetts to foster by every means in her power the manufactures which are her main strength.

Eliot was not naive about the problems of relating the "disinterested" work of the scientist with the self-interested application of scientific truth to industrial processes. In a letter to his cousin Arthur T. Lyman, he discussed the value to the German chemical industry of discoveries made in university laboratories. But, interestingly, he seems to have seen no contradiction between the pursuit of truth and the pursuit of profit -- at least not in the short run. For him, the more pressing necessity was to "naturalize" the pursuit of science, both pure and applied, in the United States. To do this would, inevitably, benefit both. As he noted in the conclusion of his letter to Cousin Lyman:

Every one of the famous universities of Europe was founded by Princes or privileged classes -- every Polytechnic School, which I have visited in France or Germany, has been supported in the main by Government. Now this is not our way of managing these matters of education, and we have not yet found any equivalent, but republican, method of producing the like results. In our generation I hardly expect to see the institutions founded which have produced such results in Europe, and after they are established they do not begin to tell upon the national industries for ten or twenty years. The Puritans thought they must have trained ministers for the Church and they supported Harvard College -- when the American people are convinced that they require more competent chemists, engineers, artists, architects, than they now have, they will somehow establish the institutions to train them. In the meantime, freedom and the American spirit of enterprise will do much for us, as in the past

While Eliot was in Europe, he was again presented with the opportunity to enter the world of active business. The Merrimack Company, one of the largest textile mills in Lowell, tendered him an invitation to become its superintendent. In spite of the urgings of his friends and the attractiveness of what for the time was the enormous salary of \$5000 (plus a good house, rent free), Eliot, after giving considerable thought to the offer, turned it down. One of his biographers speculated that

he surely realized by this time that he had a strong taste for organizing and administering. This post would have given it scope. He must have felt, even if dimly, that if science interested him, it was not because he was first and last a lover of her laws and generalizations, nor only because the clarity and precision of science was congenial, but because science answered the questions of practical men and conferred knowledge and power upon those who would the labors of their generation. During nearly two years in Europe he had found himself as much fascinated by what he could learn concerning the methods by which science could be made to help industry as by what he discovered about the organization of institutions of learning. He was thinking much about what his own young country needed, and his hopes for the United States took account of industry and commerce as well as the field of academic endeavor. To be the chief executive officer of a particular business only a limited range of influence; but to stand at the intersection of the realm of production and the realm of knowledge offered considerably more.

It is tempting at this point to view Eliot as representing either an idiosyncratic interest or -- as many do -- to place him in the continuum of higher education reform that had been developing since the 1820s. But he was clearly not one of the *Lazzaroni*, that group of leading scientists and science educators who had championed the creation of specialized institutions like the Lawrence and Sheffield Scientific Schools at Harvard and Yale. They had been the chief obstacles to his promotion to the Rumford Professorship and his 1869 essays on the New Education were, more than anything else, a devastating critique of their educational ideas and practices. Not surprisingly, they did everything they could to block his election to Harvard's presidency. Nor was he in the party of Francis Wayland and others, who had been speaking and writing since the 1820s in favor of a more practical and vocationally oriented undergraduate curriculum. While Wayland and Eliot both advocated an elective curriculum, there were crucial differences in the purposes which they saw such a system as serving. For Wayland, the elective system made college education more attractive to the public and more utilitarian to society and industry in a direct sense. Eliot, on the other hand, saw it as an improvement on the traditional mode of character education: it was a method which enabled the young to experiment in the realm of ideas in order to find out what kind of intellectual endeavors made them *happy*. The determination thus made -- whether in a specialized or generalized direction -- the individual could go forward to become *useful* by perfecting his skills, either through post-graduate and professional education or through on-the-job training (such as the world of business required).

Both the *Lazzaroni* and the vocationalists were, unlike Eliot, part of the earlier clerical academic tradition, which sought to elevate academicians to controlling positions in academic institutions. Charles W. Eliot understood that such a secular priesthood was no better or less prone to corruption than its sacred counterparts in Catholic countries. The irony of the kind of autonomy sought by the Lazzaroni was that, insulation from the men of affairs would make them their clients, much as the Roman Church had become the client of political authority in Europe. Rather than protecting the pursuit of pure science, it would in fact diminish opportunities for it, both because those studying science would tend to be persons narrowly committed to science to the exclusion of everything else, and because the priorities of scientific teaching and research would be determined by either those scientists who held positions of institutional power or by those who hired them to do particular jobs. In either case, the effect would be a narrowing rather than a broadening of possibilities.

Eliot was sympathetic to the situation of the scientific schools which had been grafted onto older colleges at Harvard, Yale, Dartmouth, and Columbia. His sympathy did not, however, restrain the severity of his criticism of the quality of the educational product turned out by these institutions. He questioned their standards of admission, as well as the narrow training which students received once admitted to the schools. He was especially concerned that these "vocational" efforts, for all of their extravagant claims, did not succeed in giving young men the kind of training they really needed to pursue their specialties in actual business settings. Apprenticeship in the real worlds of engineering, mining, and manufacturing was essential to the educational preparation of executives. "Young men of twenty to twenty-four," Eliot tartly remarked, "are seldom equal to great money responsibilities."

Eliot's most important conclusion lay in the distinction he drew between the objectives scientific and academic training --between the purposes of a polytechnic or scientific school and those of a university. The university, he believed, should aim for "broadest culture, for the best formation and information of the mind, the enthusiastic study of subjects for the love of them without any ulterior objects, the love of learning and research for their own sake." The polytechnic school "has a practical end

constantly in view" and should train its students to make better manufacturers, engineers, and teacher. This distinction did not preclude the university offering vocational training. It did, however, point to the need to distinguish the two within the structure of the curriculum, by making a set of generalized undergraduate studies the prerequisite for more specialized education on the graduate level.

In mounting this argument, Eliot was envisioning a role for undergraduate education which in crucial ways preserved -- and even enhanced -- its traditional spiritual and character education functions. Every individual mind, in Eliot's view, had "its own peculiar constitution." The problem, both in terms of fully developing an individual's capacities and in maximizing his social utility, was to present him with a course of study sufficiently representative so as "to reveal to him, or at least to his teachers and parents, his capacities and tastes." An informed choice once made, the individual might pursue whatever specialized branch of knowledge he found congenial: "When the revelation of his own peculiar taste and capacity comes to a young men, let him reverently give it welcome, thank God, and take courage. Thereafter he knows his way to happy, enthusiastic work, and, God willing, to usefulness and success."

Eliot, like his contemporary, the railroad reformer Henry Varnum Poor, must be seen as a product both of Transcendentalism and social Darwinism. Both saw the world as moving towards a more perfect order; both believed in the changeability of institutions; and both believed that the achievement of that order depended on mobilizing the material resources of society in order to attain what were ultimately spiritual ends. But, because of the influence of Darwinism and, via Transcendentalism, of Hegel, the spiritual achievement had come to consist not of a formless, abstract, millennial unity, but was embedded in material things themselves -- in measurable progress in the movement of history (the totality of human and institutional relations) and in the mastery of the human spirit over the world of matter. For both, collective achievement depended on the fullest possible realization of individual capacities and this, in turn, was facilitated through institutions which established conditions both for individual and collective progress. As for the more enlightened businessmen of the period, social morality and material efficiency inextricably intertwined.

C. W. Eliot, "The New Education," *Atlantic Monthly*, XXIII (February and March, 1869), 202-20, 365-66.

"What can I do with my boy? I can afford, and am glad, to give him the best training to be had. I should be proud to have him turn out a preacher or a learned man; but I don't think he has the making of that in him. I want to give him a practical education; one that will prepare him, better than I was prepared, to follow my business or any other active calling. The classical schools and the colleges do not offer what I want. Where can I put him?" Here is a real need and a very serious problem. The difficulty presses more heavily upon the thoughtful American than upon the European. He is absolutely free to choose a way of life for himself and his children; no government leading strings or social prescriptions guide or limit him in his choice. But freedom is responsibility. Secondly, being thus free, and being also in face of prodigious material resources of a vast and new territory, he is more fully awake than the European can be to the gravity and urgency of the problem. Thirdly, he has fewer means than any other, except the English parent, of solving the problem to his son's advantage. It is one hundred and thirty years since the first German practical school (*Realschule*) was established, and such schools are now common. Sixty years ago, in France, the first Napoleon made great changes, mostly useful ones, in methods of education. For more than a generation the government schools of arts and trades, arts and manufactures, bridges and highways, mines, agriculture, and commerce, have introduced hundreds of well-trained young men every year into the workshops, factories, mines, forges, public works, and counting rooms of the empire. These young men begin as subalterns, but soon become the commissioned officers of the army of industry.

The American people are fighting a wilderness, physical and moral, on the one hand, and on the other are struggling to work out the awful problem of self-government. For this fight they must be trained and armed. No thoughtful American in active life reaches manhood without painfully realizing the deficiencies and shortcomings of his own early training. He knows how ignorance balks and competition overwhelms, but he knows also the greatness of the material prizes to be won. He is anxious to have his boys better equipped for the American man's life than he himself was. It is useless to commend to him the good old ways, the established methods. [204] He has a decided opinion that there are or ought to be better ways. He will not believe that the same methods which trained some boys well for the life of fifty or one hundred years ago are applicable to his son; for the reason, that the kind of man which he wants his son to make did not exist in

all the world fifty years ago. So without any clear idea of what a practical education is, but still with some tolerably distinct notion of what it is not, he asks, "How can I give my boy a practical education?"

Thanks to the experience gained during the last twenty years in this country, it is easier to answer this question than it used to be. Certain experiments have been tried whose collective results are instructive. There have been found many American parents willing to try new experiments even in the irrevocable matter of their children's education, so impressed were they with the insufficiency of the established system. It requires courage to quit the beaten paths in which the great majority of well-educated men have walked and still walk. . . .

Without a wide-spreading organization, no system of education can have large success. The organization of the American colleges and their connections is extensive and inflexible. Endowed institutions offer teaching at less than its cost. A large number of professors trained in the existing methods hold firm possession, and transmit the traditions they inherited. Then there are the recognized text-books, mostly of exquisite perverseness, but backed by the reputation of their authors and the capital of their publishers. Lastly, the colleges have regular inlets and outlets. They are steadily fed by schools whose masters are inspired by the colleges, and they as regularly feed all the real and all the so-called learned professions.

The new education must also be successfully organized, if it would live. A system of education which attracts no great number of boys, which unites its disciples in no strong bonds of common associations and good-fellowship, and which, after years of trial, is not highly organized with well-graded schools, numerous teachers, good text-books, and a large and increasing body of attached alumni, has no strong hold upon the community in which it exists. Let us see what has been done towards this organization.

We wish to review the recent experience of this country in the attempt to organize a system of education based chiefly upon the pure and applied sciences, the living European languages, and mathematics, instead of upon Greek, Latin, and mathematics, as in the established college system. The history of education is full of still-born theories; the literature of the subject is largely made up of theorizing; whoever reads it much will turn with infinite relief to the lessons of experience. But it should be observed that it is experience in mass, the experience of institutions, the experience of a

generation, and not individual experience, which is of value. To have been a schoolmaster or college professor thirty years only too often makes a man an [205] unsafe witness in matters of education: there are flanges on his mental wheels which will only fit one gauge. On the other hand, it must be acknowledged that conservatism is never more respectable than in education, for nowhere are the risks of change greater. Our survey of the institutions which represent the new education in this country will be absolutely impersonal; the merits of the different systems are to be discussed, not the characters or qualifications of the men who have invented, or worked under, these systems. This limitation of the discussion is judicious, from all points of view; for in no country is so little attention paid by parents and students to the reputations of teachers for genius and deep learning as in our own. Faradays, Rumfords, and Cuviers would get very few pupils here, if their teachings were unmethodical and objectless,--if, in short, they taught under a bad general system. Spasmodic and ill-directed genius cannot compete in the American community with methodical, careful teaching by less inspired men. This American instinct seems, on the whole, to be a sagacious one. Nevertheless, it is only when genius warms and invigorates a wise and well-administered system, that the best conditions are attained.

We must begin our survey with the institutions of highest grade, because from the parent's point of view the higher school necessarily determines in large measure the nature of the lower school, just as the shape, weight, and bearings of a superstructure determine the form and quality of its foundations. The foundation-plan is the last to leave a careful architect's office. In choosing a preparatory school, the careful parent will consider to what it leads; above all, he will make sure that the school is not an impasse. The higher and lower institutions are, indeed, mutually dependent; if the admission examinations of the colleges and polytechnic schools seem, on the one hand, to sharply define the studies of the preparatory schools; on the other hand, it is quite as true that the colleges and advanced schools are practically controlled in their requisitions by the actual state of the preparatory schools. They can only ask for what is to be had. They must accept such preparation as the schools can give.

Institutions which exist only on paper, or which have been so lately organized that their term of actual work is only counted by months, will not be alluded to. The agricultural colleges begotten by Congress are all in this category. A large school can hardly get under way in less than four or five years. Three kinds of institutions or organizations for giving the new education are to be distinguished: the scientific

"schools" connected with colleges; the scientific "courses" organized within colleges; and the independent "schools" especially devoted to non-classical education. These three organizations will be considered in succession.

The greater part of the "scientific schools" of the United States are connected with colleges. Such are the Sheffield Scientific School of Yale College, the Lawrence Scientific School at Harvard College, the Chandler Scientific School of Dartmouth College, and the School of Mines of Columbia College. Two considerations seemed to justify this connection: first, the natural desire to utilize the libraries, collections, and cabinets of apparatus already belonging to the colleges; and, secondly, the expectation of engaging the professors of the colleges in the work of the new schools. It was thought that an unnecessary duplication of buildings, equipments, and salaries might thus be avoided. These advantages have been in part realized, but only in part. The scientific schools have needed separate buildings, and to a large extent separate apparatus and separate professorships; but the college libraries have been a gain to them, and some courses of lectures, delivered to undergraduates of the colleges, have been open to the students of the scientific schools, though not always much resorted to by them. Except at Dartmouth, the aid of the college professors [206] has been more apparent than real, because, being greatly overtasked with college work, these professors have had little time or energy to spare for the scientific schools.

A decided disadvantage is to be offset against any advantages which the scientific schools may have gained from their association with established colleges. A new system of education, crude, ill-organized, and in good degree experimental, has been brought into direct comparison and daily contact with a well-tried system in full possession of the field. The foundling has suffered by comparison with the children of the house. Even where there have been no jealousies about money or influence, and no jarrings about theological tendencies or religious temper, the faculty and students of the scientific school have necessarily felt themselves in an inferior position to the college proper as regards property, numbers, and the confidence of the community. They have been in a defensive attitude. It is the story of the ugly duckling.

