

WHAT IS A LIBERAL EDUCATION?*

THE general growth of knowledge and the rise of new literatures, arts, and sciences during the past two hundred and fifty years have made it necessary to define anew liberal education, and hence to enlarge the signification of the degree of bachelor of arts, which is the customary evidence of a liberal education. Already the meaning of this ancient degree has quietly undergone many serious modifications; it ought now to be fundamentally and openly changed.

The course of study which terminates in the degree of bachelor of arts ordinarily covers from seven to ten years, of which four are spent in college and three to six at school; and this long course is, for my present purpose, to be considered as a whole. I wish to demonstrate, first, that the number of school and college studies admissible with equal weight or rank for this highly valued degree needs to be much enlarged; secondly, that among admissible subjects a considerable range of choice should be allowed from an earlier age than that at which choice is now generally permitted; and, thirdly, that the existing order of studies should be changed in important respects. The phrase "studies admissible with equal weight or rank" requires some explanation. I use it to describe subjects which are taught with equal care and completeness, and are supported by the same prescriptions, and which win for their respective adherents equal admission to academic competitions, distinctions, and rewards, and equal access to the traditional goal of a liberal education, the degree of bachelor of arts. Coördinate studies must be on an equal footing in all respects: of two studies, if one is required and the other elective, if one is taught elaborately and fully and the other only in its elements, if honors and scholarships may be obtained through one and not through the other, if one may be counted toward the valuable degree of bachelor of arts and the other only toward the very inferior degree of bachelor of science or bachelor of philosophy, the two studies are not coördinate—they have not the same academic weight or rank.

The three principal propositions just enunciated lead to consequences which at first sight are repulsive to most men educated in the existing system. For example, it would follow from them that children might not receive the training which their fathers re-

ceived; that young men educated simultaneously in the same institutions might not have knowledge of the same subjects, share precisely the same intellectual pleasures, or cultivate the same tastes; and that the degree of bachelor of arts would cease to indicate—what it has indicated for nearly three hundred years—that every recipient had devoted the larger part of his years of training to Latin, Greek, and mathematics. Proposals which lead to such results inevitably offend all minds naturally conservative. The common belief of most educated men in the indispensableness of the subjects in which they were themselves instructed, reinforces the general conservatism of mankind in regard to methods of education; and this useful conservatism is securely entrenched behind the general fact that anything which one generation is to impart to the next through educational institutions must, as a rule, be apprehended with tolerable precision by a considerable number of individuals of the elder generation. Hence, a new subject can only force its way very gradually into the circle of the arts called liberal. For instance, it was more than a hundred years after the widespread revival of Greek in Europe before that language was established at Paris and Oxford as a regular constituent in the academic curriculum; and physics and chemistry are not yet fully admitted to that curriculum, although Robert Boyle published his "New Experiments touching the Spring of the Air" in 1660, Galvani discovered animal electricity in 1790, Lavoisier analyzed water in 1783, and John Dalton published his "New System of Chemical Philosophy" in 1808. Indeed, so stout and insurmountable seem the barriers against progress in education, as we look forward, that we are rather startled on looking back to see how short a time what is has been.

It is the received opinion that mathematics is an indispensable and universal constituent of education, possessing the venerable sanction of immemorial use; but when we examine closely the matters now taught as mathematics in this country, we find that they are all recent inventions, of a character so distinct from the Greek geometry and conic sections which with arithmetic represented mathematics down to the seventeenth century, that they do not furnish the same mental

* This paper was read on the 22d of February last before the members of the Johns Hopkins University, an institution which from the start has effectually promoted many of the reforms herein advocated.

training at all. As Whewell pointed out forty years ago, modern mathematics — algebra, analytic geometry, the differential and integral calculus, analytical mechanics, and quaternions — has almost put out of sight the ancient form of mathematical science. Leibnitz published his "Rules of the Differential Calculus" in 1684, Newton his "Method of Fluxions" in 1711, Euler his "Institutiones Calculi Integralis" in 1768-70; but Lagrange, Laplace, Monge, Legendre, Gauss, and Hamilton, the chief promulgators of what we now call mathematical science, all lived into or in this century. The name of this well-established constituent of the course of study required for the baccalaureate is old, but the thing itself is new. A brief citation from the conclusion of Whewell's prolix discussion of the educational value of mathematics, in his treatise entitled "Of a Liberal Education," will explain and fortify the statement that the mental discipline furnished by the mathematics of Euclid and Archimedes was essentially different from that furnished by the analytical mathematics now almost exclusively in use:

"On all these accounts, then, I venture to assert, that while we hold mathematics to be of inestimable value as a permanent study by which the reason of man is to be educated, we must hold also that the geometrical forms of mathematics must be especially preserved and maintained, as essentially requisite for this office; that analytical mathematics can in no way answer this purpose, and, if the attempt be made so to employ it, will not only be worthless, but highly prejudicial to men's minds."

