

II

WHAT IS AN EDUCATION WORTH?¹

THE world we live in is getting itself made over again. In politics, in business, in industry our concepts are not the solid old ideals inherited from earlier ages. The globe seems to be more plastic, moulding itself into new shapes, strained by novel forces, yielding in adjustment to strange demands. A new valuation is sought for the basic elements of human society, a valuation which affects all classes and all interests, which penetrates all vocations and seeks to reorganize all careers. Things men once thought priceless are deemed of little worth, and much which they were wont to condemn now seems precious and essential for the right ordering of human life.

In this swift and sudden remoulding all things, even the most rudimentary, are to be fabricated anew. The nurture and discipline of children, the relations of the family and the school, the training of boys and girls, the education of young men and young women, must be restudied and perhaps re-shaped. Schools and colleges, no less than factories and workshops, farms and mills, laboratories and hospitals, feel the pressure and the power of this new movement. Everywhere, in every country, in every home, fathers and mothers are asking, "What is an education worth? Not in general and abstract terms, but in practical and personal application.

¹ Address by William Mynn Thornton, Dean of the Department of Engineering of the University of Virginia, at the fourth commencement convocation of the Rice Institute, held Monday morning, June 9, 1919, at nine o'clock.

“What is it worth to my boy, to my girl?” “Is it worth enough to pay us if we stint ourselves of ease and comfort to give them the best?” “Is it worth enough to pay the State if we vote for higher taxes that more may be spent on schools and colleges and universities?” “Is it worth enough to pay the boys and the girls who give eight or twelve or sixteen precious years of youthful power just to get ready to begin to live?” I shall try to answer these frank questions with an equal frankness; but to give solidity and clear form to our problems I shall begin with three thumb-nail biographies, three outline histories of American boys, drawn from our national “Who’s Who in America.”

The first is of a Virginian, born nearly two hundred years ago on a plantation, brought up in country ways. His father died when he was eleven years old, and after that he drifted from one home to another. The mother—fond, foolish, illiterate—had no art to guide him. Good teachers were few, and his school life was brief. His school-days ended when he was fourteen years old, leaving him a “good cipherer, a bad speller, and a worse grammarian.” Thereafter he taught himself. A queer old book had come into his hands, “The Young Man’s Companion,” written, according to its title, “in a plain and easy stile, that a young Man may attain the same without a Tutor.” From this book our young Virginian acquired an easy, flowing, and legible handwriting; skill in simple arithmetic; a knowledge of proper form for letters and business documents; the rules of book-keeping; the rudiments of land surveying; and the “Rules of Civility and Decent Behaviour in Company and Conversation.” To impress such precepts on his mind he would write them out with painstaking care in his own beautiful script—documents now prized by American collectors:

“Sleep not when others speak, sit not when others stand, speak not when you should hold your peace, walk not when others stop.”

“Put not off your clothes in the presence of others, nor go out of your chamber half drest. Shift not yourself in the sight of others, nor gnaw your nails.”

Such are some of its quaint injunctions.

In his fourteenth year he began work as a land surveyor. Two years later he was given responsible charge of extensive properties. Shortly after he was commissioned as public surveyor. Men soon learned to know and value his courage, his sagacity, his resourcefulness. In 1753, when he was just turning twenty-one, he was sent by the Governor of Virginia to warn the French away from the posts they had seized on the Ohio River within the territory of colonial Virginia. Shortly after he was appointed lieutenant-colonel of a Virginia regiment and ordered to the defense of the border. You have already guessed the name of this young American, and I need not tell you more of his wonderful story. You know how he served his country as soldier, as patriot, as commander-in-chief of the Revolutionary armies, as first President of this great Republic. You know how he died at the summit of his fame, honored and beloved by a nation, “first in war, first in peace, first in the hearts of his countrymen.” Thomas Jefferson said of him: “He was, indeed, in every sense of the word, a wise, a good, and a great man. His integrity was most pure, his justice the most inflexible I have ever known.”