An impression prevailed at the outset, that a scientific school was to be a professional school in the same sense as a law or medical school, and that graduates of the colleges would continue their studies in the scientific schools precisely as they do in the schools of law, medicine, and theology. The men who projected the Harvard and

Yale schools were evidently under this impression. Experience has shown that the scientific schools proper are not recruited in this manner to any considerable extent. . . .

[207] Whatever, therefore, may have been the anticipations of their founders, it is evident that, as a matter of fact, the scientific schools, as they have been actually conducted, have not attracted college graduates in any considerable number. They have not been professional schools in the same sense as the schools of law, medicine, and theology; nor, speaking generally, have they been schools of higher grade than the colleges, in respect to the average quality of their students. The methods of instruction at some of them have been such as are suitable for advanced students; but the methods have been in advance of the students.

In plan, these scientific schools are not all alike. They agree in requiring no knowledge of Latin and Greek for admission, and in excluding the dead languages from their schemes of instruction, but in many essential respects they differ widely. Thus, the minimum age of admission is eighteen at the Cambridge School, seventeen at the Columbia School, sixteen at the Sheffield School; and fourteen at the Chandler School. The requisites for admission are very various, and the schemes of study and methods of instruction are not the same at any two of these four schools. Each school must be examined by itself.

The history of the development of the Department of Philosophy and the Arts in Yale College is so full of instruction as to justify us in dwelling upon it at some length; it is at once an epitome of the past history of scientific instruction in this country, and a prophecy of its future. The department was established in 1847, at a time when a thrill of aspiration and enthusiasm seems to have run through all the New England colleges. As at Harvard in 1846 and at Columbia in 1864, it was a laboratory of applied chemistry which was really the principal feature of the new scheme; but at Yale, advanced instruction [208] in philology, philosophy, and pure science, suitable for graduates, was also offered. In the five years from 1847 to 1852 the average annual number of students was only about sixteen. In 1852 a department of engineering was added to the department of chemistry; and a degree of Bachelor of Philosophy was offered to students who remained two years in either department, and passed satisfactory examinations in three branches of study within the same department. The two departments of chemistry and engineering were entirely distinct. A student might take the degree in either department without knowing anything of the studies pursued in

the other. As there was no examination for admission, and only a narrow, one-sided, two years' course of study in either department, it is not surprising that the degree of Bachelor of Philosophy soon came to be slightly considered; it really stood for very little culture. In the eight years from 1852 to 1860 the average annual number of students was about forty-seven. A slight change for the better occurred in 1858, when candidates for a degree were required to pass an examination in French or German.

Thus far the Yale Scientific School had borne a strong resemblance to what the Lawrence Scientific School at Cambridge then was, and has always remained; but in 1860 the teachers in the Yale Department of Philosophy and the Arts, dissatisfied with the fruits of their labors, took a great step in advance.

They first systematized the post-graduate instruction in philosophy, philology, and science by offering the degree of Doctor of Philosophy to Bachelors of Arts, Science, or Philosophy, who after two additional years of study should give good evidence of high attainment in two distinct branches of learning. Candidates for this degree, not already Bachelors, were required to pass an admission examination equivalent to that required for the bachelor's degree, the three bachelor degrees taking equal rank. This Doctor's degree has been given thirteen times since 1861. The existence of this programme of instruction at Yale, unpretentious but genuine, and perseveringly offered to a few real students, taken in connection with the facts, that one hundred and sixty nine persons possessed of degrees have studied something additional to the ordinary college course in this Yale Department of Philosophy and the Arts since its foundation; that one hundred and sixty-four persons possessed of degrees have been m*embers of the Lawrence Scientific School within the same period; that the Columbia School of Mines has received a few persons possessed of degrees; and that young Americans go every year to Europe, in search of better educational facilities than they suppose their own country to afford them proves that there is a small but steady demand in the older American communities for instruction higher than that of the ordinary college course, and yet different from that of the law, medical, and theological schools. This legitimate success at Yale, on a really high level, if also on a modest scale, points the way to improvements which ought soon to be made at all the more important American "universities," which will then better describe their ambitious title.

At the same time, the Yale instructors in the Department of Philosophy and the Arts reorganized completely the Scientific School by constituting, first, a three years' "general

course" of studies, embracing mathematics, physical science, modern languages, literature, history, political economy, and commercial law; secondly, a special course in chemistry, which included French, German, English, botany, physical geography, physics, history of the inductive sciences, geology, and logic, besides the chemistry; and, thirdly, a special course in engineering, which included French and German, and lectures upon astronomy, chemistry, physics, mineralogy, and geology, besides the studies which bear most directly upon engineering. These two special courses at first covered but two years; but in 1862 the first year of the general [209] course was required of all candidates for a degree in the chemical department, besides the two years' special course; and in 1864 a three years' course of study was definitely adopted as the plan of the whole school. Other special departments have since been added to the original ones of chemistry and engineering, but the fundamental plan of the school is essentially unchanged since 1864. A year's course of general studies precedes a two years' course in some one of seven different departments. These departments are chemistry and mineralogy, natural history and geology, engineering, mechanics, agriculture, mining, and a selected course in science and literature. The studies of these seven departments are in large measure common; but there is nevertheless a very decided divergence into different ways at the beginning of the second year of the school, according to the student's bent or to his choice of a profession. Since 1864 every candidate for the degree of Bachelor of Philosophy has been required to pass successfully through a three years' course of carefully selected studies -- a generous course, embracing mathematics, English, French, and German, moral, mental, and political philosophy, and history, besides a large variety of scientific subjects. This scheme of course analogous to that of the common American college, with a large elective element in the last two years. The classics are omitted, the course is only three years long instead of four, and the studies of the last two years have a distinctly practical or professional turn; but there is the same regular course of studies leading to a degree, the same movement by classes, and a range of subjects as extensive as in the common college course. It should be said that, in 1864, the Congressional grant to promote the giving of instruction in agriculture and the mechanic arts, so wisely given to Yale College by the Connecticut Legislature, began to influence for good the development of the Scientific School.

Another marked change in the policy of this school deserves attention. Up to 1860 there was no real examination for admission. Anybody, no matter how ignorant, could join the chemical department; and, in the engineering department, some acquaintance with algebra, geometry, and plane trigonometry was all that was required. No previous

knowledge of chemistry was expected of students entering the laboratory. The Yale school did not differ from the Cambridge school in this respect. In fact, the Lawrence Scientific School had no other requisites for admission than those mentioned until this year (1868). In 1860 the Yale Scientific School established an examination for admission to any department of the school. This examination comprised arithmetic, algebra, geometry, plane trigonometry, the elements of natural philosophy and chemistry, English grammar, and geography. The same preparation in Latin as for the college proper was also recommended to the candidate for admission to the Scientific School. This admission examination has been but slightly modified since 1860. The history of the United States has been substituted for chemistry, and Latin is about to be insisted upon as a qualification for admission.

The changes in the Yale school since 1860 have all had one aim, namely, to raise the grade of the school by getting in a better class of students, and then teaching them more and better. The methods of a professional school have been abandoned as unsuitable, and those of a college have been taken up; but the apparent declension is a real elevation. For the loose-jointed, one-sided scheme has been substituted one which is both methodical and comprehensive. It is interesting to see that the improvement has been appreciated. The average annual number of students in the period from 1847 to 1852 was sixteen; in the period from [210] 1852 to 1860 it was forty-seven, but the average attendance was largest in the earlier years of this period; since 1860 the annual number of students has steadily risen from thirty-eight, the number of that year, to one hundred and twenty-two in 1867-68. Nineteen teachers now take an active part in the work of instruction. Every legitimate effort is made to carry as many students as possible through the regular course, and bring them up to the standard fixed by the examination for the degree. Effort in this direction is needed; for numbers of students resort to the school for brief periods, to their own injury and that of the school. Since the foundation of the school, only one hundred and twenty-eight degrees of Bachelor of Philosophy have been given.

The Lawrence Scientific School at Cambridge is, and always has been, what the Yale school also was at first, -- a group of independent professorships, each with its own treasury and its own methods of instruction. The several departments are so distinct that the student in one department has no necessary connection with any other. Each student is, as it were, the private pupil of some one of the professors, and the other professors are no more to him than if they did not exist. . . . There is no common

discipline, and no general course of co-ordinated studies which all candidates for any degree must pass through. A young man who has studied nothing but chemistry, or nothing but engineering, and who is densely ignorant of everything else, may obtain the sole degree given by the school, -- that of Bachelor of Science. There appears never to have been any examination for admission, except that some knowledge of algebra, geometry, and trigonometry has been required, before a student could join the department of engineering. It has been the practice to receive students into the chemical laboratory without requiring any previous knowledge of chemistry, or indeed of anything else. Nominally, students have not been admitted until they were eighteen years of age, but practically this rule has proved quite elastic. The degree of Bachelor of Science can be obtained in any one department by residing at least one year in Cambridge, and passing the examination of that single department. This examination has usually been passed after a residence of from eighteen to thirty months. This system, or, rather, lack of system, might do for really advanced students in science, for men in years and acquired habits of study, -- in fact, the school has been of great service to a score or two of such men, but it is singularly ill adapted to the wants of the average American boy of eighteen. The range of study is inconceivably narrow; and it is quite possible for a young man to become a Bachelor of Science without a sound knowledge of any language, not even his own, and without any knowledge at all of philosophy, history, political science, or of any natural or physical science, except the single one to which he has devoted two or three years at the most. . . .

[211] The two schools thus far considered are the oldest scientific schools, connected with the colleges, in the country, and they have had the prestige of connection with the two leading colleges in the United States. Their experience has been various, and is of great value for the guidance of new enterprises.

In 1852, the Chandler Scientific School at Dartmouth College was founded. The age of admission was put at fourteen; and the requisites for admission were very low, being little more than a decent grammar-school training. A regular course of study, covering three years, and ending in a degree of Bachelor of Science, was laid down at the start, and was extended to four years in 1857. It must be confessed that the humble starting point of the course necessarily lowers the character of the whole; but, nevertheless, the range of studies is considerable. . . . Up to 1864 the average annual number of students in the Chandler Scientific School was less than forty. Since that year it has materially increased, reaching sixty-three in 1867-68. Dartmouth College has lately received two

gifts which will materially add to its resources, and enable it to elevate the character of its scientific instruction. Sylvanus Thayer, Brigadier-General of Engineers, U.S.A., has given the college fifty thousand dollars as a foundation for a school of architecture and engineering; and the New Hampshire Legislature has wisely transferred to the college the Congressional grant in aid of technical instruction in agriculture and the mechanic arts.

The Chandler Scientific School has labored under the serious disadvantage of having too intimate a connection with the college proper. It has borne another name, and offered instruction of a lower character than that of Dartmouth College. It cannot be said to have had a distinct faculty. Some of the teachers in the college have given a part of their time to the subordinate course. It has been distinctly in a position of inferiority.

The Columbia School of Mines was founded in 1864, with a somewhat narrower scope than the schools thus far described. Its object was to give instruction in those branches of science which relate to mining and metallurgy; and, perhaps unintentionally, it held out to persons engaged in mining and metallurgical enterprises the hope that graduates of the school would be competent forthwith to conduct works, whether new or old.

It was doubtless intended to suggest that the three years course of study laid out in the school programme would give an adequate preliminary training to young men, who, after some years of experience in actual works, would become competent to conduct mining and metallurgical enterprises. It is to be regretted that the paragraph of the catalogue in which the objects of the school were announced, taken in connection with a very recent statement by the President of Columbia College, and a passage in a circular lately issued [212] by the school, still gives some support to the erroneous notion that young men can be made competent at any school, no matter how good, to take up immediately the charge of great enterprises in mining, manufacturing, or road and bridge building.

A technical school lays the best foundation for later work; if well organized, with a broad scheme of study, it can convert the boy of fair abilities and intentions into an observant, judicious man, well informed in the sciences which bear upon his profession; so trained, the graduate will rapidly master the principles and details of any actual works, and he will rise rapidly through the grades of employment; moreover, he will be worth more to his employers from the start than an untrained man. Nevertheless, after

the school, a longer or shorter term of apprenticeship upon real works of engineering, mining, building, or manufacturing will be found essential for the best graduates of the best technical schools. When people are content with the services of the last graduates of the medical school as family physicians, when the youngest bachelors of laws are forthwith retained with heavy fees for important cases, it will be time enough to expect that young men who have just completed their school training for the difficult professions of the engineer, manufacturer, miner, or chemist, will be competent at once to take charge of mines, manufacturing establishments, or large works of engineering. No matter how good the polytechnic, scientific, technological, or mining schools may be, it is a delusive expectation that their graduates will be able to enter at once the highest grades of employment, and assume the direction of practical affairs upon a large scale immediately upon leaving the schools. Common sense brings any one who considers the magnitude of the investments necessary in mining and metallurgical works to this conclusion. Young men of twenty to twenty-four are seldom equal to great money responsibilities.

The Columbia School of Mines was organized during one of the periodical hot turns of intermittant mining-fever to which the American people is subject. . . .

[213] We come now to the examination of the scientific or English "courses" organized within colleges. These courses run parallel with the classical course of instruction which it has been the primary object of the American colleges to provide. They are cast in the same mould as the classical course; but the metal is of a different composition. The experiment of conducting parallel classical and scientific courses in one and the same institution is by no means a new one. It is merely being tried afresh on a large scale and under new conditions in this country, after having failed in Europe. In Brown University, Union College, and the University of Michigan, for example, there have existed for several years two or more parallel courses, -- one the common semiclassical course; the other, or others, constructed on the same framework as the classical course by simply replacing Latin and Greek, or Greek alone, by living European languages, and at the same time expanding a little the mathematical and scientific instruction. A student may choose either course, but not two; at the end of one course he will probably be a Bachelor of Arts; at the end of the other, a Bachelor of Science or Philosophy. . . .

[214] The simultaneous carrying on of what should be such different courses of instruction within the same walls, in the same community of students, and by one and

the same corps of instructors, is, we believe, very disadvantageous to both systems of training. Such a combination has been thoroughly tried in the Lycees of France, and has completely failed and been abandoned. In Germany it has seemed expedient to separate the two courses, even during the school-boy period; and for the higher instruction of both systems entirely separate institutions have been found necessary. The fact is, that the whole tone and spirit of a good college ought to be different in kind from that of a good polytechnic, or scientific school. In the college, the desire for the broadest culture, for the best formation and information of the mind, the enthusiastic study of subjects for the love of them without any ulterior objects, the love of learning and research for their own sake, should be the dominant ideas. In the polytechnic school should be found a mental training inferior to none in breadth and vigor, a thirst for knowledge, a genuine enthusiasm in scientific research, and a true love of nature; but underneath all these things is a tempter or leading motive unlike that of a college. The student in a polytechnic school has a practical end constantly in view; he is training his faculties with the express object of making himself a better manufacturer, engineer, or teacher; he is studying the processes of nature, in order afterwards to turn them to [215] human uses and his own profit; if he is eager to penetrate the mysteries of electricity, it is largely because he wants to understand telegraphs; if he learns French and German, it is chiefly because he would not have the best technical literature of his generation sealed for him; if he imbues his mind with the profound and exquisite conceptions of the calculus, it is in order the better to comprehend mechanics. This practical end should never be lost sight of by student or teacher in a polytechnic school, and it should very seldom be thought of or alluded to in a college. Just as far as the spirit proper to a polytechnic school pervades a college, just so far that college falls below its idea. The practical spirit and the literary or scholastic spirit are both good, but they are incompatible. If commingled, they are both spoiled.