The modern analytical mathematics, thus condemned by Whewell, is practically the only mathematics now in common use in the United States.

Again, it is obvious that the spirit and method in which Latin has been for the most part studied during the present century are very different from the spirit and method in which it was studied in the preceding centuries. During this century it has been taught as a dead language (except perhaps in parts of Italy and Hungary), whereas it used to be taught as a living language, the common speech of all scholars, both lay and clerical. Those advocates of classical learning who maintain that a dead language must have more disciplinary virtue than a living one, would hardly have been satisfied with the prevailing modes of teaching and learning Latin in any century before our own. At any rate, it was a different discipline which Latin supplied when young scholars learned not only to read it, but to write and speak it with fluency.

I venture to inquire next how long Greek has held its present place in the accepted scheme of liberal education. Although the study of Greek took root in Italy as early as

1400, and was rapidly diffused there after the fall of Constantinople in 1453, it can hardly be said to have become established at Paris as a subject worthy the attention of scholars before 1458, or at Oxford before the end of the fifteenth century. At Paris, for many years after 1458, Greek was taught with indifferent success, and its professors, who were mostly foreigners, were excluded from the privileges of regency in the University. Indeed, the subject seems to have long been in the condition of what we should now call an extra study, and its teachers were much in the position of modern-language teachers in an American college, which does not admit them to the faculty. Grocyn, Linacre, and Latimer, who learned Greek at Florence, introduced the study at Oxford in the last years of the fifteenth century; but Anthony Wood says that Grocyn gave lectures of his own free will, and without any emolument. It is certain that in 1578 the instruction in Greek which was given to undergraduates at Cambridge started with the elements of the language; and it is altogether probable that Greek had no real hold in the English grammar schools until the end of the sixteenth century. The statutes which were adopted by the University of Paris in the year 1600 define the studies in arts to be Latin, Greek, Aristotle's philosophy, and Euclid; and they make Greek one of the requirements for admission to the School of Law. It took two hundred years, then, for the Greek language and literature gradually to displace in great part the scholastic metaphysics which, with scholastic theology, had been for generations regarded as the main staple of liberal education; and this displacement was accomplished only after the same sort of tedious struggle by which the new knowledges of the eighteenth and nineteenth centuries are now winning their way to academic recognition. The revived classical literature was vigorously and sincerely opposed as frivolous, heterodox, and useless for discipline; just as natural history, chemistry, physics, and modern literatures are now opposed. The conservatives of that day used precisely the same arguments which the conservatives of to-day bring forward, only they were used against classical literature then, while now they are used in its support. Let it not be imagined that the scholastic metaphysics and theology, which lost most of the ground won by Greek, were in the eyes of the educated men of the twelfth to the sixteenth century at all what they seem to us. They were the chief delight of the wise, learned, and pious; they were the best mental food of at least twelve generations; and they aroused in Europe an enthusiasm for study which has

hardly been equaled in later centuries. When Abélard taught at Paris early in the twelfth century, thousands of pupils flocked around his chair; when the Dominican Thomas Aquinas wrote his "Summa Theologiæ," and lectured at Paris, Bologna, Rome, and Naples, in the middle of the thirteenth century, he had a prodigious following, and for three centuries his fame and influence grew; when the Franciscan Duns Scotus lectured at Oxford at the beginning of the fourteenth century, the resort of students to the university seems to have been far greater than it has ever been since. We may be sure that these wonders were not wrought with dust or chaff. Nevertheless, the scholastic theology and metaphysics were in large measure displaced, and for three hundred years the classical literatures have reigned in their stead.

Authentic history records an earlier change of a fundamental sort in the list of arts called liberal, and consequently in the recognized scheme of liberal education. When Erasmus was a student, that is, in the last third of the fifteenth century, before Greek had been admitted to the circle of the liberal arts, the regular twelve years' course of study included, and had long included, reading, arithmetic, grammar, syntax, poetry, rhetoric, metaphysics, and theology, all studied in Latin; and of these subjects metaphysics and theology occupied half of the whole time, and all of the university period. But in the eleventh century, before Abélard founded scholastic theology, the authoritative list of liberal studies was quite different. It was given in the single line:

"Lingua, tropus, ratio, numerus, tonus, angulus, astra."

Most students were content with the first three — grammar, rhetoric, and logic; a few also pursued arithmetic, music, geometry, and astronomy, if these grave names may be properly applied to the strange mixtures of fact and fancy which in obscure Latin versions of Greek and Arabian originals passed for science. It was this privileged circle which scholastic divinity successfully invaded at the beginning of the twelfth century, the success of the invasion being probably due to the fact that religion was then the only thing which could be systematically studied.

