SCIENCE

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*THE RELATION OF EDUCATED MEN TO THE STATE.**

I SHOULD fail to do justice to my own feeling did I not pause for one moment to acknowledge the kindly greeting which has just been extended to me at the beginning of my life among you. For the words of encouragement which have been spoken, for the assurance of cooperation and support, for the cordial personal welcome, I am more grateful than I can say. The response to such words and to such welcome is not to be made at this time and at this place. It can be given only in the years of service which lie before us.

In choosing a subject upon which I might address you to-day, I have felt strongly influenced to call to your attention certain conclusions which touch upon that great interest which is the common bond which brings us together to-day—the education of men.

It was my fortune some years ago to pass from a university place to that of an executive office of the general government; to go from the work of training students to a corps of men who are recruited almost wholly from the ranks of college graduates. In the attempt to secure for the government service men of the best training, the relation

* Inaugural Address of Dr. H. S. Pritchett, late Superintendent of the U. S. Coast and Geodetic Survey, as President of the Massachusetts Institute of Technology.

of the educated man to the government, whether as an employe or as a citizen, has been a matter of immediate practical consideration.

In such a position one studies the output, if one may use that term, of our universities and of our colleges from a different point of view from that which the teacher occupies. He is measuring the college man in comparison with other men, from the standpoint of his ability to do things and not from the standpoint of the knowing how to do things.

The two points of view are very different, and it is for this reason, as well as for the strong interest which I have in the subject, that I have deemed it not entirely without interest to say a word to you at this time concerning higher education in relation to the government, and more particularly to consider the part which educated men are to-day taking, and ought to take, in government, the obligations of the higher institutions of learning to the State, and finally to discuss briefly the question whether these obligations are being fairly and honestly and intelligently met.

There is a saying which is current in the student talk of German universities to the effect that of those who enter the university doors one-third breaks down, and one-third goes to the devil, but that the remaining third governs Europe. Such expressions are oftentimes more apt than true; yet, on the other hand, they sometimes represent popular conviction more correctly than formal tables of statistics, just as a bit of floating straw shows the direction of the current more truthfully than the powerful cruiser.

Unfortunately, it is not easy to subject such a statement to accurate examination. The statistics of the unsuccessful are necessarily far more incomplete than the statistics of those who attain prominence. The devil keeps no books, so far as I know; or if he does, they are not open to examination of the student. But it requires only a limited study to show that the last part of the statement is certainly true, at least so far as Germany is concerned. The educated man, trained in either the university or polytechnicum, governs Europe to-day.

No one connected with the government of the United States in any executive capacity can fail to see that the government of this country is also passing rapidly into the hands of educated men. The population of the country at this time is approximately 76,000,000 of people. The number of college trained men is perhaps less than one per cent. of the population. From this small percentage, however, are filled a majority of the legislative, executive and judicial places of the general government which have to do in any large way with shaping the policy and determining the character of the government.

Not only in the ordinary positions of the government service is this true, but the government is calling more and more frequently upon the educated man for the expert service for which his training is supposed to fit him, and this not only in the relation of scientific experts, but in all other directions in which the government seeks the advice and the assistance of trained men.

On the other side of the Pacific a commission of five American citizens has undertaken the most delicate, the most difficult, doubtless the most thankless task in the establishment of civil government to which any group of our citizens has ever devoted its unselfish efforts. It is a significant fact that a majority of that commission are college professors.

In the service of the government, as in all other fields where intelligence and skill are factors, the educated man is displacing from the higher places the one who has no training or who has a poor training. Whether wisely or unwisely, whether for

good or ill, it may be accepted as a fact that the government of this country is passing rapidly into the hands of the educated man.

It is a matter of the highest practical importance to inquire whether the man who is coming into this power is worthy of it, and whether the training which he has received in the college or in the technical school is given with any purpose of fitting him for this trust.

Before approaching this question it may be well to call to mind the attitude of the government of the United States and of the State governments toward higher education and toward scientific investigation.

Notwithstanding the crudeness of our legislation, it is still a fact that Congress and the State governments of the United States have been generous in gifts to higher education and to scientific work. The gifts of the general government have come from the sale of public lands; to the separate States has been left, heretofore, the power to lay taxes for the support of institutions of higher training.

It is difficult to bring together the data for a trustworthy statement of the value of all these gifts, but they aggregate an enormous amount. At the present time the Federal government is devoting more than ten millions annually to the work of the scientific departments of the government. At the very beginning of organized government in this commonwealth the question of education was one of the first with which the State concerned itself.

The principle of State aid to higher education, then recognized, has been since that time accepted by the general government and by every State government. In New England, Harvard and Yale and other foundations of higher learning are now dependent upon private endowments; yet almost every one of these has at one time or another received State aid. Harvard was in reality a State institution, having received from John Harvard only £800 and 320 books.

And while the more generous gifts to New England colleges have come from private sources, they have never hesitated, in time of emergency, to come before the representatives of the people and ask for assistance—these petitions have never been disregarded by the State.

The American republic may fairly claim to have adopted, and to have followed out Macaulay's motto: 'The first business of a State is the education of its citizens.' In no land and at no time has the State responded so quickly and so generously to the demand for higher education as in the United States of America, and during the last half-century.