It is not to be imagined that the mental training afforded by a good polytechnic school is necessarily inferior in any respect to that of a good college, whether in breadth, vigor, or wholesomeness. Certain it is that an average graduate of the Zurich Polytechnicum or the Paris Ecole Centrale has a much better title to be called "learned"¹

¹ The term "learned profession" is getting to have a sarcastic flavor. Only a very small proportion of lawyers, doctors, and ministers, the country over, are Bachelors of Arts. The degrees of LL.B. and M.D. stand, on the average, for decidedly less culture than the degree of A.B., and it is found quite possible to prepare young men of scanty education to be successful pulpit exhorters in a year or eighteen months. A really learned minister is almost as rare as a logical sermon.

than most graduates of American colleges and professional schools. He has studied more, harder, and to better effect, though in a different spirit. But the two kinds of education cannot be carried on together, in the same schedules, by the same teachers. The classical course will hurt the scientific, and the scientific the classical. Neither will be at its best. The experience of the world and common sense are against such experiments as those of Brown, Union, and Michigan. Nevertheless, they may be good temporary expedients during a transition period, or in crude communities where hasty culture is as natural as fast eating. They do good service in lack of better things.

The incompatibility of the practical spirit and the literary spirit, which has here been dwelt upon, may appear to some to limit unduly the number of subjects proper to be taught in colleges. The tendency to the practical side of every subject which befits a good polytechnic school would be improper in a college; but the same subjects may to a very great extent be taught in both. One and the same subject may be studied in two very unlike frames of mind. We have only desired to urge the incompatibility of one temper with another temper, both being good in their separate places.

Another unjust inference might be drawn from what has been said of the impossibility of carrying on two long courses of instruction of different aims and essence within the same schedules of hours and terms and the same walls. It might be inferred

On the catalogue of the University of Michigan for 1867-68, there stand the names of three hundred and eighty-seven law students, not one of whom appears to have possessed at that stage of his education any degree whatever. There are four teachers. To enter the school, a young man must be eighteen years of age, and he must present a certificate of good moral character. Nothing else is required. To obtain a degree he must follow certain courses of lectures through two terms of six months each. Nothing else is required. It is possible that the degrees really possessed by law students have been omitted; but degrees are printed against the names of their possessors in other departments of the University on the same catalogue. Among one hundred and forty-six persons who received the degree of LL.B., in that year, seventeen had other degrees, -- a very small proportion.

On the same catalogue there are enrolled four hundred and eleven medical students, of whom nineteen already possess a Bachelor's degree. There are eleven teachers. The school is established in the small town of Ann Arbor, quite remote from large hospitals. Poor humanity shudders at the spectacle of so large a crop of such doctors.

Such professional schools may, indeed, be the best which the hastily organized, fast-growing American communities will support; but the word "learned" can only be conventionally applied to professions for which the preliminary training exacted is so short and so loose.

that the applied sciences are necessarily unfit to be taught or studied in a university, taking that word in its best sense. It cannot be said too loudly or too often, [216] that no subject of human inquiry can be out of place in the programme of a real university. It is only necessary that every subject should be taught at the university on a higher plane than elsewhere. Even scholars are apt to be intolerant of this subject or that in university schemes; one can see no sense in archaeology; another condemns natural history as being without practical applications, useless for training, and frightfully absorbent of money; a third finds pure science wholesome meat, but applied science utilitarian chaff. It is impossible to be too catholic in this matter. But the American university has not yet grown out of the soil, and we are rather meeting a theoretical than a practical objection. The incidental remark may be permitted, that a university, in any worthy sense of the term, must grow from seed. It cannot be transplanted from England or Germany in full leaf and bearing. It cannot be run up, like a cotton-mill, in six months, to meet a quick demand. Neither can it be created by an energetic use of the inspired editorial, the advertising circular, and the frequent telegram. Numbers do not constitute it, and no money can make it before its time. There is more of the university about the eight or ten Yale graduates who are studying in the Yale Department of Philosophy and the Arts, than in as many hundred raw youths who do not know more than a fair grammar school may teach. When the American university appears, it will not be a copy of foreign institutions, or a hot-bed plant, but the slow and natural outgrowth of American social and political habits, and an expression of the average aims and ambitions of the better educated classes. The American college is an institution without a parallel; the American university will be equally original.

Besides the scientific schools connected with colleges, and the scientific or English courses within colleges, there exist in the United States several independent schools in which mathematics, the exact sciences and their applications, the modern languages, and philosophy form the staple of instruction. Such are the Rensselaer Polytechnic Institute at Troy, and the School of the Massachusetts Institute of Technology at Boston.² These two schools have a certain general resemblance; they are independent

² The United States naval and military academies are not referred to at length, because access to them is not free. A thoroughly vicious system of selecting the candidates for admission to these schools annuls the influence they might otherwise exert upon technical education in this country. A patron, and not a good previous training, being the essential requisite, no schools make it their business to give such training. In France for many years, and lately in England too, numerous private schools make a special point of fitting young men for the competitive examinations which regulate the admission to the government

establishments; they have the same minimum age of admission, namely, sixteen years, although practically the average age of the students who enter these institutions is decidedly above this minimum; they do not require any Latin or Greek for admission, and do not admit these languages to their courses of study; finally, in each the course of study lasts four years. In the comprehensiveness of their courses of instruction, in the number of teachers employed, and in their general scale of operations, these schools differ materially.

The Rensselaer Polytechnic Institute is the oldest school of its sort in the country. Its organization has undergone several changes since its establishment in 1824; but for the past fifteen years, it has offered a substantial four year's course of instruction in the various branches of engineering. The programme comprehends, besides the general and special studies absolutely essential for engineers, a certain amount of instruction in English, French, natural science, and philosophy. This pioneer school has attracted a good number of young men; and of its graduates a large proportion have become engineers or railroad men. . . .

[217] It may be mentioned, in passing, that the Troy school is one of the many American institutions in which the experiment of making manual labor a part of the regular curriculum has been tried, and has failed. In spite of the uniform failure which has attended such experiments, the idea that it is practicable for young men to engage regularly in productive manual labor, and to train his mental faculties to a high degree at the same time, still keeps its hold upon the American mind. Reading, writing, and arithmetic may indeed be taught to young children who work in factories half of the day, as the English half-time schools have demonstrated; but advanced education is not to be had on such terms. Then again, it is essential that manual work, to be genuine and not make-believe, should be done on a farm, or in a shop, where the primary object is to produce profitably and make money, not to teach. A school farm or machine-shop is a very different place from a real farm or shop. The two things are as different as a militia muster and a field of battle. The fact is, that in training his brains, a young man cannot have his cake and eat it too. An hour a day of judicious exercise, which had better be for fun than for money, will keep anybody of fair constitution, who eats and drinks with discretion, sleeps regularly, laughs well, and is careful what he breathes, in good working

military and naval schools. France is essentially democratic; but it seems extraordinary that England, the stronghold of caste, should be more democratic than America in the important matter of appointing to the public service.

order. Every hour more than this spent in hand work is so much time lost for better things. Labor is not exercise. To be sure, a young man cannot read and write fourteen hours a day; but when he cannot be studying books, he can be catching butterflies, hunting for flowers and stones, experimenting in a chemical laboratory, practising mechanical drawing, sharpening his wits in converse with bright associates, or learning manners in ladies' society. Any of these occupations is much better for him than digging potatoes, sawing wood, laying brick, or setting type.

The most ample course of instruction which has been thus far offered in this country to students who demand a liberal and practical education as well as a training specially adapted to make them ultimately good engineers, manufacturers, architects, chemists, merchants, teachers of science, or directors of mines and industrial works, is that organized by the Massachusetts Institute of Technology at Boston. The course extends through four years. The studies of the first and second years, and certain general studies in the third and fourth years, are required of all regular students. At the beginning of the third year each student selects one of six courses, which he follows during his third and fourth years at the school. These six courses are:--

1. Mechanical Engineering.
2. Civil Engineering.
3. Chemistry.
4. Geology and Mining.
5. Building and Architecture.
6. General Science and Literature. . . .

It is very obvious that the student who should be led by competent men, provided with the necessary tools, through such a four years' course of study as this, would have received a training which would be neither loose, superficial, nor one-sided. Between this course and the ordinary semi-classical college course there is no question of information by one and formation by the other; of cramming utilitarian facts by one system, and developing mental powers by the other. Both courses form, train, and educate the mind; and one no more than the other, only the disciplines are different. Either course, well organized, can make out of a capable boy a reasoning man, with his faculties well in hand. One man swings dumb-bells, and walks; another rows, and rides on horseback; both train their muscles. One eats beef, another mutton; but both are nourished.

People who think vaguely about the difference between a good college and a good polytechnic school are apt to say that the aim of the college course is to make a rounded man, with all his faculties impartially developed, while it is the express object of a technical course to make a one-sided man,-- a mere engineer, chemist, or architect. Two truths are suppressed in this form of statement. First, faculties are not given by God impartially to each round soul a little of each power, as if the soul were a pill, which must contain its due proportion of many various ingredients. To reason about the average human mind as if it were a globe, to be expanded symmetrically from a centre outward, is to be betrayed by a metaphor. A cutting-tool, a drill, or auger would be a juster symbol of the mind. The natural bent and peculiar quality of every boy's mind should be sacredly regarded in his education; the division of mental labor, which is essential in civilized communities in order that knowledge may grow and society improve, demands this regard to the peculiar constitution of each mind, as much as does the happiness of the individual most nearly concerned. Secondly, to make a good engineer, chemist, or architect, the only sure way is to make first, or at least simultaneously, an observant, reflecting, and sensible man, whose mind is not only well stored, but well trained also to see, compare, reason, and decide. The vigorous training of the mental powers is therefore the primary object of every well-organized technical school. At the same time a well-arranged course of study, that of the New Haven school, the Troy school, or the Institute of Technology, will include a vast deal of information [219] and many practical exercises appropriate to the professions which the students have in view. . . .

The experimental period in the development of technical instruction in the United States is past. Henceforth the American parent who wants to give a practical education to his son, may know clearly what is accessible to him as an alternative with the college. He may find at several schools a carefully arranged and comprehensive course of coordinated studies, lasting three or four years, and covering the same period of life as the common college course, namely, the period from sixteen or eighteen till twenty or twenty-two. This comprehensive course of studies is generally called, in such schools as those at New Haven, Troy, and Boston, the "regular" or "general course"; and the students who follow it are the "regular students," in contradistinction to the "partial" or "special" students, who only study one subject, or a few irregularly selected subjects, among all those taught in the school.

These partial or special students are of two sorts in most of the technical schools. First, men of age and acquirements, who come to add to their previous attainments a special training in some professional subject, some one application of science to the arts; to meet the wants of such men has been and is one of the most useful functions of the technical schools. Secondly, young men of imperfect preliminary training, whose parents think, or who themselves think, that they can best become chemists by studying nothing but chemistry, or engineers by only attending to the mathematics and their applications, or architects by ignoring all knowledge but that of architectural design. This notion is certainly a very crude one; but it deceives many uninstructed parents and inexperienced young men. It would be as sensible to give a child nothing but law-papers to read, on the ground that he is destined for the law. Such partial or special students injure their school, both by interfering with the order and discipline [220] of the school while they are students, and by failing in after life, and so bringing an unjust discredit upon scientific education. While they are students, they are in the school ranks, so to say, but they are out of step. When they go into the world, they soon show themselves to be inadequately trained. They have built an ill-proportioned structure upon inadequate foundations. The scientific schools, in their earlier days, sent many such illiberally educated men into the scientific professions, and it will still take them years to recover from the bad effects of this serious mistake. Some of the most vigorous of these very men have since realized the defects of their early training, and are now the warmest friends of the improved methods of scientific education.

If the presence of these partial or special students, whose industry and abilities are simply misdirected, is an injury to the technical schools, it will be plain to all, that these schools must suffer still more in receiving, as most of them have been compelled to, students who take part of the regular course simply because they are incompetent or too lazy to do the whole. All the scientific schools of the country, whether connected with colleges or not, have suffered from the fact, that boys and young men who, from lack of wit or vigor, were found incompetent to pursue the usual classical studies of the preparatory school of the college, turned to loosely organized scientific schools as safe harbors for their laziness or stupidity. The scientific schools have been recruited in large part, of course, from that excellent and numerous class of young men who have more taste and capacity for science than for language and literature, and who have followed their natural bent in making choice of a school and a profession; but they have also been the refuge of shirks and stragglers from the better organized and stricter colleges. This evil is a temporary one, incident to what has been the experimental condition of

education through science. It will correct itself, when the new system of education is as well organized as the old, and when the community understands the legitimate inlets and outlets of the new schools,-- how to get into them, and what they lead to.

To avoid misapprehension, let it be distinctly stated that the scientific schools have already done a very timely and necessary work in this country by training, although hastily and imperfectly, a certain number of specialists, such as assayers, analysts, railroad engineers, and teachers of science, to very useful functions. And again, let it be acknowledged with thankfulness, that genius, or even an unusual vigor of mind and will, often overcomes in after life that worst of obstacles, insuperable for common men,-- an inadequate or mistaken training in youth.

At present it is the wise effort of the faculties of all the leading polytechnic or scientific schools to carry as many of their pupils as possible through the "regular" course of study; in other words, they recommend their pupils to lay, during three or four years between seventeen and twenty-two, a broad and strong foundation for the strictly professional studies, of which a part are pursued in the school, and a part during the apprenticeship which should follow their school life. . . .

We have next to discuss the nature of the preparation for this three or four years' course of scientific and literary studies. A young man cannot well enter upon this course much before his seventeenth or eighteenth year. What kind of a preparatory school shall the parent select, who proposes to send his son at the right age to a scientific, polytechnic, or technological school? What preliminary training would be the most advantageous, and what is actually attainable?

Atlantic, March 1869, 358-367

THE NEW EDUCATION ITS ORGANIZATION

II.