When we remember that this great man was launched in life with nothing that would now be called an education, that in all his laborious and eventful career there was a minimum of leisure and a maximum of activity, that he achieved great-

ness as a statesman no less than as a soldier, and that to-day, one hundred and twenty years after his death, his wisdom and his patriotism are the beacon lights of our storm-tossed time, we begin to see how much capacity and character count in the proper conduct of life. His early disadvantages and deficiencies only awoke in him a beautiful modesty and taught him to value and to win that loyal coöperation which his great associates in the government frankly and freely gave. They left behind also a deep sense of the worth of the gifts life had denied him. In the training of his foster-children no pains and no expense were spared to give them the best teachers the country could supply. In the "Farewell Address" he urged the promotion of "institutions for the general diffusion of knowledge," and later expressed regret that he had not advised "the establishment of a University where the youth from all parts of the United States might receive the polish of erudition in the arts, sciences, and belles-lettres." And it is known that during his lifetime, as well as by his bequests, he generously provided for the endowment of schools of higher learning. The plea for education might well rest on the value set by this sagacious statesman on the training which he himself had missed.

Here is the story of another American boy. Born by the sea, he knew also the sights and sounds of country life—"the lilacs blooming in the door-yard and the songs of the birds, the sow's pink faint litter and the mare's foal, the sharp-bow'd steam ships and the beautiful sail ships." He pictures for us also his carpenter father, "strong, self-sufficient, manly"; but when "angered, mean, unjust." The mother, too, he limns: once "a daily and daring rider," "mother with mild words—clean her cap and gown, a wholesome odor falling off her person and clothes as she walks." Walt Whitman was born on Long Island in 1819; removed to

Brooklyn in 1824; went to the public schools until 1831, and then his schooling ended—reading, writing and arithmetic, the ghost of grammar and a touch of geography—and that was all. He was just twelve years old.

He ran errands for the office of a lawyer, who gave him a desk in a window-nook and lent him books to read; then passed over to a doctor's office, and when fifteen years old went into a printing-office and learned to set type. After that came three years of teaching in country schools, followed by more printing, editing, newspaper work, travel, carpentering, building and selling cheap little houses. All the time he was printing also—poems, stories, essays. Then at the last, when he had tried the old poetic forms and found them empty, came the true utterance of his spirit in "Leaves of Grass," a thin quarto, twelve poems, written, type-set, printed by the poet's own hands. The prose preface, a ten-page essay, set in double columns, expounded the author's theory of the poetic art. Luckily, his poetry was better than his theory. Emerson wrote him: "I find 'Leaves of Grass' the most extraordinary piece of wit and wisdom that America has yet contributed. I greet you at the beginning of a great career." Bryant and Thoreau came to visit the author. But the book fell dead. The poetic method was too new; the egoism and sensuality too repellent. New and enlarged editions had a scarcely better fate. Whitman's time was not yet.

Next came the Civil War, and Whitman's earnest patriotism, joined to his profound humanity, swept him like a great tidal wave into war work. His brother's wounds hurried him to Washington, and for three years he labored in hospitals, nursing the hurt and sick and dying with all a woman's tenderness; writing letters, distributing gifts, reading, consoling. Already the strong emotions of the war

spirit were finding poetic utterance. In April, 1865, a fresh volume, "Drum Taps," was passing through the press. Whitman was back in Brooklyn on a visit to his mother when the assassin's bullet found Lincoln, object of the poet's supreme affection and reverence. The solemn beauty of "When Lilacs Last in the Door-yard Bloom'd," the passionate grief of "O Captain, My Captain," the lyric ecstasy of the "Death Carol," all incorporated into "Drum Taps," marked the high tide of Whitman's poetic power. Algernon Swinburne deemed "Lilacs" "the most sonorous nocturne ever chanted in the church of the world."

A great poet had, indeed, issued from the untaught errand-boy, but only after a long apprenticeship, only into an art blemished and limited. Whitman, like Washington, educated himself. He spent thirty-three years on the job. And, after all, to read him with patience or profit we must follow out his advice as to other books: "Re-examine all you have been told at school, or at church, or in any book, and dismiss whatever insults your own soul."