This hasty retrospect shows, first, that some of the studies now commonly called liberal have not long held their present preëminence; and, secondly, that new learning has repeatedly forced its way, in times past, to full academic standing, in spite of the opposition of the conservative, and of the keener resistance of established teachers and learned bodies, whose standing is always supposed to be

threatened by the rise of new sciences. History teaches boldness in urging the claims of modern literatures and sciences to full recognition as liberal arts.

The first subject which, as I conceive, is entitled to recognition as of equal academic value or rank with any subject now most honored is the English language and literature. When Greek began to revive in Europe, English was just acquiring a literary form; but when Greek had won its present rank among the liberal arts, Shakspeare had risen, the English language was formed, and English literature was soon to become the greatest of modern literatures. How does it stand now, with its immense array of poets, philosophers, historians, commentators, critics, satirists, dramatists, novelists, and orators? It cannot be doubted that English literature is beyond all comparison the amplest, most various, and most splendid literature which the world has seen; and it is enough to say of the English language that it is the language of that literature. Greek literature compares with English as Homer compares with Shakspeare, that is, as infantile with adult civilization. It may further be said of the English language that it is the native tongue of nations which are preëminent in the world by force of character, enterprise, and wealth, and whose political and social institutions have a higher moral interest and greater promise than any which mankind has hitherto invented. To the original creations of English genius are to be added translations into English of all the masterpieces of other literatures, sacred and profane. It is a very rare scholar who has not learned much more about the Jews, the Greeks, or the Romans through English than through Hebrew, Greek, or Latin.

And now, with all this wonderful treasure within reach of our youth, what is the position of American schools and colleges in regard to teaching English? Has English literature the foremost place in the programmes of schools? By no means; at best only a subordinate place, and in many schools no place at all. Does English take equal rank with Greek or Latin in our colleges? By no means; not in the number and rank of the teachers, nor in the consideration in which the subject is held by faculty and students, nor in the time which may be devoted to it by a candidate for a degree. Until within a few years the American colleges made no demand upon candidates for admission in regard to knowledge of English; and now that some colleges make a small requirement in English, the chief result of the examinations is to demonstrate the woful ignorance of their own language

and literature which prevails among the picked youth of the country. Shall we be told, as usual, that the best way to learn English is to study Latin and Greek? The answer is, that the facts do not corroborate this improbable hypothesis. American youth in large numbers study Latin and Greek, but do not thereby learn English. Moreover, this hypothesis is obviously inapplicable to the literatures. Shall we also be told, as usual, that no linguistic discipline can be got out of the study of the native language? How, then, was the Greek mind trained in language? Shall we be told that knowledge of English literature should be picked up without systematic effort? The answer is, first, that as a matter of fact this knowledge is not picked up by American youth; and, secondly, that there never was any good reason to suppose that it would be, the acquisition of a competent knowledge of English literature being not an easy but a laborious undertaking for an average youth—not a matter of entertaining reading, but of serious study. Indeed, there is no subject in which competent guidance and systematic instruction are of greater value. For ten years past Harvard University has been trying, first, to stimulate the preparatory schools to give attention to English, and, secondly, to develop and improve its own instruction in that department; but its success has thus far been very moderate. So little attention is paid to English at the preparatory schools that half of the time, labor, and money which the University spends upon English must be devoted to the mere elements of the subject. Moreover, this very year at Harvard less than half as much instruction, of proper university grade, is offered in English as in Greek or in Latin. The experience of all other colleges and universities resembles in this respect that of Harvard.

This comparative neglect of the greatest of literatures in American schools and colleges is certainly a remarkable phenomenon. How is it to be explained? First, by the relative newness of this language and literature: it requires two or three hundred years to introduce new intellectual staples; secondly, by the real difficulty of teaching English well—a difficulty which has only of late years been overcome; and, thirdly, by the dazzling splendor of the revived Greek and Latin literatures when in the fourteenth and fifteenth centuries they broke upon the mind of Western Europe. Through the force of custom, tradition, inherited tastes, and transmitted opinions, the educational practices of to-day are still cast in the molds of the seventeenth century. The scholars of that time saw a great light which shone out of darkness, and

they worshiped it; and we, their descendants in the ninth generation, upon whom greater lights have arisen, still worship at the same shrine. Let us continue to worship there; but let us pay at least equal honors to the glorious lights which have since been kindled.