In a former paper we have seen that several good American schools, variously called scientific, polytechnic, or technological, now offer to young men who are not inclined to go to college a liberal and practical education for the active pursuits and the scientific professions. . . .

The proper studies of boyhood may be classified under three heads,—language, mathematics, and science. Without going into much detail, we wish, first, to consider what the training of all boys whose parents can afford to let them study until they are twenty-one should be in each of these principal subdivisions up to about the seventeenth year.

In language, the first thing which a child should study with persistence and thoroughness is his native tongue; and this, not through its formal grammar, but by reading aloud, by committing to memory choice bits, and by listening to a good teacher's commentary upon passages selected from standard authors on purpose to illustrate the capacities and varieties of the English sentence, the nature of its parts, the significance of the order of words, and the use of epithets. A child can drink in and instinctively appreciate the beauties of a refined style years before he can understand grammar and rhetoric, just as he admires the flaming woods of autumn long before he even thinks to enquire into the elements and explanations of their sudden glory. The mother tongue should come to a child by unconscious imitation of good examples, by impregnation unawares with the idiomatic essence of the native speech. But to this end the best examples, in prose and poetry, must be constantly before him from the time when he can first commit to memory a bit of poetry (not doggerel) or a verse of the Bible. Almost all American schools utterly neglect this kind of training. French and German boys study their own languages in the manner above indicated early and late; but in England and the United States the study of formal grammar has unfortunately replaced the true study of English. When a boy has learned by imitation to know and use his mother tongue it will be time enough for him to look at it as an instrument of thought; and before this time comes it is to be hoped that he will have studied grammar in some other language than his own. English literature should be the first literature which an American boy studies. It is a shame that so many boys of seventeen read the *Georgics* before the *Midsummer Night's Dream*, Horace before Milton, and Xenophon before

Napier. The boys' school ought to teach English systematically and amply, so that no child's [359] knowledge of his native language should be left to the chance influences of his home, the street, and the newspaper.

After English, the most desirable language for a boy to study is Latin. Its study imparts knowledge of language as a vehicle of thought better than the study of less regular and less inflected languages. Moreover, by learning to read Latin, access is gained to a splendid literature which has exerted, and still exerts, a wonderful influence over modern civilized communities. The living languages and recent literatures of Western Europe are all impregnated with the Roman speech and thought, and no man can be thoroughly at home in any one of them, even in his own, without some knowledge of Latin. It is sometimes said that nothing is worth teaching which is not worth remembering, and that the man forgets all the Latin which the boy knew. But it is not true that the man loses the mental habits which the boy has acquired in studying Latin. Most of the technical ideas which a boy gets while he studies Latin can be transferred to other languages; most of the ways of thinking which become natural to him will be applicable to other subjects of thought. The distinctions between subject, predicate and object, between active and passive, between different moods and tenses, the various connections of time and place, the relations of dependence, sequence and contingency, the definitions of technical terms, each of which contains a philosophical distinction,—these are things which can be made familiar to a boy of seventeen; and if he never after open a Latin book, he will have acquired notions and habits which go far to fix his mental tone. His mind will have been already furnished with a literary stock of the best quality. It is possible, or perhaps probable, that this intellectual furniture, this mental discipline, may be obtained by hard work over any language and literature. The Gettysburg speech proves that it can be got out of English. But in the actual state of educational appliances, the study of Latin is the readiest means of obtaining it. As the world stands, Latin is the best medium, after the mother tongue, through which to study language in general, and to acquire the powers of clear conception and adequate expression. Young men who are to devote themselves chiefly to other than linguistic studies after their seventeenth or eighteenth year have special reason to give a large portion of their time before that year to the study of language. No men have greater need of the power of expressing their ideas with clearness, conciseness, and vigor than those whose avocations require them to describe and discuss material resources, industrial processes, public works, mining enterprises, and the complicated problems of trade and finance. In such writings embellishment may be dispensed with, but the chief

merits of style -- precision, simplicity, perspicuity, and force -- are never more necessary.

...

Nobody ought to teach Latin to boys on the ground that it is indispensable to professional men. Any doctor, lawyer, or popular exhorter, who cannot learn by heart in a week all the technical terms and phrases of Latin origin which he encounters in his common professional occupations, has not wits enough for his calling. . . . The vulgar argument that the study of the classics is necessary to "make a gentleman" is beneath contempt. Honor and gentleness are not a dye or a lacquer, but warp and woof. It is true that a certain social consideration attaches to persons who are supposed to know Latin and Greek, whether they are gentlemen or not. The reason is that for many generations, Latin and Greek stood for all education, and society has not yet [360] sufficiently enlarged this old definition of an educated man.

The great need of a more thorough study of language than has lately been common among scientific men plainly appears in many of the scientific writings of the day. Many a genuine discoverer in science is quite unable to describe a fact, or a series of facts, methodically, clearly, and accurately. Many an inventor whose mind is full of original and curious ideas is at a loss for language in which to convey them to others. . . .

[361] One cannot too early teach a child the distinction between a fact and an inference and an inference from a fact. Few adults appreciate this fundamental difference in its full strength. But it may, nevertheless, be very early impressed upon a child's mind, and daily illustrated from his own experience and observation. The second consideration is, that the familiar acquaintance with many of the phenomena which constitute the raw material of the sciences is attainable at an early age. Scientific study will proceed in maturer years with greater ease and firmness, if the common phenomena with which science deals have become domesticated during childhood. We use the term "phenomena" advisedly. It is to the appearance of things that a child's attention should be directed, not to their explanations or supposed final causes. The boy of seventeen will take to scientific chemistry much more kindly if he has always been encouraged to consider exactly what it is which happens to his father's tools when they are left out in the wet, or what becomes of a log put on the fire, or of the sugar in a tumbler of water. Geology will not be a wholly strange thing to a boy who has really noticed how, when sudden showers flood the roads, the sand and little stones are swept to the gutters, and hurried down the hill, and then dropped gently in the first level expanse. He has made

early acquaintance with the transporting power of water. A boy who has observed with real attention the annual course of his father's market-garden -- merely the events without cause or consequence -- has unconsciously assimilated a mass of facts which he will be agreeably surprised to find already a part of himself, when he meets them again in the grave sciences of vegetable physiology, chemistry, and meteorology. This early assimilation of the countless common facts which form the main staple of the sciences is of great advantage in education. If, however, the facts are confounded with, or obscured by, theories and speculations, the gain is straightway converted into a loss.

There remains one other subject which some people would desire to see made matter of early study at school, namely, history, or at least the history of the United States. Many think, on the contrary, that so much of history as a child finds interesting will be picked up as a part of home reading, and as to the uninteresting parts, the dates and names of kings and queens, that it is as useless to learn a list of dates as of atomic weights, and that genealogies and tariffs are as unsuitable food for a child's mind as tables of the conducting power of the metals, or the baker's score by the kitchen window.

Judicious parents will see that their boys learn to draw and sing, either in school or out of school. It is a common mistake to consider these things luxuries of education; they are both of great practical advantage to every man. Drawing, especially, is admirable training of the eye and hand and imagination. . . .

Having thus sketched the proper preliminary training for boys destined for the scientific or technological schools, let us inquire how such a school-training is to be obtained at this day in this country. The answer is plain. It can only be obtained in the best schools, both public and private, which make it an important part of their business to [362] fit boys for college. The programme of study which has been detailed is not exactly the actual course of study which boys now pass through who are well prepared to enter Harvard, Yale, Columbia, or any other good college; but it is very nearly what such boys ought to accomplish besides their elementary study of Greek. At present the colleges require for admission a modicum of Greek. So long as this is the case, the preparatory schools must teach Greek; but this is the one study of such schools which boys destined for scientific or technological schools should omit. There is no necessity of putting Greek on the same ground with Latin in a scheme of education. The two languages are very unlike, and are entirely separable in discussion and in teaching. Greek has very little to do with the languages of modern Europe. It is Roman law, and

not Greek law, which is the basis of the modern states. It is Latin, not in Greek, that European science, philosophy, and history are written down to the time of the French Revolution. It is a marvellous instrument of thought, the vehicle of an unsurpassed literature, and it is the language of the Gospels. But art is immensely broader and deeper than it was two generations ago, and average life is only a few months longer. Not every good thing can be eaten or studied at once. The welfare of the great mass of boys must not be sacrificed in school arrangements to that of the few who are to be ministers and literary men. A heavy responsibility rests on colleg examiners in this regard; the schools are very much what the colleges make them.

Let the best preparatory schools, therefore, keep in the same classes the boys for college and the boys for technical schools in all subjects except Greek; and let the study of Greek be put off as late as possible, in order to keep the boys together until the last practicable moment. If the necessity of giving boys destined for college a considerable time for the study of Greek, compel a reduction for them in the studies enumerated above as best suited for the boys going to a technological school, let this reduction be made upon geometry, elementary mechanics, and English subjects, which the boys destined for science need to study more thoroughly than the boys who will subsequently pass through the semi-classical college course. But the time assigned to the study of Greek must not be exaggerated. The Phillips Academy at Exeter, than which there is certainly no better preparatory school in the country, teaches thoroughly, in a course of three years, all the Latin, Greek, and mathematics required for admission to college. There have been many good college students who have learned in two years all the Latin and Greek demanded for admission.

It is a great object, worth some sacrifices, to keep all the boys together until the last year or eighteen months of their school life. A boy's course of study should be representative; it should be so selected as to reveal to him, or at least to his parents and teachers, his capacities and tastes before he is seventeen years old. Teachers are apt not to believe much in natural bents. They observe that the boy who is fond of mathematics is generally good in the classics also; that the boy who takes kindly to language is generally respectable in all other subjects. The observation is correct, but the inference from it is not a just one. The boy who loves mathematical reasoning learns to concentrate all his powers upon that subject. This power of thinking, once acquired, he applies successfully to other subjects. Another boy, who has a natural gift for languages, acquires this power of concentrated attention while studying Latin or Greek;

he then applies it to his other studies, which he succeeds in mastering in spite of their distastefulness. But this general fact does not in the least invalidate the fundamental proposition, that a man will be productive in proportion to his natural fitness for it. The teacher, mother, or father [363] can do nothing better for a boy than to find out, or help him find out, this innate aptitude. But to this end the boy's course of study at school must be fairly representative. It must be neither language, science, or mathematics chiefly, but all combined in due proportion. Parents who are able to do the best thing for their children, which is attainable in the actual state of American society may be sure that their boys' training up to sixteen years of age has not been right if it has not been possible for them all careers which start at or near that point. . . .

There is a great need of broadening and deepening the course of study in the schools which receive the American boy from ten to seventeen. Reasonable parents justly complain of the very small number of subjects in which their boys are instructed at this forming period of their lives. It is indisputable that French and German boys, though inferior as a rule to American boys in reach and liveliness of mind, are better trained at seventeen than their American contemporaries, and in a larger variety of subjects. It is necessary to teach the very elements of French to a large part of the Senior class at Yale College. Not a few Harvard Sophomores were rather doubtful where the joke was, when one of their number announced that the Rhine is an African river. . . .

A very interesting work is before the younger men who are now establishing or conducting preparatory schools. The school programmes are to be extended and enriched, the unprofitable subjects cut out, a great variety of studies introduced, and the course of study so modified as to make it as available for boys who are going on to polytechnic schools as for those who are going to college. We venture the prediction that the teachers who first or best effect these changes will find their account in them. The process of adaptation has already begun.

The country will shortly need more polytechnic schools of the highest grade than it now has. The four or five existing schools will be filled, and new ones will be established. The number of trained young men entering the scientific professions every year, becoming engineers, architects, teachers of science, chemists, superintendents of mines and works, and constructors of machinery, ought to bear some comparison with the number of those who enter the professions of law and medicine. The polytechnic schools may also play an important part in the much-hoped-for reform of the civil

service of the country. It is a mistake to suppose that the growth of the technical schools will injure the colleges. On the contrary, the polytechnic schools, though claiming young men of the college age, and perhaps diverting a few from academic life, will do the colleges good service by relieving them of all necessity of meeting the demand for practical instruction, and leaving them at ease for their legitimate work.

[364] A polytechnic or technological school is best placed in a large city, in a great industrial centre. A college needs quiet and seclusion; a technical school, on the contrary, should be within easy reach of works, mills, forges, machine shops, and mines. The professors of a scientific school have need to be brought into daily contact with practical affairs, to watch the progress of new inventions as they develop from day to day, and to know the men who are improving special industries. The students of a scientific school have a like need. They need to see as much as possible of the actual conditions of practical mining, manufacturing, constructing, and inventing, while they are students, because, when they leave the school, they are almost invariably thrown directly into the vortex of business, and have not the interval of little work and much leisure through which the young lawyer or doctor is gradually initiated into the practical details of his profession.

The amount of money required to establish securely a polytechnic school of the best sort, capable of receiving four or five hundred pupils, is considerable, but yet within the means of many individuals in this country. One man provided all the buildings, apparatus, and money needed to found, and carry on for many years, the Ecole Centrale at Paris. He saw the school grow into a famous institution, resorted to by all nations, and of the first importance to French science and industry, and finally presented it to the state. For several years it has been a government school of large size and the highest rank. It would be impossible to estimate the good effects upon French industry of that one man's sagacity and good management.

To house and equip such a school in any of our large cities, requires the expenditure of three or four hundred thousand dollars. To provide for the the running expenses of the school, once equipped, requires the interest of invested funds to about the same amount, besides the students' fees. American trustees for educational establishments are apt to be ignorant of the fact that no school or college of high grade can be worthily conducted on the principle of making it pay its own expenses. The original "plant" must be given by individuals or the state, and the income of permanent funds must eke out the

receipts from students. The fees will necessarily be high, unless the invested property of the school be large; for technical education is the most expensive kind of education, because of the costly apparatus and collections which are absolutely required. All attempts to domesticate in this country the foreign custom of paying professors by the fees of the students they attract, instead of fixed salaries, have signally failed. Whenever it has been tried in this country, the tone of the instruction has been lowered by the too direct money relation between the teacher and the taught. The American boy is not well adapted to hold that attitude towards his instructors; and the American man cannot abide such a relation to his pupils.