And now let me outline for you one more life-story. We have followed the career of a great soldier and statesman, have heard the tale of a born poet from whom issued a new American concept of poetry; listen to one more story—the story of a great American inventor and engineer, the story of George Westinghouse. For Washington there were no schools accessible; for Whitman there were schools, but no money for the boy's support; for Westinghouse there were good schools and money enough to sustain him, but no love for books. His father's machine-shop had for him charms which the school lacked; the boy haunted it, despite the parental frown, and in a little den fitted up for him in the loft by a good-natured foreman made models of rotary engines.

The father remonstrated with him for neglecting his

studies and wasting time in making "toys," contrasting his idleness with the diligence of regular workmen. "They are paid," answered little George, then about twelve years old. "What I do for you brings me in nothing." The end of the discussion was that George was hired at a fixed wage—half time on school-days, full time on Saturdays. Presently a Saturday came on which George planned to play baseball; the father objected, reminded him of his agreement, gave him a pile of iron pipe to be cut to length, and departed for the day. George watched until he was out of sight. Then he rigged up a combination tool which, geared to a motor, would cut the pipes for him, asked the friendly foreman to keep an eye on the work, shucked off his overalls and hiked to the ball-field. When he got home the pipes lay all neatly cut to the proper length. This was George's first invention.

The father begged him to get ready for college, and George assented, mainly because he could give no reason for refusing. So school went sluggishly on, George manifestly capable but waterproof to the streams of learning. Penmanship he considered a branch of the black art, spelling a deadly bore, grammar an intellectual slavery. For mathematics only was he keen, and drawing and the related arts; his circles were truly round, his lines were really straight, and every angle had in it the right number of degrees. One of his teachers, too, appealed to him, a skilful and sympathetic woman, to whom he rendered lifelong gratitude and helpfulness, and perhaps under her guidance George might have been waked up to the beauty and the power of letters. But the Civil War came, and George, like all other boys, was hot to go in. His father held him back until 1863, when he was sixteen years old; then let him go. His military service was not of great moment to his country or to him. First a corporal of cavalry, he campaigned against Mosby in the

Piedmont Virginia hills; then, transferred to the navy, he won on examination an appointment as third assistant engineer and patrolled the Potomac. The war ended and George went home, developed physically, with better manners, with a more controlled temper, but still to his family the same old dreamy George. They did not know what to do with him.

Union College was tried, and George was matriculated as sophomore in September, 1865. He lived through one term; was often absent from lectures because he wanted to inspect some new machine just set up in Schenectady, abhorred all his studies except solid geometry, and attained such grades as might be expected. French and German were peculiarly odious to him; his professor complained that instead of listening and learning the pronunciation of those foreign tongues, George would spend the hour drawing pictures of locomotives on his shirt cuffs. At the end of the term the president of the college sent for him.

"Westinghouse," he said, "how do you like college, now that you have tried it?" George was deeply perplexed. He wanted to be polite, he wanted to be fair, but he wanted, too—oh, so terribly!—to get out of this prison of the mind. Like a flash, the way appeared to him: "I dare say I should like it very well, Doctor, if I had time to give my mind to my studies." And then he went on to explain at length a mechanical invention to which his recent thought had been given.

I suspect that this was George's second invention. Anyhow, it worked just as well as the first one; for by set of sun George was out of Union College. His father, acting on the president's advice, withdrew his son from the school.

Back to the machine-shop, but not until he had engineered another strike and forced his father to pay him a

man's wages. After that life seemed to open for him into the upward road. Sent on a business journey, he saw a car derailed. The train-crew spent several hours in setting the car on the track again. Westinghouse finished his journey, transacted his business, and came home. That night he invented his car replacer, with which a derailed car could be set back on the rails in fifteen minutes, and incidentally planned the all-steel railway frog, now the universal American standard.

His father declined to put capital in the new invention, but that did not stop George. He secured his patents, explained his plan to other business men, and finally launched the manufacture of his invention. Then, on a journey in the interest of his new business, he was delayed by a disastrous freight wreck and on inquiry found that the wreck had been unavoidable. With the old-fashioned hand-brakes then in use, it had been impossible to stop the train and avoid a collision. Out of his reflections on this wreck the plans for the Westinghouse air-brake were born, and the inventor's fame crossed the Atlantic.