The next subjects for which I claim a position of academic equality with Greek, Latin, and mathematics are French and German. This claim rests not on the usefulness of these languages to couriers, tourists, or commercial travelers, and not on their merit as languages, but on the magnitude and worth of the literatures, and on the unquestionable fact that facility in reading these languages is absolutely indispensable to a scholar, whatever may be his department of study. Until within one hundred or one hundred and fifty years, scholarship had a common language, the Latin; so that scholars of all the European nationalities had a perfect means of communication, whether in speaking, writing, or printing. But the cultivation of the spirit of nationality and the development of national literatures have brought about the abandonment of Latin as the common language of learning, and imposed on every student who would go beyond the elements of his subject the necessity of acquiring at least a reading knowledge of French and German, besides Latin. Indeed, the advanced student of our day can dispense with Latin better than with French, German, or English; for, although the antiquated publications in any science may be printed in Latin, the recent (which will probably contain all that is best in the old) will be found printed in one of these modern languages. I cannot state too strongly the indispensableness of both French and German to the American or English student. Without these languages he will be much worse off in respect to communicating with his contemporaries than was the student of the seventeenth century who could read and speak Latin; for through Latin the student of the year 1684 could put himself into direct communication with all contemporary learning. So far as I know, there is no difference of opinion among American scholars as to the need of mastering these two languages in youth. The philologists, archæologists, metaphysicians, physicians, physicists, naturalists, chemists, economists, engineers, architects, artists, and musicians, all agree that a knowledge of these languages is indispensable to the intelligent pursuit of any one of their respective subjects beyond its elements. Every college professor who gives a thorough course of instruction—no matter in what department—finds himself obliged to refer his pupils to French and German authorities. In

the reference library of any modern laboratory, whether of chemistry, physics, physiology, pathology, botany, or zoölogy, a large proportion of the books will be found to be in French or German. The working library of the philologist, archæologist, or historian teaches the same lesson. Without a knowledge of these two languages it is impossible to get at the experience of the world upon any modern industrial, social, or financial question, or to master any profession which depends upon applications of modern science. I urge no utilitarian argument, but rest the claims of French and German for admission to complete academic equality on the copiousness and merit of the literatures, and the indispensableness of the languages to all scholars.

Such being the reasons for teaching French and German to all young scholars at an early stage of their training, what is the condition of these languages at American schools and colleges? For answer to this question I will describe the condition of instruction in French and German at Yale College, an institution, I need not say, which holds a leading position among American colleges. No knowledge of either French or German is required for admission to Yale College, and no instruction is provided in either language before the beginning of the Junior year. In that year German must be and French may be studied, each four hours a week; in the Senior year either language may be studied four hours a week. In other words, Yale College does not suggest that the preparatory schools ought to teach either French or German, does not give its students the opportunity of acquiring these languages in season to use them in other studies, and does not offer them any adequate opportunity of becoming acquainted with the literature of either language before they take the bachelor's degree. Could we have stronger evidence than this of the degraded condition of French and German in the mass of our schools and colleges? A few colleges have lately been demanding a small amount of French or German for admission, and a few schools have met this very moderate demand; but, as a general rule, American boys who go to college devote from two to three solid years to Greek and Latin, but study French and German scarcely at all while at school, and at college only for a part of the time during the later half of the course. The opportunities and facilities for studying Greek and Latin in our schools and colleges are none too great; but surely the opportunities and facilities for studying French and German are far too small. The modern languages should be put on an equality with the ancient.

The next subject which demands an entirely different position from that it now occupies in American schools and colleges is history. If any study is liberal and liberalizing, it is the modern study of history—the study of the passions, opinions, beliefs, arts, laws, and institutions of different races or communities, and of the joys, sufferings, conflicts, and achievements of mankind. Philology and polite literature arrogate the title of the “humanities”; but what study can so justly claim that honorable title as the study which deals with the actual experience on this earth of social and progressive man? What kind of knowledge can be so useful to a legislator, administrator, journalist, publicist, philanthropist, or philosopher as a well-ordered knowledge of history? If the humanity or liberality of a study depends upon its power to enlarge the intellectual and moral interests of the student, quicken his sympathies, impel him to the side of truth and virtue, and make him loathe falsehood and vice, no study can be more humane or liberal than history. These being the just claims of history in general, the history of the community and nation to which we belong has a still more pressing claim upon our attention. That study shows the young the springs of public honor and dishonor; sets before them the national failings, weaknesses, and sins; warns them against future dangers by exhibiting the losses and sufferings of the past; enshrines in their hearts the national heroes; and strengthens in them the precious love of country. One would naturally suppose that the history of the United States and England, at least, would hold an important place in the programmes of American schools and colleges, and that no subject would occupy a more dignified position in the best colleges and universities than history in respect to the number and rank of its teachers. The facts do not accord with this natural supposition. The great majority of American colleges (there are nearly four hundred of them) make no requirements in history for admission, and have no teacher of history whatever. Lest it be imagined that this can be true only of inferior colleges, I will mention that in so old and well-established a college as Dartmouth there is no teacher of history, whether professor, tutor, or temporary instructor; while in so excellent an institution as Princeton there is only one professor of history against three of Greek, and this single professor includes political science with history in his teaching. No institution which calls itself a college expects to do without a professor of Greek, or of Latin, or of mathematics; but nearly all of them do without a teacher of history. The example of the colleges governs