It is of the first importance that the schools which train American boys for the scientific professions should be American. European schools teach American students a great many things which are not only inapplicable in America, but positively misleading and dangerous. The prices of labor, fuel, and transportation are so very unlike in Europe and this country, that methods and processes which are profitable there are ruinous here, in spite of the fact that scientific principles do not change with the latitude and longitude. The conditions of success in all manufacturing and mining industries are very different in a thinly peopled country of immense distances from what they are in compact, crowded communities; so that it is not to be wondered at, if men thoroughly imbued with the spirit of European schools, and taught only the practices and results of established European industries, are less successful than could be wished when they attempt to put their school knowledge in practice under the [365] novel American conditions. A man who has spent all his apprenticeship in building Dutch galliots is not likely to excel in building Baltimore clippers. An uneducated Welsh miner, perfectly familiar with every detail of his trade at home, is utterly lost if he is put down among strange rocks and minerals. His home experience is almost useless to him. A well-trained man, perfectly competent to superintend zinc-works in Belgium or Upper Silesia, may easily prove an unsafe guide in Pennsylvania or Illinois. An architect, who would have difficulty in finishing a tasteful house or handsome church in Paris within his estimates, might be quite unable to make feasible plans and binding specifications in New York. Conditions of business and ways of living in America are fundamentally different from European habits and conditions. An average American does not eat, drink, sleep, work, or amuse himself like an average European. He wants different tools, carriages, cars, steamboats, clothes, medicines, and houses. His necessities and his luxuries are both unlike those of the European. The industries which exist to supply American wants are therefore not like the corresponding European industries. They will

be better learned at home than abroad. The whole spirit of the school at home will be in conformity with American requirements. The spirit of a European school cannot but be foreign in many respects to American habits. It is not now as it was thirty years ago, when an American boy had to go to Europe if he wanted to learn chemical analysis or the elements of engineering. Now one might as well go to Europe to learn the multiplication table, as to study the common subjects in chemistry, physics, mechanics, and engineering. The instruction in these and many other scientific subjects is as good in several American schools and colleges as it is anywhere in Europe. More schools are needed; but even now the American should do all his student-work at home. When he has become a master in his art, he may well go to Europe to see how his business there is conducted.

Three difficulties beset the establishment of such new schools in this country. The first danger is the tendency to reckless preliminary expenditure upon buildings and mechanical fittings. Many American schools and colleges have been wrecked on this rock. The American trustee has a deplorable propensity to put what should be quick capital into more or less unsuitable bricks and mortar. This danger escaped, the second difficulty is the scarcity of teachers having the necessary training and the equally necessary enthusiasm. There must be brought together a harmonious body of teachers, young, if possible, both in years and spirit, but at any rate in spirit, allowed the leisure necessary for men to keep themselves on a level with the rapid progress of the arts and sciences, and paid enough to have a mind at ease. High reputation is not necessary; but conscientiousness in the discharge of routine duties, fair talents well improved, and a genuine enthusiasm are essential. If to these qualifications there can be added personal devotion to the head of the institution, the happiest conditions are united. The American scientific schools and colleges and the European universities have trained a few Americans to such functions; but they are still scarce, because the active industries of the country absorb the greater number of energetic young men possessed of the requisite training. The supreme difficulty remains. Men competent to administer a large school of science are rare in all communities; they are not only rare in this country, but are here peculiarly liable to be drawn into other pursuits. A steady, careful, and kindly administration is required, not thrusting itself into notice, but quietly felt alike by teachers, students, and servants. The building up in any new place of a great school for the new education must be in the main the work of a single man, or, in rare cases, of two or three men animated by the same [366] spirit. To find this man should always be the first step; it will certainly be the hardest in the whole undertaking.

The American colleges have taken, and still take, their presidents from the clerical profession almost exclusively. This course has been perfectly natural for the colleges, because almost all of them have been founded expressly to propagate and perpetuate the Gospel as the founders understood it, or, in other words, to breed ministers and laymen of some particular religious communion. It is gradually becoming apparent that even the colleges are suffering from this too exclusively clerical administration. Fortunately for the country, education is getting to be a profession by itself. For the discharge of the highest functions in this profession, the training of a divinity student, years of weekly preaching, and much practice in the discharge of pastoral duties, are no longer supposed to be the best, or at least the only preparation. Several other classes of men are now as cultivated as the clergy. As a class, ministers are as fit to be suddenly transferred to the bench at forty-five or fifty years of age, as they are to be put at the head of large educational establishments. The legal profession would be somewhat astonished at such an intrusion. Yet in their capacity of trustees, lawyers and men of business are constantly putting clergymen into the highest posts of the profession of education, which is thus robbed of its few prizes, and subjected to such indignity as soldiers feel when untried civilians are put over their heads. But, however it may be with the colleges, to transplant a successful clergyman in the prime of life from the charge of a parish to the charge of a polytechnic school would be felt to be absurd. The difficulty of finding a good head is not to be surmounted in any such ready fashion.

But now some one may ask, To what good end all this discourse about the improvement of technical education? Are not Americans already the most ingenious people on earth? Have we not invented mowers, and sewing machines, and the best printing- presses? Are we not doing countless things by machinery which other people do by hand? Is there really any need of instructing Americans in the application of science to the arts? The answers to these incredulous suggestions are not far to seek. In the first place, it is emphatically true that Americans have invented a large number of labor-saving machines of the greatest value. They are powerfully incited to this sort of invention by the dearness of labor in this country. secondly, the same scarcity of laborers, and the consequent abundance of work for all willing hands, enable an American to pursue the precarious rewards of invention, perhaps for years, with that certainty that if, after all, he wins no prize in the lottery, he can readily find some steady employment to keep his old age from absolute want. But if a European once fall out of the ranks of industry, he has infinite trouble, in case he fails in his adventures, to recover

any standing room whatever in society. An American may do with impunity, and without real wrong perhaps, what a European could do only in the spirit of the most reckless gambler or in the confidence of inspired genius. Freedom, and the newness and breadth of the land, explain this favored condition of the American. But it is to be noticed that the chief American successes in invention are of one sort,--machinery and mechanical appliances. In other departments of invention, which require greater knowledge, we are obviously borrowers, rather than lenders. How many millions of dollars are sunk every few years in mining enterprises, through sheer ignorance? Freiberg and Swansea have to be called upon to smelt American ores. The best managers of American print-works receive patterns of the latest French designs by every steamer. The aniline colors are not American discoveries. There are hardly twenty miles of good road, in the European sense, in the whole [367] United States. The various chemical industries are chiefly foreign. American ingenuity has been of more limited range than is commonly imagined. Not a few reputed American inventions are really of European origin. But, however this may be, we may zealously endeavor to strengthen the scientific professions in this country without being a whit less proud of the undisputed achievements of American ingenuity. It is not a question of promoting fertility of invention by improving technical education. Inventors are a law unto themselves. What the country needs is a steady supply of men well trained in recognized principles of science and art, and well informed about established practice. We need engineers who thoroughly understand what is already known at home and abroad about mining, road and bridge building, railways, canals, water-powers, and steam machinery; architects who have thoroughly studied their art; builders who can at least construct buildings which will not fall down; chemists and metallurgists who will know what the world has done and is doing in the chemical arts, and in the extraction and working of metals; manufacturers who appreciate what science and technical skill can do for the works which they superintend.

Americans must not sit down contented with their position among the industrial nations. We have inherited civil liberty, social mobility, and immense native resources. The advantages we thus hold over the European nations are inestimable. The question is, not how much our freedom can do for us unaided, but how much we can help freedom by judicious education. We appreciate better than we did ten years ago that true progress in this country means progress for the world. In organizing the new education, we do not labor for ourselves alone. Freedom will be glorified in her works.

"THE CIVILIZATION OF A PEOPLE MAY BE INFERRED FROM THE VARIETY OF ITS TOOLS": ELITE HIGHER EDUCATION AND THE MODERN ECONOMIC AND POLITICAL ORDER

The men who gathered in Cambridge to elect a new president for America's oldest college were acutely sensitive to the issues that Eliot had raised. They were not unaware of the controversy that Eliot's election would spark -- the ministers feared him because he was a layman; the classicists deplored his curricular ideas; the scientists resented his unsparing criticism of their work; the physicians and lawyers, who had run Harvard's professional schools as lucrative adjuncts to their private practices, trembled at the suggestion of reform. And almost everyone questioned the wisdom of placing such a young man in charge of the college.

But the trustees believed that Harvard and the nation stood at a crossroads. The Civil War had resolved the political question of nationality by asserting the supremacy of the federal government over those of the states. Joined from coast to coast by railroads and telegraphs, the foundation of a national economy was finally in place. The United States was no longer a loose confederation of regions. Its future destiny would be controlled by those who understood and acted on the implications of nationhood. Some Bostonians had understood this for decades. In 1835, pioneer and philanthropist Abbott Lawrence had urged the completion of Boston's rail link to the West, predicting "we shall live to see the banks of the Upper Mississippi connected by iron bands to State Street." The more imaginative Boston investors followed his advice. Their dollars had been major forces in financing the construction of western railroads and underwriting its commercial and industrial development.

But to base leadership on finance alone was to build upon shifting sands. Other cities, notably New York, already far surpassed Boston in population, commercial resources, and national market share. If Boston was to lead the nation, it had to do so using resources for which it had no rivals. And, by the 1860s, this resource was education. Strategically, using education to ensure leadership made sense. Harvard, though its facilities could hardly be compared to those of the leading European universities, was the wealthiest and best equipped college in the United States.

Investing in education appeared to be a way of exercising leadership independent of the vagaries of politics and the business cycle. At the same time, it was a vitally important way of increasing Boston's economic clout. For the growth of the national economy, as the previous twenty years had shown, would be increasingly dependent on the application of science to industry, of quantitative methods to management, and, more generally, of trained expertise to any and every large-scale enterprise. Harvard was in an advantaged position to control the leadership market. But to do so it needed a president who both shared the national vision of its trustees and who had concrete and workable ideas about tying Harvard into the life of the nation and its economy. Eliot was clearly the man for the job.

Eliot had made no secret his beliefs about the need for reform at Harvard and his views about the university's proper constituency clear while he taught there. And, by 1868, having scrutinized the schools and social systems of Europe and having taught at M.I.T., as well as having spent nearly a decade discussing educational issues with members of Boston's business community, he was in a good position both to make ringing statements about what the university should become and to know the audience to which his arguments would have the greatest appeal. Thus, Eliot's election to the presidency of Harvard came to be a struggle which arrayed those who favored institutional autonomy -- the churchmen, classicists, and scientific Lazzaroni -- against those who favored institutional accountability, particularly accountability to the business community. It was clear to all that Eliot's election would mean not only acceptance of his general conception of the place of the university in the process of national economic, social, and political development, and of a curriculum which would enable the university to actively participate in that development, but also that, the enterprise of knowledge would be placed firmly in the hands of the men of affairs.

Eliot's ideas, if alien to the clerically-dominated world of the colleges, did not sound quite so strangely to the ears of many businessmen, who were already contemplating the technical and managerial challenges of exploiting the continent's untapped resources and creating a genuinely national economy. And Boston's businessmen in particular were in an advantaged position to appreciate his analysis of

the prospects for the higher learning in America. As entrepreneurs, they knew the nature of the challenges that had to be met: the need for specialized information, for informed and flexible administrators, and for means of ordering diverse and geographically extensive range of economic activities. As individuals who had shared the peculiar Ante-Bellum Brahmin experience of being expected to pursue specialized careers restrained, and sometimes paralyzed, by a perfectionist morality, they could appreciate the truth in Eliot's assertions about the psychology of learning and achievement, which seemed to promise a compatibility between happiness and usefulness.

Charles W. Eliot, "Inaugural Address as President of Harvard College, October 19, 1869. [From: Charles W. Eliot, *Educational Reform -- Essays and Addresses* (New York: The Century Company, 1905), 1-46].

The endless controversies whether language, philosophy, mathematics, or science supplies the best mental training, whether general education should be chiefly literary or chiefly scientific, have no practical lesson for us to-day. This University recognizes no real antagonism between literature and science, and consents to no such narrow alternatives as mathematics or classics, science or metaphysics. We would have them all, and at their best. To observe keenly, to reason soundly, and to imagine vividly are operations as essential as that of clear and forcible expression; and to develop one of these faculties, it is not necessary to repress and dwarf the others. A university is not closely concerned with the applications of knowledge, until its general education branches into professional. Poetry and philosophy and science do indeed conspire to promote the material welfare of mankind; but science no more than poetry finds its best warrant in its utility. Truth [2] and right are above utility in all realms of thought and action.

It were a bitter mockery to suggest that any subject whatever should be taught less than it now is in American colleges. The only conceivable aim of a college government in our day is to broaden, deepen, and invigorate American teaching in all branches of learning. It will be generations before the best of American institutions of education will get growth enough to bear pruning. The descendants of the Pilgrim Fathers are still very thankful for the parched corn of learning.

Recent discussions have added pitifully little to the world's stock of wisdom about the staple of education. Who blows to-day such a ringing trumpet-call to the study of language as Luther blew? Hardly a significant word has been added in two centuries to Milton's description of the unprofitable way to study languages. Would any young American learn how to profit by travel, that foolish beginning but excellent sequel to education, he can find no apter advice than Bacon's. The practice of England and America is literally centuries behind the precept of the best thinkers upon education. A striking illustration may be found in the prevailing neglect of the systematic study of the English language. How lamentably true to-day are these words of Locke: "If any one among us have a facility or purity more than ordinary in his mother-tongue, it is owing to chance, or his genius, or anything rather than to his education or any care of his teacher."

[3] The best result of the discussion which has raged so long about the relative educational value of the main branches of learning is the conviction that there is room for them all in a sound scheme, provided that right methods of teaching be employed. It is not because of the limitation of their faculties that boys of eighteen come to college, having mastered nothing but a few score pages of Latin and Greek, and the bare elements of mathematics. Not nature, but an unintelligent system of instruction from the primary school through the college, is responsible for the fact that many college graduates have so inadequate a conception of what is meant by scientific observation, reasoning, and proof. It is possible for the young to get actual experience of all the principal methods of thought. There is a method of thought in language, and a method in mathematics, and another of natural and physical science, and another of faith. With wise direction, even a child would drink at all these springs. The actual problem to be solved is not what to teach, but how to teach. The revolutions accomplished in other fields of labor have a lesson for teachers. New England could not cut her hay with scythes, or the West her wheat with sickles. When millions are to be fed where formerly there were but scores, the single fish-line must be replaced by seines and trawls, the human shoulders by steam-elevators, and the wooden-axled ox-cart on a corduroy road by the smooth-running freight-train. In education, there is a great hungry multitude to [4] be fed. The great well at Orvieto, up whose spiral paths files of donkeys painfully brought the sweet water in kegs, was an admirable construction in its day; but now we tap Fresh Pond in our chambers. The Orvieto well might remind some persons of educational methods not yet extinct. With good methods, we may confidently hope to give young men of twenty to twenty-five an accurate general knowledge of all the main subjects of human interest, besides a minute and thorough knowledge of the one subject which each may select as his principal occupation in life. To think this impossible is to despair of mankind; for unless a general acquaintance with many branches of knowledge, good so far as it goes, be attainable by great numbers of men, there can be no such thing as an intelligent public opinion; and in the modern world the intelligence of public opinion is the one indispensable condition of social progress.