To catalogue all this great man's achievements would be too long. Bold, ingenious, indomitable, he looked always forward, was undaunted by no obstacles, and shrank from no labor. He was aggressive, hard-headed, exacting, unsparing of others as well as of himself; but a deep kindness, a perfect honesty, and a stainless loyalty underlay his massive and militant front. He won unwavering allegiance because he gave his aides whole-hearted trust and unreserved support and true friendship.

A great inventor himself, he had the gift of discovering great inventors and great inventions. He discovered Stanley and Tesla and many others,—men who have since enriched the field of American engineering. He introduced

the polyphase electric motor, the alternating current transformer, the Parsons steam turbine. He filled his life with struggles, achievements, catastrophes, recoveries, honors, plaudits, the love of his subordinates, the respect of his fellow-men. To-day his ashes lie beneath the sod of Arlington, and the marble over him, with fine patriot feeling, tells nothing of all his discoveries, inventions, achievements, wealth, honors—only this, that he once served his country.

1846 GEORGE WESTINGHOUSE 1914
ACTING THIRD ASSISTANT ENGINEER, U. S. NAVY,
1864-1865

Once more we have the story of a half-educated American boy who found means to rise to shining heights of usefulness and honor. The secret, again, was that this man was always learning, ever seeking to arrive at the truth. He who rejected schools in his youth organized schools for others: night schools, in which thousands of pupils, who must work by day get an adequate training for their vocation by night classes; apprenticeship schools, where the more capable boys are given complete and systematic instruction; application schools, to which college graduates are admitted for post-graduate instruction in mechanical and electrical engineering. One feature they all have in common: every pupil is put in the way of earning his own living while he is passing through the schools.

And now, in the light of these stories, let me try to explain what schools really do for the world. I think you will understand me better if I remind you of the meaning of an

often misunderstood school term. People speak of the curriculum of a school without really understanding what the word signifies and whence it comes. The Latin word *currere* means "to run," and *curriculum* means "a running track"—a track on which young horses were tested out, for speed, for wind, for endurance, for power. The men who gave us our educational terminology used it in a legitimate sense: for a course of study designed to test the pupils of the school—their native ability, their gifts for learning, their gifts of character, their gifts for discovery. Nowadays people, even teachers themselves, have forgotten the real meaning, and think and speak of the curriculum of a school as if it had something to do with a circle, a dull and endless round, a sort of intellectual tread-mill, a squirrel cage in which harmless little animals run foolishly round and round forever and forever.

A good school, a good college, a good university, then, must be organized as a running track. Its purpose is to test capacity and to sort men out into their proper groups. Not all horses are racers: some are trotters; some are pacers; some are draft-horses; all are useful in the work of the world. So some boys have born in them the love of letters, and out of these will come, now and then, an enthralling poet, like Poe or Whitman; or an illuminating historian, like Parkman; or a writer of stories, like Hawthorne. Some boys are predestined for the study of science, and out of this group come the Audubons, the Maurys, the Westinghouses. Others, as by some compulsion of nature, press into law or medicine, or the church, or engineering, or industry, or commerce, or diplomacy, or politics. And then there is a large group of boys who at school or college have not yet found themselves, and drift for a year or two on the surface tides until some revealing experience, some stimulating teacher,

some uplifting book, throws a powerful search-light down the roadway along which Heaven means that boy to walk.

To change the figure somewhat, we might describe the school as a great screen, equipped with sieves of various meshes, through which a mass of ore is passed. The business of the screen is to separate the ore into its component parts. There is one small part made up of precious metals, the gold of humanity; we must save all that, for out of it come our poets and inventors and discoverers, our prophets, our leaders. And there is a larger part which gives us the useful metals, the sturdy iron of our race; we must save that, too, for without it we could not build up the civilization which makes this world fit to live in. And then there is a residue, out of which come the sand and cement and mortar and concrete from which the solid structure of our civic life needs to be fabricated if it is to withstand wind and weather, fire and storm.