If this aid had been rendered by an individual, if one could imagine the spirit of the whole people, both State and National, incarnated in a personal intelligence, which should take cognizance of the obligations of those whom the State had befriended, I can imagine that one of the most direct questions which such an intelligence would address to those who direct the education of the youth would be:

"I, representing the whole people, have given you freely of my national domain, the heritage of the whole people; I have founded and supported colleges and universities and technical institutions. What direct return has been made to me for this assistance, and have those who control the training of the youth kept in view their obligations to me and the dignity and the needs of my service?"

The question is a perfectly legitimate and a perfectly fair one. And while it is easy to answer it in generalities, it is not so easy to give a reply of that definite sort which shall lead somewhither. The subject is too large and has too many ramifications to be discussed in full on this occasion.

Perhaps the best I can do is to call attention to the importance of the inquiry itself, and to the obligation which exists for a definite and full, and most of all an honest answer. In addition, I shall endeavor to point out certain directions in which, to my thinking, the ends of government have been well served in our system of education, and certain others in which, it seems to me, we need improvement.

It may be stated as a general result that the State (using that term to characterize both the general government and the State governments), has been well served by the institutions of higher learning. It can be shown satisfactorily that in the main these institutions have not only served the general purpose of the diffusion of knowledge among men, that they have trained men in such a way as to make them more effective in the pursuit of their own fortunes, but also that they have given back to the State men well trained to serve it.

In a very real sense, education and science have been handmaidens of the State, for they have not only thrown their friendly light upon the problems of statecraft, but their children have been more numerous and more helpful in the service of the State than any other group of citizens. It may be said with perfect truthfulness that the higher institutions of learning have well earned from the State the assistance they have received.

Notwithstanding this general outcome, there are certain directions in which the State may reasonably demand additional results. It is to be remembered that the State represents, as does no other agency, the whole people, and in considering the obligations due the State, and the best method of discharging them, the institutions of learning are attempting to serve, in the most direct and, at the same time, in the broadest way, the whole body of citizens.

One thing which the government has a right to expect of those educated in the higher institutions of learning is a decent respect for the service of the State.

I am sure I express the sentiment of all men of serious purpose who have stood in executive places in Washington when I say that there is no greater source of discouragement to those who are honestly striving for good administration than the facility with which good and honest and intelligent men will ascribe the worst motives to those in government office.

Again and again a man of pure life and of high purpose, who has accepted a post under the government, discovers with infinite pain and surprise that the silliest charge against him is accepted, not only among the idle and the curious, but by those upon whose support he had most counted. This tendency is not peculiar to our time or to our nation. It is a part of 'that touch of nature which makes the whole world kin,' a kinship as universal as it is detestable.

One cannot think of the failure to discriminate between the dishonest few and the honest many, of the courage brought to failure by the wellnigh universal suspicion, of the unmerited pain, from Washington's day to this, inflicted by the careless judgment of men's motives, without recalling the words of Edmund Burke: "It is very rare, indeed, for men to be wrong in their feelings concerning public misconduct; as rare to be right in their speculation upon the cause of it. I have constantly observed that the generality of people are at least fifty years behind in their politics. There are very few men who are capable of comparing and digesting what passes before their eyes at different times and occasions so as to form the whole into a distinct system. But in books everything is settled for them without the exertion of any considerable diligence of sagacity. For which reason men are wise with but little reflection,

and good with little self-denial in the business of all times except their own."

Let me say that no man can be brought into contact with the actual machinery of our government, can mingle with the men who make our laws, who interpret them and who execute them, without gaining not only a wholesome respect for the service of the State, but also a reasonable hopefulness for the future of our institutions.

So far as my judgment goes, there are few conventions of men brought together for any purpose in which the average of intelligence and of honesty is higher than in the American Congress. It goes without saying that its members are influenced by personal considerations, by social ties, by all the things which move men—in other words, they are human—but it is a gathering of men who honestly desire to do the right thing.

It is the fashion to speak of the honesty and the intelligence of the good old days when the republic was young and when statesmen were pure, and to deprecate the decadence of the present day. Such talk is the purest nonsense. The general intelligence of the body of Congress is higher to-day then it ever was, and its conscience is quite as acute. Unfortunately, the work of quiet and serious men receives little attention from the public, although these men count enormously in the actual work of legislation.

In the executive branches of the government as well, one will find a quality of service to command respect. There are incompetents in greater numbers than one could wish, but the quality of men entering government service is improving steadily since the civil service law has made it possible for men of education and energy to find a career there. And, notwithstanding the half-hearted service of the few, it is true that the government receives quite as much of devotion and of unselfish service as one can find in the ranks of those engaged in private business.

The government of the United States is honestly conducted. Its condition furnishes to those who know it best the basis of a rational optimism as to the future of democratic institutions. In its service men of education should find, in increasing numbers, careers of the highest usefulness and of the highest dignity.

Another quality of the education given to the youth upon which the State has a right to insist is its catholicity. The State makes no distinctions in the matter of education. It aims to make its highest training accessible to the humblest as well as to the most aristocratic.