What has been said of needed reformation in methods of teaching the subjects which have already been nominally admitted to the American curriculum applies not only to the university, but to the preparatory schools of every grade down to the primary. The American college is obliged to supplement the American school. Whatever elementary instruction the schools fail to give, the college must supply. The improvement of the schools has of late years permitted the college to advance the grade of its

teaching, and adapt the methods of its later years to men instead of boys. This improvement of the college reacts upon the [5] schools to their advantage; and this action and reaction will be continuous. A university is not built in the air, but on social and literary foundations which preceding generations have bequeathed. If the whole structure needs rebuilding, it must be rebuilt from the foundation. Hence, sudden reconstruction is impossible in our high places of education. Such inducements as the College can offer for enriching and enlarging the course of study pursued in preparatory schools as the Faculty has recently decided to give. The requirements in Latin and Greek grammar are to be set at a thorough knowledge of forms and general principles; the lists of classical authors accepted as equivalents for the regular standards are to be enlarged; an acquaintance with physical geography is to be required; the study of elementary mechanics is to be recommended, and prizes are to be offered for reading aloud, and for the critical analysis of passages from English authors. At the same time the University will take to heart the counsel which it gives to others.

In every department of learning the University would search out by trial and reflection the best methods of instruction. The University believes in the thorough study of language. it contends for all languages -- Oriental, Greek, Latin, Romance, German, and especially for the mother-tongue; seeing in them all one institution, one history, one means of discipline, one department of learning. In teaching languages, it is for this [6] American generation to invent, or to accept from abroad, better tools than the old; to devise, or to transplant from Europe, prompter and more comprehensive methods than the prevailing; and to command more intelligent labor, in order to gather rapidly and surely the best fruit of that culture and have time for other harvests.

The University recognizes the natural and physical sciences as indispensable branches of education, and has long acted upon this opinion; but it would have science taught in a rational way, objects and instruments in hand-not from books merely, not through the memory chiefly, but by the seeing eye and the informing fingers. Some of the scientific scoffers at gerund grinding and nonsense verses might well look at home; the prevailing methods of teaching science, the world over, are, on the whole, less intelligent than the methods of teaching language. The University would have scientific studies in school and college and professional school develop and discipline those powers of the mind by which science has been created and is daily nourished -- the powers of observation, the inductive faculty, the sober imagination, the sincere and proportionate judgment. A student in the elements gets no such training by studying even a good

text-book, though he really master it, nor yet by sitting at the feet of the most admirable lecturer.

If there be any subject which seems fixed and settled in its educational aspects, it is the mathematics; yet there is no department of the University [7] which has been, during the last fifteen years, in such a state of vigorous experiment upon methods and appliances of teaching as the mathematical department. It would be well if the primary schools had as much faith in the possibility of improving their way of teaching multiplication.

The important place which history, and mental, moral, and political philosophy, should hold in any broad scheme of education is recognized of all; but none know so well how crude are the prevailing methods of teaching these subjects as those who teach them best. They cannot be taught from books alone, but must be vivified and illustrated by teachers of active, comprehensive, and judicial mind. To learn by rote a list of dates is not to study history. Mr. Emerson says that history is biography. In a deep sense this is true. Certainly, the best way to impart the facts of history to the young is through the quick interest they take in the lives of the men and women who fill great historical scenes or epitomize epochs. From the centers so established, their interest may be spread over great areas. For the young especially, it is better to enter with intense sympathy into the great moments of history, than to stretch a thin attention through its weary centuries.

Philosophical subjects should never be taught with authority. They are not established sciences; they are full of disputed matters) open questions, and bottomless speculations. it is not the function of the teacher to settle philosophical and political controversies for the pu or even to [8] recommend to him any one set of opinions as better than another. Exposition, not imposition, of opinions is the professor's part. The student should be made acquainted with all sides of these controversies, with salient points of each system; he should be shown what is still in force of institutions and philosophies mainly outgrown, and what is new in those now in vogue. The very word "education" is a standing protest against dogmatic teaching. The notion that education consists in the authoritative inculcation of what the teacher deems true may be logical and appropriate in a convent, or a seminary for priests, but it is intolerable in universities and public schools, from primary to professional. The worthy fruit of academic culture is an open mind, trained to careful thinking, instructed in methods of philosophic investigation, acquainted in a general way with the accumulated thought of

past generations, and penetrated with humility. It is thus that the university in our day serves Christ and the church.

The increasing weight, range, and thoroughness of the examination for admission to college may strike some observers with dismay. The increase of real requisitions is hardly perceptible from year to year; but on looking back ten or twenty years, the changes are marked, and all in one direction. The dignity and importance of this examination have been steadily rising, and this rise measures the improvement of the preparatory schools. When the gradual improvement of American [9] schools has lifted them to a level with the German gymnasia, we may expect to see the American college bearing a nearer resemblance to the German faculties of philosophy than it now does. The actual admission examination may best be compared with the first examination of the University of France. This examination, which comes at the end of a French boy's school life, is for the degree of Bachelor of Arts or of Sciences. The degree is given to young men who come fresh from school and have never been under university teachers; a large part of the recipients never enter the university. The young men who come to our examination for admission to college are older than the average of French Bachelors of Arts. The examination tests not only the capacity of the candidates, but also the quality of their school instruction; it is a great event in their lives, though not, as in France, marked by any degree. The examination is conducted by college professors and tutors who have never had any relations whatever with those examined. It would be a great gain if all subsequent college examinations could be as impartially conducted by competent examiners brought from without the college and paid for their services. When the teacher examines his class, there is no effective examination of the teacher. If the examinations for the scientific, theological, medical, and dental degrees were conducted by independent boards of examiners, appointed by professional bodies of dignity and influence, the significance of these degrees would be greatly enhanced. [10] The same might be said of the degree of Bachelor of Laws, were it not that this degree is, at present, earned by attendance alone, and not by attendance and examination. The American practice of allowing the teaching body to examine for degrees has been partly dictated by the scarcity of men outside the faculties who are at once thoroughly acquainted with the subjects of examination, and sufficiently versed in teaching to know what may fairly be expected of both students and instructors. This difficulty could now be overcome. The chief reason, however, for the existence of this practice is that the faculties were the only bodies that could confer degrees intelligently, when degrees were obtained by passing through a prescribed course of study without serious checks, and

completing a certain term of residence without disgrace. The change in the manner of earning the University degrees ought, by right, to have brought into being an examining body distinct from the teaching body. So far as the College proper is concerned, the Board of Overseers have, during the past year, taken a step which tends in this direction.

The rigorous examination for admission has one good effect throughout the college course: it prevents a waste of instruction upon incompetent persons. A school with a low standard for admission and a high standard of graduation, like West Point, is obliged to dismiss a large proportion of its students by the way. Hence much individual distress, and a great waste of resources, both public [11] and private. But, on the other hand, it must not be supposed that every student who enters Harvard College necessarily graduates. Strict annual examinations are to be passed. More than a fourth of those who enter the College fail to take their degree. Only a few years ago, all students who graduated at this College passed through one uniform curriculum. Every man studied the same subjects in the same proportions, without regard to his natural bent or preference. The individual student had no choice of either subjects or teachers. This system is still the prevailing system among American colleges, and finds vigorous defenders. It has the merit of simplicity. So had the school methods of our grandfathers -- one primer, one catechism, one rod for all children. On the whole, a single common course of studies, tolerably well selected to meet the average needs, seems to most Americans a very proper and natural thing, even for grown men.

As a people, we do not apply to mental activities the principle of division of labor; and we have but a halting faith in special training for high professional employments. The vulgar conceit that a Yankee can turn his hand to anything we insensibly carry into high places, where it is preposterous and criminal. We are accustomed to seeing men leap from farm or shop to court-room or pulpit, and we half believe that common men can safely use the seven-league boots of genius. [12] What amount of knowledge and experience do we habitually demand of our lawgivers? What special training do we ordinarily think necessary for our diplomatists? -- although in great emergencies the nation has known where to turn. Only after years of the bitterest experience did we come to believe the professional training of a soldier to be of value in war. This lack of faith in the prophecy of a natural bent, and in the value of a discipline concentrated upon a single object, amounts to a national danger. In education, the individual traits of different minds have not been sufficiently attended to. Through all

the period of boyhood the school studies should be representative; all the main fields of knowledge should be entered upon. But the young man of nineteen or twenty ought to know what he likes best and is most fit for. If his previous training has been sufficiently wide, he will know by that time whether he is most apt at language or philosophy or natural science or mathematics. If he feels no loves, he will at least have his hates. At that age the teacher may wisely abandon the school-dame's practice of giving a copy of nothing but zeros to the child who alleges that he cannot make that figure. When the revelation of his own peculiar taste and capacity comes to a young man, let him reverently give it welcome, thank God, and take courage. Thereafter he knows his way to happy, enthusiastic work, and, God willing, to usefulness and success. The civilization of a people may be inferred from the variety of its [13] tools. There are thousands of years between the stone hatchet and the machine-shop. As tools multiply, each is more ingeniously adapted to its own exclusive purpose. So with the men that make the State. For the individual, concentration, and the highest development of his own peculiar faculty, is the only prudence. But for the State, it is variety, not uniformity, of intellectual product, which is needful.

These principles are the justification of the system of elective studies which has been gradually developed in this College during the past forty years. At present the Freshman year is the only one in which there is a fixed course prescribed for all. In the other three years, more than half the time allotted to study is filled with subjects chosen by each student from lists which comprise six studies in the Sophomore year, nine in the junior year, and eleven in the Senior year. The range of elective studies is large, though there are some striking deficiencies. The liberty of choice of subject is wide, but yet has very rigid limits. There is a certain framework which must be filled; and about half the material of the filling is prescribed. The choice offered to the student does not lie between liberal studies and professional or utilitarian studies. All the studies which are open to him are liberal and disciplinary, not narrow or special. Under this system the College does not demand, it is true, one invariable set of studies of every candidate for the first degree in Arts; but its requisitions for this degree are nevertheless high and [14] inflexible, being nothing less than four years devoted to liberal culture.

It has been alleged that the elective system must weaken the bond which unites members of the same class. This is true; but in view of another much more efficient cause of the diminution of class intimacy, the point is not very significant. The increased size of the college classes inevitably works a great change in this respect. One hundred and

fifty young men cannot be so intimate with each other as fifty used to be. This increase is progressive. Taken in connection with the rising average age of the students, it would compel the adoption of methods of instruction different from the old, if there were no better motive for such change. The elective system fosters scholarship, because it gives free play to natural preferences and inborn aptitudes, makes possible enthusiasm for a chosen work, relieves the professor and the ardent disciple of the presence of a body of students who are compelled to an unwelcome task, and enlarges instruction by substituting many and various lessons given to small, lively classes, for a few lessons manytimes repeated to different sections of a numerous class. The College therefore proposes to persevere in its efforts to establish, improve, and extend the elective system. Its administrative difficulties, which seem formidable at first, vanish before a brief experience.

There has been much discussion about the comparative merits of lectures and recitations. Both [15] are useful -- lectures, for inspiration, guidance, and the comprehensive methodizing which only one who has a view of the whole field can rightly contrive; recitations, for securing and testifying a thorough mastery on the part of the pupil of the treatise or author in hand, for conversational comment and amplification, for emulation and competition. Recitations alone readily degenerate into dusty repetitions, and lectures alone are too often a useless expenditure of force. The lecturer pumps laboriously into sieves. The water may be wholesome, but it runs through. A mind must work to grow. just as far, however, as the student can be relied on to master and appreciate his author without the aid of frequent questioning and repetitions, so far is it possible to dispense with recitations. Accordingly, in the later College years there is a decided tendency to diminish the number of recitations, the faithfulness of the student being tested by periodical examinations. This tendency is in a right direction, if prudently controlled.

The discussion about lectures and recitations has brought out some strong opinions about text-books and their use. Impatience with text-books and manuals is very natural in both teachers and taught. These books are indeed, for the most part, very imperfect, and stand in constant need of correction by the well-informed teacher. Stereotyping, in its present undeveloped condition, is in part to blame for their most exasperating defects. To make the metal plates keep pace with the progress of learning is costly. The manifest [16] deficiencies of text-books must not, however, drive us into a too sweeping condemnation of their use. It is a rare teacher who is superior to all

manuals in his subject. Scientific manuals are, as a rule, much worse than those upon language, literature, or philosophy; yet the main improvement in medical education in this country during the last twenty years has been the addition of systematic recitations from text-books to the lectures which were formerly the principal means of theoretical instruction. The training of a medical student, inadequate as it is, offers the best example we have of the methods and fruits of an education mainly scientific. The transformation which the average student of a good medical school undergoes in three years is strong testimony to the efficiency of the training he receives.

There are certain common misapprehensions about colleges in general, and this College in particular, to which I wish to devote a few moments' attention. And, first, in spite of the familiar picture of the moral dangers which environ the student, there is no place so safe as a good college during the critical passage from boyhood to manhood. The security of the college commonwealth is largely due to its exuberant activity. Its public opinion, though easily led astray, is still high in the main. Its scholarly tastes and habits, its eager friendships and quick hatreds, its keen debates, its frank discussions of character and of deep political and religious questions, all are [17] safeguards against sloth, vulgarity, and depravity. Its society and, not less, its solitudes are full of teaching. Shams, conceit, and fictitious distinctions get no mercy. There is nothing but ridicule for bombast and sentimentality. Repression of genuine sentiment and emotion is indeed, in this College, carried too far. Reserve is more respectable than any undiscerning communicativeness; but neither Yankee shamefacedness nor English stolidity is admirable. This point especially touches you, young men, who are still undergraduates. When you feel a true admiration for a teacher, a glow of enthusiasm for work, a thrill of pleasure at some excellent saying, give it expression. Do not be ashamed of these emotions. Cherish the natural sentiment of personal devotion to the teacher who calls out your better powers. It is a great delight to serve an intellectual master. We Americans are but too apt to lose this happiness. German and French students get it. If ever in after years you come to smile at the youthful reverence you paid, believe me, it will be with tears in your eyes.

Many excellent persons see great offense in any system of college rank; but why should we expect more of young men than we do of their elders? How many men and women perform their daily tasks from the highest motives alone -- for the glory of God and the relief of man's estate? Most people work for bare bread, a few for cake. The college rank-list reinforces higher motives. In the campaign for character, no auxiliaries

are to be [18] refused. Next to despising the enemy, it is dangerous to reject allies. To devise a suitable method of estimating the fidelity and attainments of college students is, however, a problem which has long been under discussion, and has not yet received a satisfactory solution. The worst of rank as a stimulus is the self-reference it implies in the aspirants. The less a young man thinks about the cultivation of his mind, about his own mental progress,
 -- about himself, in short, -- the better.