It is of the essence of a good school that it should perform effectually this selective process; that it should demand from the most capable pupils their maximum output, and at the same time stimulate the duller students to their highest possible activity. Hence the need of component and trained teachers, for they alone are able to exercise this office; of high standards applied with integrity and intelligence, for only thus can the material of the school be classified and tested; of the spirit of rectitude and honor among the pupils, for no skill and no intelligence can reach just decisions if the work is flawed with trickery and deceit. The teacher who passes every student in every class is either foolish or dishonest. It is not possible thus to test ability, to classify talents; and unless this testing is done, the entire process of education has lost its meaning.

If we are asked whether facts justify these propositions,

it is possible to point to innumerable confirmations from the experiences of daily life. Careful studies have been made by various hands of the data furnished in books of reference such as the "United States Congressional Directory," "Who's Who in America," the various biographical dictionaries, and so on. The results of all these studies show a remarkable accord. Of the total number of names thus assembled, embracing women as well as men, and including a vast majority of the real "People of the Period," only about one half of one per cent. are wholly self-educated. Of the remainder, ten per cent. were trained in grammar schools but went no higher; twenty per cent. are furnished by high schools and academies; seventy per cent. by colleges and universities. In other words, given a capable boy who has finished the grammar school, you double his chance for success by giving him a high-school course; you multiply it by seven if you add college training.

A very interesting set of tests was carried out during the late war at the coast artillery training schools of the United States Army. Careful records were kept of the preliminary school training of candidates for officers' commissions; against the time of training as a base was platted the percentage number of commissions won by the candidates. It was found that of the men who had only grammar-school training nearly all failed; that the number of commissions won by high-school students was small, but slowly increased as the high-school period was prolonged; that the college men brought a marked rise in the curve, and that when at last men with engineering training came to be platted, the curve shot swiftly up to the one-hundred-per-cent. limit.

So important did the problem of testing for native ability seem to the men charged with the duty of providing for the new national army competent officer material, that an or-

ganized attempt was made to apply for this purpose, on the largest possible scale, the devices originated by Professor Thorndike of Columbia. The purpose of these tests is to rate men for native capacity, with the view of training only the fit. The point of interest seems to be that the ratings obtained furnished just the percentages given by the normal processes of college education. This coincidence has seemed to the inventors of these devices the chief demonstration of their value.

In numerous unexpected directions we obtain confirmation of the validity of the selective action of the processes of education. For example, the statistics of the University of Virginia show—what the records of other colleges show also—that of the living alumni, including those beyond as well as those within the military age, about one man in every four was in the army or the navy of the United States. For the country at large the proportion was about one man in twelve. Of the University of Virginia alumni in the national service, a little more than one half won officers' commissions. For the army as a whole, the number of men who won commissions is about one in fifty. That is to say, the nation's chance for effectual service in a national emergency is three times as great from the college-trained men as from the average citizen; and for competent leadership the chance seems to be about seventy-five to one.

The record drawn from the statistics of the so-called learned professions are, of course, still more overwhelming. Of lawyers who attain a respectable professional position, out of every thousand only two are self-trained; of preachers, only two; of engineers, only four; of artists, only eight. No doctor is allowed to practise without some valid evidence of professional training. It is important for us to remember that the process is not simply a process of train-

ing. It is primarily a process of selection. The best material is first of all chosen, that material is by successive stages still further trained and sorted, and the final result is an output which provides human society with the directive skill and propelling power needed to insure the world's progress.

The question whether the modern State can afford to educate its children is answered. It cannot afford not to educate them. Democracy and ignorance are mortal foes. As one of our great governors has just said:

“Neglect the school-houses and you provide a fertile field for the spread of the doctrines of the discontented; of the men who, without proper understanding of the benefits and blessings of our free country, cry out from the street corners for the downfall of our State and the dissolution of our Union.”

Nor is education the guarantee of our safety only: it is the price of our progress. The modern State demands for its order, for its advancement, an ever higher degree of trained intelligence and expert knowledge. Ignorance and incompetence are more dangerous to the civic life of the world than dishonesty and crime. They do their evil work widely and openly, whereas the thief and the criminal must labor under cover and in darkness. Our public servants must be trained servants. Our leaders must be trained leaders. The proper and only culmination of a democracy is in an aristocracy, not of birth or wealth or caste or privilege, but an aristocracy of ability, of training, of character, of service.