the preparatory schools. When young men who are interested in historical study ask me if it would be advisable for them to fit themselves to teach history for a livelihood, I am obliged to say that it would be the height of imprudence on their part, there being only an infinitesimal demand for competent teachers of history in our whole country. This humiliated condition of history is only made the more conspicuous by the old practice, which still obtains at some colleges (Harvard College, for instance), of demanding from all candidates for admission a small amount of Greek and Roman history—as much as a clever boy could commit to memory in three or four days. One hardly knows which most to wonder at in this requirement, the selection of topic or the minuteness of the amount. Is it not plain that the great subject of history holds no proper place in American education?

Closely allied to the study of history is the study of the new science called political economy, or public economics. I say the new science, because Smith's "Wealth of Nations" was not published until 1776; Malthus's "Essay on the Principle of Population" only appeared in 1798; and Ricardo's "Political Economy and Taxation," in 1817. The subject is related to history inasmuch as it gleams its most important facts by the study of the institutions and industrial and social conditions of the past; it is the science of wealth in so far as it deals with the methods by which private or national wealth is accumulated, protected, enjoyed, and distributed; and it is connected with ethics in that it deals with social theories and the moral effects of economic conditions. In some of its aspects it were better called the science of the health of nations; for its results show how nations might happily grow and live in conformity with physical and moral laws. It is by far the most complex and difficult of the sciences of which modern education has to take account, and therefore should not be introduced too early into the course of study for the degree of bachelor of arts; but when it is introduced, enough of it should be offered to the student to enable him to get more than a smattering.

When we consider how formidable are the industrial, social, and political problems with which the next generations must grapple,—when we observe how inequalities of condition increase, notwithstanding the general acceptance of theories of equality; how population irresistibly tends to huge agglomerations in spite of demonstrations that such agglomerations are physically and morally unhealthy; how the universal thirst for the enjoyments of life grows hotter and hotter

and is not assuaged; how the relations of government to society become constantly more and more complicated, while the governing capacity of men does not seem to increase proportionally; and how free institutions commit to masses of men the determination of public policy in regard to economic problems of immense difficulty, such as the problems concerning tariffs, banking, currency, the domestic carrying trade, foreign commerce, and the incidence of taxes,—we can hardly fail to appreciate the importance of offering to large numbers of American students ample facilities for learning all that is known of economic science.

How does the ordinary provision made in our colleges for the study of political economy meet this need of students and of the community? That I may not understate this provision, I will describe the provisions made at Columbia College, an institution which is said to be the richest of our colleges, and at Brown University, one of the most substantial of the New England colleges. At Columbia, Juniors must attend two exercises a week in political economy for half the year, and Seniors may elect that subject for two hours a week throughout the year. At Brown, Juniors may elect political economy two hours a week for half the year, and Seniors have a like privilege. The provision of instruction in Greek at Brown is five and a half times as much as the provision in political economy, and seven-elevenths of the Greek is required of all students, besides the Greek which was required at school; but none of the political economy is required. Columbia College makes a further provision of instruction in history, law, and political science for students who are able to devote either one or two years to these subjects after taking the degree of bachelor of arts, or who are willing to procure one year's instruction in these subjects by accepting the degree of bachelor of philosophy instead of the degree of bachelor of arts—a very high price to pay for this one year's privilege. If this is the state of things in two leading Eastern colleges with regard to instruction in political economy, what should we find to be the average provision in American colleges? We should find it poor in quality and insignificant in amount. In view of this comparative neglect of a subject all-important to our own generation and those which are to follow, one is tempted to join in the impatient cry, Are our young men being educated for the work of the twentieth century or of the seventeenth? There can be no pretense that political economy is an easy subject, or that it affords no mental discipline. Indeed, it requires

such exactness of statement, such accurate weighing of premises, and such closeness of reasoning, that many young men of twenty, who have been disciplined by the study of Greek, Latin, and mathematics for six or eight years, find that it tasks their utmost powers. Neither can it be justly called a material or utilitarian subject; for it is full of grave moral problems, and deals with many questions of public honor and duty.