The petty discipline of colleges attracts altogether too much attention from both friends and foes. It is to be remembered that the rules concerning decorum, however necessary to maintain the high standard of manners and conduct which characterizes this College, are nevertheless justly described as petty. What is technically called a quiet term cannot be accepted as the acme of university success. This success is not to be measured by the frequency or rarity of college punishments. The criteria of success or failure in a high place of learning are not the boyish escapades of an insignificant minority, nor the exceptional cases of ruinous vice. Each year must be judged by the added opportunities of instruction, by the prevailing enthusiasm in learning, and by the gathered wealth of culture and character. The best way to put boyishness to shame is to foster scholarship and manliness. The manners of a community cannot be improved by main force any more than its morals. The Statutes of the University need some amendment and reduction in the chapters on [19] crimes and misdemeanors. But let us render to our fathers the justice we shall need from our sons. What is too minute or precise for our use was doubtless wise and proper in its day. It was to inculcate a reverent bearing and due consideration for things sacred that the regulations prescribed a black dress on Sunday. Black is not the only decorous wear in these days; but we must not seem, in ceasing from this particular mode of good manners, to think less of the gentle breeding of which only the outward signs, and not the substance, have been changed.

Harvard College has always attracted and still attracts students in all conditions of life. From the city trader or professional man, who maybe careless how much his son spends at Cambridge, to the farmer or mechanic, who finds it a hard sacrifice to give his boy his time early enough to enable him to prepare for college, all sorts and conditions of men have wished and still wish to send their sons hither. There are always scores of young men in this University who earn or borrow every dollar they spend here. Every year many young men enter this College without any resources whatever. If they prove

themselves men of capacity and character, they never go away for lack of money. More than twenty thousand dollars a year is now devoted to aiding students of narrow means to compass their education, besides all the remitted fees and the numerous private benefactions. These latter are unfailing. Taken [20] in connection with the proceeds of the funds applicable to the aid of poor students, they enable the Corporation to say that no good student need ever stay away from Cambridge or leave college simply because he is poor. There is one uniform condition, however, on which help is given: the recipient must be of promising ability and the best character. The community does not owe superior education to all children, but only to the elite -- to those who, having the capacity, prove by hard work that they have also the necessary perseverance and endurance. The process of preparing to enter college under the difficulties which poverty entails is just such a test of worthiness as is needed. At this moment there is no college in the country more eligible for a poor student than Harvard on the mere ground of economy. The scholarship funds are mainly the fruit of the last fifteen years. The future will take care of itself; for it is to be expected that the men who in this generation have had the benefit of these funds, and who succeed in after life, will pay manifold to their successors in need the debt which they owe, not to the College, but to benefactors whom they cannot even thank, save in heaven. No wonder that scholarships are founded. What greater privilege than this of giving young men of promise the coveted means of intellectual growth and freedom? The angels of heaven might envy mortals so fine a luxury. The happiness which the winning of a scholarship gives is not the recipient's alone: it flashes back to the home whence he came, and gladdens anxious hearts there. The good which it does is not his alone, but descends, multiplying at every step, through generations. Thanks to the beneficent mysteries of hereditary transmission, no capital earns such interest as personal culture. The poorest and the richest students are equally welcome here, provided that with their poverty or their wealth they bring capacity, ambition, and purity. The poverty of scholars is of inestimable worth in this money-getting nation. It maintains the true standards of virtue and honor. The poor friars, not the bishops, saved the church. The poor scholars and preachers of duty defend the modern community against its own material prosperity. Luxury and learning are ill bedfellows. Nevertheless, this College owes much of its distinctive character to those who, bringing hither from refined homes good breeding, gentle tastes, and a manly delicacy, add to them openness and activity of mind, intellectual interests, and a sense of public duty. It is as high a privilege for a rich man's son as for a poor man's to resort to these academic halls, and so to take his proper place among cultivated and intellectual men. To lose altogether the presence of those who in

early life have enjoyed the domestic and social advantages of wealth would be as great a blow to the College as to lose the sons of the poor. The interests of the College and the country are identical in this regard. The country suffers when the rich are ignorant and unrefined. Inherited wealth is an unmitigated curse when divorced from culture. Harvard College is sometimes reproached with [22] being aristocratic. If by aristocracy be meant a stupid and pretentious caste, founded on wealth, and birth, and an affectation of European manners, no charge could be more preposterous: the College is intensely American in affection, and intensely democratic in temper. But there is an aristocracy to which the sons of Harvard have belonged, and, let us hope, will ever aspire to belong -- the aristocracy which excels in manly sports, carries off the honors and prizes of the learned professions, and bears itself with distinction in all fields of intellectual labor and combat; the aristocracy which in peace stands firmest for the public honor and renown, and in war rides first into the murderous thickets.

The attitude of the University in the prevailing discussions touching the education and fit employments of women demands brief explanation. America is the natural arena for these debates; for here the female sex has a better past and a better present than elsewhere. Americans, as a rule, hate disabilities of all sorts, whether religious, political, or social. Equality between the sexes, without privilege or oppression on either side, is the happy custom of American homes. While this great discussion is going on, it is the duty of the University to maintain a cautious and expectant policy. The Corporation will not receive women as students into the College proper, nor into any school whose discipline requires residence near the school. The difficulties involved in a [23] common residence of hundreds of young men and women of immature character and marriageable age are very grave. The necessary police regulations are exceedingly burdensome. The Corporation are not influenced to this decision, however, by any crude notions about the innate capacities of women. The world knows next to nothing about the natural mental capacities of the female sex. Only after generations of civil freedom and social equality will it be possible to obtain the data necessary for an adequate discussion of woman's natural tendencies, tastes, and capabilities. The Corporation do not find it necessary to entertain a confident opinion upon the fitness or unfitness of women for professional pursuits. It is not the business of the University to decide this mooted point. In this country the University does not undertake to protect the community against incompetent lawyers, ministers, or doctors. The community must protect itself by refusing to employ such. Practical, not theoretical, considerations determine the policy of the University. Upon a matter concerning which

prejudices are deep, and opinion inflammable, and experience scanty, only one course is prudent or justifiable when such great interests are at stake-- that of cautious and well-considered experiment. The practical problem is to devise a safe, promising, and instructive experiment. Such an experiment the Corporation have meant to try in opening the newly established University Courses of Instruction to competent women. In these courses [24] the University offers to young women who have been to good schools as many years as they wish of liberal culture in studies which have no direct professional value, to be sure, but which enrich and enlarge both intellect and character. The University hopes thus to contribute to the intellectual emancipation of women. It hopes to prepare some women better than they would otherwise have been prepared for the profession of teaching, the one learned profession to which women have already acquired a clear title. It hopes that the proffer of this higher instruction will have some reflex influence upon schools for girls -- to discourage superficiality, and to promote substantial education.

The governing bodies of the University are the Faculties, the Board of Overseers, and the Corporation. The University as a place of study and instruction is, at any moment, what the Faculties make it. The professors, lecturers, and tutors of the University are the living sources of learning and enthusiasm. They personally represent the possibilities of instruction. They are united in several distinct bodies, the academic and professional Faculties, each of which practically determines its own processes and rules. The discussion of methods of instruction is the principal business of these bodies. As a fact, progress comes mainly from the Faculties. This has been conspicuously the case with the Academic and Medical Faculties during the last fifteen or twenty [25] years. The undergraduates used to have a notion that the time of the Academic Faculty was mainly devoted to petty discipline. Nothing could be further from the truth. The Academic Faculty is the most active, vigilant, and devoted body connected with the University. It indeed is constantly obliged to discuss minute details, which might appear trivial to an inexperienced observer. But, in education, technical details tell. Whether German be studied by the juniors once a week as an extra study, or twice a week as an elective, seems, perhaps, an unimportant matter; but, twenty years hence, it makes all the difference between a generation of Alumni who know German and a generation who do not. The Faculty renews its youth, through the frequent appointments of tutors and assistant professors, better and oftener than any other organization within the University. Two kinds of men make good teachers -- young men and men who never grow old. The incessant discussions of the Academic Faculty have

borne much fruit: witness the transformation of the University since the beginning of President Walker's administration. And it never tires. New men take up the old debates, and one year's progress is not less than another's. The divisions within the Faculty are never between the old and the young officers. There are always old radicals and young conservatives.

The Medical Faculty affords another illustration of the same principle -- that for real university progress we must look principally to the teaching [26] bodies. The Medical School today is almost three times as strong as it was fifteen years ago. Its teaching power is greatly increased, and its methods have been much improved. This gain is the work of the Faculty of the School.

If then the Faculties be so important, it is a vital question how the quality of these bodies can be maintained and improved. It is very hard to find competent professors for the University. Very few Americans of eminent ability are attracted to this profession. The pay has been too low, and there has been no gradual rise out of drudgery, such as may reasonably be expected in other learned callings. The law of supply and demand, or the commercial principle that the quality as well as the price of goods is best regulated by the natural contest between producers and consumers, never has worked well in the province of high education. And in spite of the high standing of some of its advocates, it is well-nigh certain that the so-called law never can work well in such a field. The reason is that the demand for instructors of the highest class on the part of parents and trustees is an ignorant demand, and the supply of highly educated teachers is so limited that the consumer has not sufficient opportunities of informing himself concerning the real qualities of the article he seeks. Originally a bad judge, he remains a bad judge, because the supply is not sufficiently abundant and various to instruct him. Moreover, a need is not necessarily a demand. Every-body knows that the supposed law affords a very imperfect [27] protection against short weight, adulteration, and sham, even in the case of those commodities which are most abundant in the market and most familiar to buyers. The most intelligent community is defenseless enough in buying clothes and groceries. When it comes to hiring learning and inspiration and personal weight, the law of supply and demand breaks down altogether. A university cannot be managed like a railroad or a cotton-mill.

There are, however, two practicable improvements in the position of college professors which will be of very good effect. Their regular stipend must and will be

increased, and the repetitions which now harass them must be diminished in number. It is a strong point of the elective system that, by reducing the size of classes or divisions, and increasing the variety of subjects, it makes the professors' labors more agreeable. Experience teaches that the strongest and most devoted professors will contribute something to the patrimony of knowledge; or if they invent little themselves, they will do something toward defending, interpreting, or diffusing the contributions of others. Nevertheless, the prime business of American professors in this generation must be regular and assiduous class teaching. With the exception of the endowments of the Observatory, the University does not hold a single fund primarily intended to secure to men of learning the leisure and means to prosecute original researches.

[28] The organization and functions of the Board of Overseers deserve the serious attention of all men who are interested in the American method of providing the community with high education through the agency of private corporations. Since 1866 the Overseers have been elected by the Alumni. Five men are chosen each year to serve six years. The body has, therefore, a large and very intelligent constituency, and is rapidly renewed. The ingenious method of nominating to the electors twice as many candidates as there are places to be filled in any year is worthy of careful study as a device of possible application in politics. The real function of the Board of Overseers is to stimulate and watch the President and Fellows. Without the Overseers, the President and Fellows would be a board of private trustees, self-perpetuated and self-controlled. Provided as it is with two governingboards, the University enjoys that principal safeguard of all American governments -- the natural antagonism between two bodies of different constitution, powers, and privileges. While having with the Corporation a common interest of the deepest kind in the welfare of the University and the advancement of learning, the Overseers should always hold toward the Corporation an attitude of suspicious vigilance. They ought always to be pushing and prying. It would be hard to overstate the importance of the public supervision exercised by the Board of Overseers. Experience proves that our main hope for the permanence and ever-widening usefulness of the University [29] must rest upon this double-headed organization. The English practice of setting up a single body of private trustees to carry on a school or charity according to the personal instructions of some founder or founders has certainly proved a lamentably bad one; and when we count by generations, the institutions thus established have proved shortlived. The same causes which have brought about the decline of English endowed schools would threaten the life of this University were it not for the existence of the Board of Overseers. These schools were generally managed by

close corporations, self-elected, self-controlled, without motive for activity, and destitute of external stimulus and aid. Such bodies are too irresponsible for human nature. At the time of life at which men generally come to such places of trust, rest is sweet, and the easiest way is apt to seem the best way; and the responsibility of inaction, though really heavier, seems lighter than the responsibility of action. These corporations were often hampered by founders' wills and statutory provisions which could not be executed, and yet stood in the way of organic improvements. There was no systematic provision for thorough inspections and public reports thereupon. We cannot flatter ourselves that under like circumstances we should always be secure against like dangers. Provoked by crying abuses, some of the best friends of education in England have gone the length of maintaining that all these schoolendowments ought to be destroyed, and the future creation of such trusts rendered [30] impossible. French law practically prohibits the creation of such trusts by private persons.

Incident to the Overseers' power of inspecting the University and publicly reporting upon its condition, is the important function of suggesting and urging improvements. The inertia of a massive University is formidable. A good past is positively dangerous, if it make us content with the present, and so unprepared for the future. The present constitution of our Board of Overseers has already stimulated the Alumni of several other New England colleges to demand a similar control over the property-holding board of trustees which has heretofore been the single source of all authority.

We come now to the heart of the University -- the Corporation. This board holds the funds, makes appointments, fixes salaries, and has, by right, the initiative in all changes of the organic law of the University. Such an executive board must be small to be efficient. It must always contain men of sound judgment in finance; and literature and the learned professions should be adequately represented in it. The Corporation should also be but slowly renewed; for it is of the utmost consequence to the University that the Government should have a steady aim, and a prevailing spirit which is independent of individuals and transmissible from generation to generation. And what should this spirit be? First, it should be a catholic spirit. A university must be indigenous; it must be rich; but, above all, it must be [31] free. The winnowing breeze of freedom must blow through all its chambers. It takes a hurricane to blow wheat away. An atmosphere of intellectual freedom is the native air of literature and science. This University aspires to serve the nation by training men to intellectual honesty and independence of mind. The

Corporation demands of all its teachers that they be grave, reverent, and high-minded; but it leaves them, like their pupils, free. A university is built, not by a sect, but by a nation. Secondly, the actuating spirit of the Corporation must be a spirit of fidelity -- fidelity to the many and various trusts reposed in them by the hundreds of persons who, out of their penury or their abundance, have given money to the President and Fellows of Harvard College in the beautiful hope of doing some perpetual good upon this earth. The Corporation has constantly done its utmost to make this hope a living fact. One hundred and ninety-nine years ago, William Pennoyer gave the rents of certain estates in the county of Norfolk, England, that "two fellows and two scholars forever should be educated, brought up, and maintained" in this College. The income from this bequest has never failed'; and to-day one of the four Pennoyer scholarships is held by a lineal descendant of William Pennoyer's brother Robert. So a lineal descendant of Governor Danforth takes this year the income of the property which Danforth bequeathed to the College in 1699. The Corporation have been as faithful in the greater things as in the [32] less. They have been greatly blessed in one respect: in the whole life of the Corporation, seven generations of men, nothing has ever been lost by malfeasance of officers or servants. A reputation for scrupulous fidelity to all trusts is the most precious possession of the Corporation. That safe, the College might lose everything else and yet survive; that lost beyond repair, and the days of the College would be numbered. Testators look first to the trustworthiness and permanence of the body which is to dispense their benefactions. The Corporation thankfully receive all gifts which may advance learning; but they believe that the interests of the University may be most effectually promoted by not restricting too narrowly the use to which a gift may be applied. Whenever the giver desires it, the Corporation will agree to keep any fund separately invested under the name of the giver, and to apply the whole proceeds of such investment to any object the giver may designate. By such special investment, however, the insurance which results from the absorption of a specific gift in the general funds is lost. A fund invested by itself may be impaired or lost by a single error of judgment in investing. The chance of such loss is small in any one generation, but appreciable in centuries. Such general designations as salaries, books, dormitories, public buildings, scholarships graduate or undergraduate, scientific collections, and expenses of experimental laboratories, are of permanent significance and effect; while experience proves that too specific [33] and minute directions concerning the application of funds must often fail of fulfilment, simply in consequence of the changing needs and habits of successive generations.