Each year, each month, each day almost, conviction of the need and the profit of schools to the commonwealth sinks deeper into the public mind, makes more urgent appeal to the public conscience. The Governor of New York has just signed a bill increasing the salaries of all the school teachers

in that State, and giving to women and men alike the same pay for equal work. In his message approving the new law he says:

“It is a narrow-minded statesman who thinks only of the day he lives in. We must build for the future, if schools are to be maintained in the degree of efficiency which the greatness of the State suggests.”

The legislative commission of Massachusetts, in the new school program, calls for a minimum yearly salary of \$650, with successive increases of \$100 each for college training and professional experience; and demands ampler equipment and better pay for the principals and superintendents of the public schools.

The United States commissioner of education, pointing to the general rise of eighty per cent. in the cost of living, maintains that small increases in the teachers' pay would be not simply unjust, but would be perfectly futile. He urges a steady augmentation which within five years would double all salaries and within the following ten years would make a further increase of fifty per cent. Not only must the State double the present salaries of the teachers: it must, in the judgment of the commissioner,—

- I. Give them further reward for special competence and tested skill.
- II. Secure permanency of tenure, to which marriage shall not be a bar.
- III. Scrap educational machinery and stimulate educational freedom.
- IV. Lengthen the school year and widen the school course.
- V. Compel school attendance of all children under a definite age.

VI. Compel every pupil above a defined age to perform within each school year some lucrative outside work.

The question whether modern parents can afford to educate their children is also answered. They cannot afford not to educate them. No economy of funds could reward the child for the loss of priceless opportunity. A father holds back his daughter from the high school, saves the money it would have cost him (\$300 at the outside), and gives it to her on her wedding day. And then a child comes, and in her loving ignorance the young mother makes some blundering error of diet or clothing, or the like; something from which a little knowledge, a little trained intelligence, would have saved her—and the child dies. And the father strives to comfort her; tells of his love, speaks of his economies for her. "Yes, father, you are very kind. It was dear of you to save that money for me. It brings me five cents a day. But if you had spent it on me, perhaps I might have known enough to keep my child."

Or he refuses to send his boy to college, saves up the \$600 a year it would have cost, and when his son comes of age gives him the \$2400 to start in life with. A neat little gift! And yet I can imagine how the young man might figure things in some hour of quiet thought: "I must invest this. I don't want to run any risk with poor, dear father's savings. It will give me, too, a regular income: I shall have forty cents a day—all my own. Only, if he had sent me to college and let me take my degree, it would have been pretty easy to earn four dollars a day."

It must not be supposed that education is recommended for its money-making power. What men call the higher education is just a luxury; the greatest of all luxuries, since it helps us to live, not to make a living. Granted; but I want you to

realize that all human civilization is built of such luxuries, luxuries more truly indispensable than the necessities of life. Human civilization has been under our own eyes defended, not by its wealth, which renders it all the more open to attack, but by the virtue and intelligence of its citizens, and the knowledge of its schools, and the science of its laboratories. And human civilization will be saved from destruction, if it is saved at all, not by the worldly wisdom which piles up riches and fattens human lusts, but by the higher wisdom which comes of deep and passionate experience, which comes of loving men for their humanity and trusting in their fundamental goodness, which comes of staking the safety of the world on the nobler passions of men.

On the other hand, it must not be forgotten that all the wealth of the modern world is the gift of modern science, and that modern science is the highest expression of the life and thought of the schools. What farmer of our day expects to prosper without recourse to the lessons of science on soils and fertilizers, on the health and disease of plants and of animals, on the selection of his seeds and the tillage of his crops? What manufacturer is able to dispense with the daily and hourly aid of the laboratory, of the testing floor, of accurate and powerful machine tools, of the motors which drive them, or of the trained intelligence and skill which direct his enterprises? The whole apparatus of production, of transportation, of the distribution of output has been developed by modern science, and can be directed only with its aid.