The last subject for which I claim admission to the magic circle of the liberal arts is natural science. All the subjects which the sixteenth century decided were liberal, and all the subjects which I have heretofore discussed, are studied in books; but natural science is to be studied not in books but in things. The student of languages, letters, philosophy, mathematics, history, or political economy, reads books, or listens to the words of his teacher. The student of natural science scrutinizes, touches, weighs, measures, analyzes, dissects, and watches things. By these exercises his powers of observation and judgment are trained, and he acquires the precious habit of observing the appearances, transformations, and processes of nature. Like the hunter and the artist, he has open eyes and an educated judgment in seeing. He is at home in some large tract of nature's domain. Finally, he acquires the scientific method of study in the field, where that method was originally perfected. In our day, the spirit in which a true scholar will study Indian arrow-heads, cuneiform inscriptions, or reptile tracks in sandstone, is one and the same, although these objects belong respectively to three separate sciences — archæology, philology, and palæontology. But what is this spirit? It is the patient, cautious, sincere, self-directing spirit of natural science. One of the best of living classical scholars, Professor Jebb of Glasgow, states this fact in the following forcible words: "The diffusion of that which is specially named science has at the same time spread abroad the only spirit in which any kind of knowledge can be prosecuted to a result of lasting intellectual value." Again, the arts built upon chemistry, physics, botany, zoölogy, and geology are chief factors in the civilization of our time, and are growing in material and moral influence at a marvelous rate. Since the beginning of this century, they have wrought wonderful changes in the physical relation of man to the earth which he inhabits, in national demarkations, in industrial organization, in governmental functions, and in the modes of domestic life; and they will certainly do as much for the twentieth century as they have done for ours. They are not simply mechanical or material forces; they are also

moral forces of great intensity. I maintain that the young science which has already given to all sciences a new and better spirit and method, and to civilization new powers and resources of infinite range, deserves to be admitted with all possible honors to the circle of the liberal arts; and that a study fitted to train noble faculties, which are not trained by the studies now chiefly pursued in youth, ought to be admitted on terms of perfect equality to the academic curriculum.

The wise men of the fifteenth century took the best intellectual and moral materials existing in their day,—namely, the classical literatures, metaphysics, mathematics, and systematic theology,—and made of them the substance of the education which they called liberal. When we take the best intellectual and moral materials of their day and of ours to make up the list of subjects worthy to rank as liberal, and to be studied for discipline, ought we to omit that natural science which in its outcome supplies some of the most important forces of modern civilization? We do omit it. I do not know a single preparatory school in this country in which natural science has an adequate place, or any approach to an adequate place, although some beginnings have lately been made. There is very little profit in studying natural science in a book, as if it were grammar or history; for nothing of the peculiar discipline which the proper study of science supplies can be obtained in that way, although some information on scientific subjects may be so acquired. In most colleges a little scientific information is offered to the student through lectures and the use of manuals, but no scientific training. The science is rarely introduced as early as the Sophomore year; generally it begins only with the Junior year, by which time the mind of the student has become so set in the habits which the study of languages and mathematics engenders, that he finds great difficulty in grasping the scientific method. It seems to him absurd to perform experiments or make dissections. Can he not read in a book, or see in a picture, what the results will be? The only way to prevent this disproportionate development of the young mind on the side of linguistic and abstract reasoning, is to introduce into school courses of study a fair amount of training in sciences of observation. Over against four languages, the elements of mathematics, and the elements of history, there must be set some accurate study of things. Were other argument needed, I should find it in the great addition to the enjoyment of life which results from an early acquaintance and constant intimacy with the wonders and beauties of

external nature. For boy and man this intimacy is a source of ever fresh delight.

To the list of studies which the sixteenth century called liberal, I would therefore add, as studies of equal rank, English, French, German, history, political economy, and natural science, not one of which can be said to have existed in mature form when the definition of liberal education, which is still in force, was laid down. In a large university many other languages and sciences will be objects of study; I confine myself here to those studies which, in my judgment, are most desirable in an ordinary college. We are now in position to consider how the necessity for allowing choice among studies has arisen.

The second and third of the three principal propositions which I wish to demonstrate—namely, that earlier choice should be allowed among coördinate studies, and that the existing order of studies needs to be modified—may be treated much more briefly than the first proposition, although in them lies the practical application of the whole discussion. When the men of the sixteenth century had taken all the sciences known to their generation to make up their curriculum of liberal study, the sum was not so large as to make it impossible for a student to cover the whole ground effectually. But if the list of liberal arts is extended, as I have urged, it is manifest that no man can cover the whole ground and get a thorough knowledge of any subject. Hence the necessity of allowing the student to choose among many coördinate studies the few to which he will devote himself. In a vain endeavor to introduce at least some notions about the new sciences into the curriculum of the year 1600, the managers of American colleges have made it impossible for the student to get a thorough knowledge of any subject whatever. The student has a better chance to learn Greek and Latin than anything else; but he does not get instruction enough in these languages to enable him to master them. In no other subject can he possibly get beyond the elements, if he keep within the official schedules of studies. Consider what sort of an idea of metaphysics can be obtained from a single text-book of moderate size, into which the whole vast subject has been filtered through one preoccupied mind; or of physics from a short course of lectures and a little manual of three or four hundred pages prepared by a teacher who is not himself an investigator; or of political economy from a single short treatise by an author not of the first rank. These are not imaginary sketches; they are described from the life. Such are the modes of dealing with these sciences which prevail