Again, the Corporation should always be filled with the spirit of enterprise. An institution like this College is getting decrepit when it sits down contentedly on its mortgages. On its invested funds the Corporation should be always seeking how safely to make a quarter of a per cent. more. A quarter of one per cent. means a new professorship. It should be always pushing after more professorships, better professors, more land and buildings, and better apparatus. It should be eager, sleepless, and untiring, never wasting a moment in counting laurels won, ever prompt to welcome and apply the liberality of the community, and liking no prospect so well as that of difficulties to be overcome and labors to be done in the cause of learning and public virtue.

You recognize, gentlemen, the picture which I have drawn in thus delineating the true spirit of the Corporation of this College. I have described the noble quintessence of the New England character -- that character which has made us a free and enlightened people; that character which, please God, shall yet do a great work in the world for the lifting up of humanity.

Apart from the responsibility which rests upon the Corporation, its actual labors are far heavier than the community imagines. The business of the University has greatly increased in volume [34] and complexity during the past twenty years, and the drafts made upon the time and thought of every member of the Corporation are heavy indeed. The high honors of the function are in these days most generously earned.

The President of the University is primarily an executive officer; but, being a member of both governing boards and of all the faculties, he has also the influence in their debates to which his more or less perfect intimacy with the University and greater or less personal weight may happen to entitle him. An administrative officer who undertakes to do everything himself will do but little, and that little ill. The President's first duty is that of supervision. He should know what each officer's and servant's work is, and how it is done. But the days are past in which the President could be called on to decide everything from the purchase of a door-mat to the appointment of a professor. The principle of divided and subordinate responsibilities, which rules in government bureaus, in manufactories, and all great companies, which makes a modern army a possibility, must be applied in the University. The President should be able to discern the practical essence of complicated and long-drawn discussions. He must often pick out that promising part of theory which ought to be tested by experiment, and must

decide how many of things desirable are also attainable, and what one of many projects is ripest for execution. He must watch and look before [35] -- watch, to seize opportunities to get money, to secure eminent teachers and scholars, and to influence public opinion toward the advancement of learning; and look before, to anticipate the due effect on the University of the fluctuations of public opinion on educational problems; of the progress of the institutions which feed the University; of the changing condition of the professions which the University supplies; of the rise of new professions; of the gradual alteration of social and religious habits in the community. The University must accommodate itself promptly to significant changes in the character of the people for whom it exists. The institutions of higher education in any nation are always a faithful mirror in which are sharply reflected the national history and character. In this mobile nation the action and reaction between the University and society at large are more sensitive and rapid than in stiffer communities. The President, therefore, must not need to see a house built before he can comprehend the plan of it. He can profit by a wide intercourse with all sorts of men, and by every real discussion on education, legislation, and sociology.

The most important function of the President is that of advising the Corporation concerning appointments, particularly about appointments of young men who have not had time and opportunity to prove themselves to the public. It is in discharging this duty that the President holds the future of the University in his hands. He cannot do it well unless he have insight, unless he be able [36] to recognize, at times beneath some crusts, the real gentleman and the natural teacher. This is the one oppressive responsibility of the President: all other cares are light beside it. To see every day the evil fruit of a bad appointment must be the cruelest of official torments. Fortunately, the good effect of a judicious appointment is also inestimable; and here, as everywhere, good is more penetrating and diffusive than evil.

It is imperative that the statutes which define the President's duties should be recast, and the customs of the College be somewhat modified, in order that lesser duties may not crowd out the greater. But, however important the functions of the President, it must not be forgotten that he is emphatically a constitutional executive. It is his character and his judgment which are of importance, not his opinions. He is the executive officer of deliberative bodies, in which decisions are reached after discussion by a majority vote. Those decisions bind him. He cannot force his own opinions upon

anybody. A university is the last place in the world for a dictator. Learning is always republican. It has idols, but not masters.

What can the community do for the University? It can love, honor, and cherish it. Love it and honor it. The University is upheld by this public affection and respect. In the loyalty of her children she finds strength and courage. The Corporation, the Overseers, and the several faculties need to feel that the leaders of public opinion, and [37] especially the sons of the College, are at their back, always ready to give them a generous and intelligent support. Therefore we welcome the Chief Magistrate of the Commonwealth, the Senators, Judges, and other dignitaries of the State, who by their presence at this ancient ceremonial bear witness to the pride which Massachusetts feels in her eldest university. Therefore we rejoice in the presence of this throng of the Alumni testifying their devotion to the College which through all changes, is still their home. Cherish it. This University, though rich among American colleges, is very poor in comparison with the great universities of Europe. The wants of the American community have far outgrown the capacity of the University to supply them. We must try to satisfy the cravings of the select few as well as the needs of the average many. We cannot afford to neglect the Fine Arts. We need groves and meadows as well as barracks; and soon there will be no chance to get, them in this expanding city. But, above all, we need professorships, books, and apparatus, that teaching and scholarship may abound.

And what will the University do for the community? First, it will make a rich return of learning, poetry, and piety. Secondly, it will foster the sense of public duty -- that great virtue which makes republics possible. The founding of Harvard College was an heroic act of public spirit. For more than a century the breath of life was [38] kept in it by the public spirit of the Province and of its private benefactors. In the last fifty years the public spirit of the friends of the College has quadrupled its endowments. And how have the young men nurtured here in successive generations repaid the founders for their pious care? Have they honored freedom and loved their country? For answer we appeal to the records of the national service; to the lists of the Senate, the cabinet, and the diplomatic service, and to the rolls of the army and navy. Honored men, here present, illustrate before the world the public quality of the graduates of this College. Theirs is no mercenary service. Other fields of labor attract them more and would reward them better; but they are filled with the noble ambition to deserve well of the republic. There have been doubts, in times yet recent, whether culture were not selfish; whether men of refined tastes and manners could really love Liberty, and be

ready to endure hardness for her sake; whether, in short, gentlemen would in this century prove as loyal to noble ideas as in other times they had been to kings. In yonder old playground, fit spot whereon to commemorate the manliness which there was nurtured, shall soon arise a noble monument which for generations will give convincing answer to such shallow doubts; for over its gates will be written: "In Memory of the sons of Harvard who died for their country." The future of the University will not be unworthy of its past.

Eliot's transformation of Harvard into a university was to be an event of more than local significance. For Harvard was the oldest and richest American institution of higher learning, and as such set an example for other institutions to follow. Because of a set of historical accidents, moreover, it would prove to be the most amenable to business influence, both as a recipient of business largesse and as a founder of programs useful to business in the course of its search for order. Groups of business alumni at other institutions such as Yale and Columbia would attempt to reform their *almae matri* in the late 60s and early 70s -- but would be frustrated in their efforts until later in the century, when Harvard had by its example demonstrated the efficacy of its version of the "new education."

THE BUSINESS OF THE UNIVERSITY

Eliot's task in transforming Harvard into an institution of particular utility to business and, hence, to the nation, involved two basic tasks. The first was expanding its funding, governance, and student constituencies beyond the greater Boston area. For no institution which drew its students and its resources from so limited a region, however wealthy and talented they might be, could ever hope to be a truly national university. The second was to reform the curriculum and expand course offerings in ways which would not only train and screen students for service in business and government bureaucracies, but also generate specific bodies of information -- the social intelligence -- that would enable the business community to come to grips with the qualitative outcomes of quantitative change. Both tasks would require strong backing from Harvard's business constituency, for such changes promised to be both expensive and profoundly alienating to the most powerful academic interest groups within the university -- the classicists and the scientists -- as well as those regional chauvanists on the faculty and among the alumni, who continued to think of Boston as the hub of the universe.

Of all of these tasks, one of the foremost was the generation of social intelligence. Unlike curricular reform and expanded student recruitment, which would take years to implement, the introduction of new courses on topics of particular interest to business and the employment of faculty members who could be counted on both to teach and engage in research on these topics could be done almost immediately.

Eliot did not, of course, originate the idea of university based social science at Harvard. A course in political economy had been taught at Harvard for some years before his election to the presidency by Francis Bowen, the Alford Professor of Natural Religion, Moral Philosophy, and Civil Polity. Bowen's teachings, which were essentially philosophical in nature and were based largely on the free-trade doctrines of writers like John Stuart Mill, were less than satisfactory to Boston's business community, both in their hostility to tariffs (which were viewed by business as essential to protecting New England's industries) and their favoring of inflationary monetary schemes (which were equally repugnant to this creditor group). Accordingly, on the eve of Eliot's election, it was reported in the 1867-68 *Annual Report* of the university that

A partial foundation has recently been established for lectures on the practical affairs of business, and the relations between labor and capital; and this suggests a very useful addition which might be made to the University lectures in general. By permanently endowing temporary courses of instruction on various subjects, the services of two classes of men might always be secured to the University, to the great benefit of the resident graduates and professional students, and sometimes to the benefit of undergraduates. One class consists of men of special gifts and acquirements, whose engagements elsewhere would prevent their constant attendance here, and whose specialty would not afford topics for an extended course, but whose usefulness in a shorter course might be for students of the same specialty almost beyond computation. The services of such men are now obtained only by a gratuity, -- a gratuity which all such men might not find it convenient to make to us. The other class consists of young men desirous of testing their ability to impart instruction, or whose ability we desire to test before inviting them to more permanent offices, and who also have made some special attainment in some subject.

As his statement suggests, the outgoing president, the Reverend Thomas Hill, did not view this fund as very central to the purposes of the university. He neither understood the seriousness of the objections of the group of Boston businessmen who had raised the fund to Bowen's teachings, nor did he comprehend their wish that Political Economy be made a central part of the undergraduate curriculum. Finally, as Hill made painfully clear, he did not even believe the study of society to be a legitimate

subject for academic enquiry. Hill epitomized the old Harvard: although progressive in certain respects, as in his encouragement of the natural sciences, he remained a bulwark against those in the university (like Eliot before his discharge) and those in the community, especially businessmen, who saw Harvard's potential importance to the nation and its economy. It is no wonder that the businessmen, rather than giving the money they had raised to the university, maintained control of it through a private trustee, disbursing it to the university on an annual basis.

Among Eliot's first actions as president were appointments in fields related to the social sciences. In the fall of 1869, Harvard introduced its first courses in political economy, underwritten by a fund raised by a group of Boston businessmen led by Henry Lee, a partner in the investment banking firm of Lee, Higginson & Company. The lectureship in political economy was not the only social science course to be introduced at Harvard during the early years of the Eliot administration. By the fall of 1870, the College had hired three new history instructors (there had been one in 1868) and an instructor in government. Within five years of Eliot's assuming the presidency, Harvard was employing four history instructors, two political economists, and was experimenting with a lectureship in public health in the medical school. At the end of the first decade of Eliot's presidency, 1879/80, these offerings had expanded to include five historians, three political economists, one economist, and a lecturer on philanthropy. The addition of instructors in new areas was complemented by the reorientation of older departments, such as philosophy, towards more pragmatic issues -- as when, in 1881, the university hired Francis Greenwood Peabody to teach social ethics, a course which lay the foundations for the teaching of sociology at Harvard.

THE EMERGENCE OF THE UNIVERSITY

In 1870, there were no American universities in the modern sense. The largest institutions were little more than colleges with loosely-affiliated professional schools. These required no undergraduate degrees of their matriculants, conducted no significant research activities, and operated pretty much for the benefit of their faculties -- usually men in private legal or medical practice who supplemented their incomes with students' lecture fees.

By 1900, this situation had dramatically changed -- and the pace had been set by Harvard, Yale, and the other private institutions. Graduate and professional departments had grown in every field. Most required undergraduate training, as well

as the completion of rigorous programs of required courses. Undergraduate education was changing as well. In place of the set curriculum required of all students were a wide range of electives which, as Eliot had hoped, permitted students to discover their "natural bents." The university became a mechanism for sorting talents and aptitudes, training and refining them, providing them with reliable credentials, and feeding them into an occupational structure whose need for expertise seemed boundless.

The institutional infrastructure that made this growth possible was complex and carefully crafted. Eliot wanted Harvard to be a national university. To do this, he had to be able to recruit students from throughout the country. By the mid-1870s, Harvard entrance examinations were being offered in major cities outside of New England. Eventually Eliot would become the leader in the creation of the College Entrance Examining Board, which would administer standardized tests the would be used by college admissions officers in most of the private universities.

Find the funds to underwrite the growth of the university also proved a challenge. Eliot was equal to it. By the 1880s, Harvard had begun systematically stimulating the growth of alumni activity through Harvard clubs in major cities, through the publication of the *Graduate's Magazine*, and through an elaboration of postgraduate class activities, which published classbooks and convened reunions at five year intervals. These activities brought a flood of donations.

TOTAL DONATIONS BY INDIVIDUALS TO HARVARD UNIVERSITY, 1851-1910
[from Jesse B. Sears, *Philanthropy in the Shaping of American Higher Education*
(Washington, DC: Government Printing Office, 1922), 23].

1851-1855	\$ 131, 898
1856-1860	254, 713
1861-1865	680, 917
1866-1870	254, 741
1871-1875	773, 427
1876-1880	784, 541
1881-1885	1, 487, 508
1886-1890	2, 594, 554
1891-1895	1, 586, 855
1896-1900	4, 306, 609
1901-1905	7, 648, 309
1906-1910	7, 309, 95

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