Yet, high above all potentialities of wealth, of service, of usefulness, of power stands the right of the child—a right which no parent dare ignore—the right to discover and measure his own powers, the right to grow into the stature of the man for which God planned him. Genius belongs to no

race, no clan, no family, no caste, no rank. It is cradled indifferently in affluence and in poverty. In families it is normally unique. There has been but one Washington out of all the Washingtons, but one Whitman out of all the Whitmans, but one Westinghouse out of all the Westinghouses. What father can justly deny opportunity to the son whose latent genius may enlighten the world; or to the daughter, potential mother of some savior of the human race? No more salutary lessons of humility and hope can be read by men than from the birthplaces of the great. Washington first saw the light in a little two-roomed cottage, twenty feet by thirty-eight; Lincoln, in a cabin; Shakespeare, in an attic; Jesus, in a stable.

We come now to our last question: Is an education worth enough to a boy, to a girl, to pay for the hours of work which it requires, the long days snatched from leisure and joy, the years of toil with no tangible reward? What does it give him which makes it so abundantly worth while?

It gives him a just gauge of his own powers, a fair measure of his own attainable speed in the race of life. So far human ingenuity has been able to develop no other apparatus for estimating these qualities. In the school, the college, the university, and there alone, he can learn to know himself, his own capabilities, his own gifts.

It helps him to bring those powers to their full development, to fit himself for his appointed work, to acquire the knowledge and the skill essential to success, to reason clearly and justly, to trace knowledge back to its authentic sources, to experiment for himself, to develop new methods, to discard old errors. Only the trained mind can wisely choose its road and make due preparation for the journey of life.

It equips him with a scale of values truer than any which the other experiences of life have been able to supply. The

educated man at least knows how to live. To him alone poverty and riches, power and responsibility, authority and obedience, are revealed in true perspective. He has learned how to be free from the bondage of things as well as from the bondage of men, "to be poor in order to be simple, to produce less in order that the product may be more beautiful and more choice."

And, above all and beyond all, it develops character; in the earnest and unselfish pursuit of truth for truth's sake there is something which strengthens and uplifts the soul of man. You hear too much and too often of the follies, the excesses, the immoralities of school-boys and college students. Do not be deceived; those things bear to the academic life just about the relation that the silly antics of New York's "Four Hundred" bear to the fierce effort and the tireless energies of the four millions who do the huge and endless work of that great metropolis. Much of it, too, is a mere camouflage of virtue. In these war times our own eyes have seen these floaters on the stream of pleasure; seen them discard their gay attire, don the khaki, grip their rifles, march off in rank with the toilers, and die like heroes in defense of liberty. More than business; more than labor; more than civic responsibility; more, I often think, than religion; more, sometimes, than the discipline of home—the honest and diligent life of the earnest student builds up the moral as well as the intellectual powers.

Napoleon declared that in an army *morale* counted three fourths and military training one fourth toward the winning of victory; and *morale* is just the French word for "character." Only lately, in a study of engineering education in the United States, directed by Dr. Mann for the Carnegie Institution, a questionnaire was sent out to all the important men in the American engineering profession. In

it they were asked to select and grade the qualities which schools should develop in intending engineers; and from their answers the report was made up. Here also, by a strange coincidence, character received an average rating of seventy-five per cent.; all the other elements which contribute to professional success—capacity, skill, training, health—summed up only twenty-five per cent. What is true of engineering is true of all the other worthy callings followed by men. The deep foundations of civic order, of social righteousness, of public freedom, of human civilization, rest on character; and character is the joint gift of the home, the church, and the school.

We began with contemplation of the heroic figure of our great Virginian, noblest and truest of all Americans, George Washington. It is his image and his memory which I would leave with you. When Thackeray, that unrivaled analyst of the human heart, wished to delineate the veritable features of this leader of humanity, he put into the mouth of one of his personages this eulogium:

“To endure is greater than to dare; to tire out hostile fortune; to be daunted by no difficulty; to keep heart when all have lost it; to go through intrigue spotless; to forego even ambition when the end is gained—who can say that this is not greatness, or show the other Englishman who has achieved so much?”

To you, young men and young women, who stand at the beginning of life, this splendid sentence sounds the note of courage and of confidence. For of all here set down as worthy of honor and memory, there is not one item to which each one of you may not aspire. All Washington's true glory and greatness may be fully yours.

WILLIAM M. THORNTON.