in the great majority of American colleges. I need not dwell upon this great evil, which is doing untold injury every year. The remedies are plain. First, let the new studies be put in every respect on a level with the old; and then let such a choice among coördinate studies be given as to secure to the student a chance to be thorough in something. To be effective, option must be permitted earlier than it is now. This proposition—that earlier options are desirable—cannot be discussed without simultaneously considering the order of studies at school and college.

Boyhood is the best time to learn new languages; so that as many as possible of the four languages, French, German, Latin, and Greek, ought to be begun at school. But if all boys who are to receive a liberal education are required to learn to read all four languages before they go to college, those boys who are not quick at languages will have very little time for other studies. English, the elements of mathematics, the elements of some natural science properly taught, and the history of England and the United States being assumed as fundamentals, it is evident that some choice among the four remaining languages must be allowed, in order not to unduly restrict the number of boys who go to college. With very good instruction, many boys could doubtless learn to read all four languages tolerably well before they were eighteen years old without sacrificing more essential things; but there are boys of excellent capacity in other subjects who could not accomplish this linguistic task; and in many States of the Union it is quite impossible to get very good instruction in all these languages. Therefore I believe that an option should be allowed among these four languages at college admission examinations, any three being accepted, and the choice being determined in each case by the wishes of parents, the advice of teachers, the destination of the candidate if settled, the better quality of accessible instruction in one language than in another, or the convenience of the school which the candidate attends. Whichever language the candidate did not offer at admission he should have opportunity to begin and pursue at college.

As to the best order in which to take up these four languages, I notice that most persons who have thought of the matter hold some theory about it with more or less confidence, but that the English-speaking peoples have little or no experience upon the subject. One would naturally suppose that easiest first, hardest last, would be a good rule; but such is not the present practice in this country. On the contrary, Latin is often begun before

French; and it is common to begin Greek at fourteen and German at twenty. In education, as in other things, I am a firm believer in the principle of expending the least force which will accomplish the object in view. If a language is to be learned, I would teach it in the easiest known method, and at the age when it can be easiest learned. But there is another theory which is often acted upon, though seldom explicitly stated,—the theory that, for the sake of discipline, hardness that is avoidable should be deliberately imposed upon boys; as, for instance, by forcing a boy to study many languages, who has no gifts that way, and can never attain to any mastery of them. To my mind the only justification of any kind of discipline, training, or drill is attainment of the appropriate end of that discipline. It is a waste for society, and an outrage upon the individual, to make a boy spend the years when he is most teachable in a discipline, the end of which he can never reach, when he might have spent them in a different discipline, which would have been rewarded by achievement. Herein lies the fundamental reason for options among school as well as college studies, all of which are liberal. A mental discipline which takes no account of differences of capacity and taste is not well directed. It follows that there must be variety in education instead of uniform prescription. To ignorant or thoughtless people it seems that the wisdom and experience of the world ought to have produced by this time a uniform course of instruction good for all boys, and made up of studies permanently preëminent; but there are two strong reasons for believing that this convenient result is unattainable: in the first place, the uniform boy is lacking; and in the second place, it is altogether probable that the educational value of any established study, far from being permanently fixed, is constantly changing as new knowledge accumulates and new sciences come into being. Doubtless the eleventh century thought it had a permanent curriculum in "*Lingua, tropus, ratio, numerus, tonus, angulus, astra*"; doubtless the course of study which Erasmus followed was held by the teachers of that day to supply the only sufficient liberal education; and we all know that since the year 1600, or thereabouts, it has been held by the wisest and most cultivated men that Greek, Latin, and mathematics are the only good disciplinary studies. Whewell, whose foible was omniscience, did not hesitate to apply to these three studies the word *permanent*. But if history proves that the staples of education have in fact changed, reason says still more clearly that they must change. It would be indeed incredible that organized

education should not take account of the progress of knowledge. We may be sure that the controlling intellectual forces of the actual world, century by century, penetrate educational processes, and that languages, literatures, philosophies, or sciences which show themselves fruitful and powerful must win recognition as liberal arts and proper means of mental discipline.

Two objections to the views which I have been presenting occur at once to every conservative mind. I have often been met with the question: Is this traditional degree of bachelor of arts, which for three hundred years, at least, has had a tolerably clear meaning, to be deprived of all exact significance, so that it will be impossible to tell what one who holds the degree has studied? I reply that the degree will continue to testify to the main fact to which it now bears witness, namely, that the recipient has spent eight or ten years, somewhere between the ages of twelve and twenty-three, in liberal studies. I might add that the most significant and valuable degree in arts which is anywhere given—the German degree of doctor of philosophy and master of arts—does not stand for any particular studies, and does not indicate in any individual case the special studies for which it was conferred, although it does presuppose the earlier accomplishment, at a distance of several years, of the curriculum of a German gymnasium.

A second objection is expressed in the significant question: What will become of Greek and Latin if all these new subjects are put on an equality with them? Will Greek and Latin, and the culture which they represent, survive the invasion? To this question I answer, first, that it is proposed, not to substitute new subjects for the old, but only to put new subjects beside the old in a fair competition, and not to close any existing road to the degree of bachelor of arts, but only to open new ones; secondly, that the proposed modification of the present prescription of Greek and Latin for all boys who are to go to college will rid the Greek and Latin classes of unwilling and incapable pupils, to the great advantage of the pupils who remain; and, thirdly, that the withdrawal of the artificial protection now given to the classics will cause the study of classical antiquity to rely—to use the well-chosen words of Professor Jebb on the last page of his life of Bentley—"no longer upon a narrow or exclusive prescription, but upon a reasonable perception of its proper place amongst the studies which belong to a liberal education." The higher the value which one sets on Greek and Latin as means of culture, the firmer must be his be-

lief in the permanence of those studies when they cease to be artificially protected. In education, as elsewhere, it is the fittest that survives. The classics, like other studies, must stand upon their own merits; for it is not the proper business of universities to force subjects of study, or particular kinds of mental discipline, upon unwilling generations; and they cannot prudently undertake that function, especially in a country where they have no support from an established church, or from an aristocratic organization of society, and where it would be so easy for the generations, if repelled, to pass the universities by.

Finally, the enlargement of the circle of liberal arts may justly be urged on the ground that the interests of the higher education and of the institutions which supply that education demand it. Liberal education is not safe and strong in a country in which the great majority of the men who belong to the intellectual professions are not liberally educated. Now, that is just the case in this country. The great majority of the men who are engaged in the practice of law and medicine, in journalism, the public service, and the scientific professions, and in industrial leadership, are not bachelors of arts. Indeed, the only learned profession which contains to-day a large proportion of bachelors of arts is the ministry. This sorry condition of things is doubtless due in part to what may be called the pioneer condition of American society; but I think it is also due to the antiquated state of the common college curriculum, and of the course of preparatory study at school. When institutions of learning cut themselves off from the sympathy and support of large numbers of men whose lives are intellectual, by refusing to recognize as liberal arts and disciplinary studies languages, literatures, and sciences which seem to these men as important as any which the institutions cultivate, they inflict a gratuitous injury both on themselves and on the country which they should

serve. Their refusal to listen to parents and teachers who ask that the avenues of approach to them may be increased in number, the new roads rising to the same grade or level as the old, would be an indication that a gulf already yawned between them and large bodies of men who by force of character, intelligence, and practical training are very influential in the modern world. For twenty years past signs have not been wanting that the American college was not keeping pace with the growth of the country in population and wealth. I believe that a chief cause of this relative decline is the narrowness of the course of study in both school and college.

The execution of the principles which I have advocated would involve considerable changes in the order of school and college studies. Thus, science-teaching should begin early in the school course; English should be studied from the beginning of school life to the end of college life; and the order in which the other languages are taken up should be for many boys essentially changed. We should in vain expect such changes to be made suddenly. They must be gradually brought about by the pressure of public opinion—by the public opinion of the educated classes taking gradual effect through established educational instrumentalities. The change will be wrought by the demands of parents upon private schools; by the influence of trustees and committees in charge of endowed and public schools upon school courses of study; by the conditions which benefactors and founders impose upon their gifts and bequests to liberal education; by the competition of industrial and technological schools; and by the gradual encroachment of the modern subjects upon the ancient in colleges and universities. All these influences are at work, and much ground has been gained during the last fifteen years.

Charles W. Eliot.

HERE AND HEREAFTER.

'Tis not sorrow, sorrow,
From sundown till the morrow;
Nor do our pleasures stay
From dawn till going of the day.

Light is ever shifting,
And darkness ever lifting;
The sunbeams and the shade
Alternate reign in field and glade.

What of our hereafter—
Shall mourning blend with laughter?
Stars roll along earth's night,—
Shall shadows veil the Hills of Light?

John Vance Cheney.