No system of education is a good one for a free State in which the students and graduates of its institutions of learning get out of touch with the great body of their fellow-citizens. Such a lack of contact between the men of education and those who lack education brings about a feeling of distrust as between men of two distinct classes. Under such circumstances the educated man is likely to lose the perspective concerning social facts and tendencies, and becomes suspicious and narrow; to feel that the country is fast going to the bad, and that the advice and the service of the educated man are not properly appreciated.

One of the practical results of this feeling has been that the college man has not always realized that he was to take his place side by side with the man who had no college education; that he must expect to begin where the uneducated man begins, and that his education was not a mark to distinguish him from other men, but a training which ought to enable him to do his part of the world's work better than the man who lacked this training, but that he was not one whit better, nor was he to receive the slightest consideration because of his better opportunity.

It is the protest againt this feeling of superiority, whether real or imagined, which is at the basis of most of the objections now offered to a college education as a preparation for the active work of life. The feeling is voiced in the following words from the late Collis P. Huntington. In a magazine article published just before his death, entitled 'Why Young Men should not go to College,' he says: "Somehow or other our schools which teach young people how to talk, do not teach them how to live. It seems to me, that slowly, but surely, there is growing up a stronger and stronger wall of caste, with good, honest labor on one side and frivolous gentility on the other."

In so far as this charge is true that a college training tends to make those who receive it a class apart, and prompts them to make extravagant demands, in just that proportion is it a fair criticism of our system of instruction. We have a right to expect that the college trained man, more than any other, shall be tolerant and patient. That he shall understand, as no one else can, that truth and honesty and virtue belong to no age and to no nation; that they are the property of no party, and no sect, and no class. And we have a right to expect that, realizing this, he shall have wholesome views regarding human nature. If the college atmosphere does not encourage all this, then the college atmosphere needs quickening.

In the great wave of enthusiasm for education which has been the remarkable social phenomenon of the last quarter-century's progress it was, perhaps, to have been anticipated that some mistakes of this kind would occur. When education—and a very narrow conception of that term—was proposed as a cure for all ills, it was natural that some should assume that the man who received a certain training should also receive, *ipso facto*, special consideration in the world.

How far this criticism has been justified in the past I do not feel able to say. I do believe, however, that the college spirit of to-day is wholesome and catholic; that the men in the higher institutions of learning are in closer touch with the great body of mankind than ever before, and that men who go through college and take their places in the world do so in accordance with the rules of common-sense.

But beyond all such questions, and including them all, is another in which the state is vitally interested, and this is the quality of citizenship which our system of education is adapted to produce. This I hesitate to approach, since to discuss it is to open the whole question as to what the object of education is and what subjects should be taught to accomplish that object.

It is the old question which has been discussed for 2,500 years, and never more vigorously than during the past decade. However we have improved the methods, we have certainly never been able to state the questions involved more clearly than the old Greeks. Listen to Aristotle; he writes:

"What, then, is education, and how are we to educate? As yet there is no agreement on these points. Men are not agreed as to what the young should learn, either with a view to perfect training or to the best life. It is not agreed whether education is to aim at the development of the intellect or of the moral character. Nor is it clear whether, in order to bring about these results, we are to train in what leads to virtue, in what is useful for ordinary life, or in abstract science."

Could any modern state more aptly or in fewer words than these, the questions which have formed the basis of discussion during the last quarter-century among those interested in education, with the marked difference that education for the development of character is less talked about.

Is education to have for its object the training of the intellect, or is it to aim at the development of character, or is it to undertake both objects? And if the character is to be developed, what are the formal means which are to be used in this development?

These questions have been asked anxiously since systems of education had their beginning. In our day they seem to have settled themselves, so far as the practical efforts of the universities and colleges are concerned, by a process of exclusion. It is tacitly assumed, at present, that education —like all other training—has for its end the acquisition of power. In order to acquire power quickly the whole effort in modern education is directed toward the training of the intellect.

There is no disputing the fact that the educated man has in the world a higher potential by reason of his education. Is it equally true that he has, on the average, a stronger and higher type of character? Is the college man broader in his sympathies, more tolerant, more courageous, more patriotic, more unselfish by reason of his life in the walls of a university or of a technical school? Are the men who come each year, in ever-increasing thousands, from the college doors, prepared to shoulder more than their proportionate share of the burdens of the State and of the country, or are they provided with a training which will enable them to more easily escape its obligations?

Let there be no misunderstanding in this matter. Whatever our system of education is doing or is leaving undone in the development of character among its students, the State is saying in terms which are becoming every day more emphatic, this:

However desirable it is to train the mind when it comes to the service of the State (if, indeed, the same is not true in all service), character is above intellect. It is vastly important to the State that her servants shall be quick, keen-witted, efficient, but it is absolutely necessary that they shall be honest, patriotic, unselfish; that they should have before them some conception of civic duty and proper ideals of civic virtue. Give me men, intellectual men, learned men, skilled men, if possible, but give me men.

It is the old story, this cry. It is the lesson which every age preaches anew to the age about to follow. Shall we ever learn it? Will it ever come to pass that in our system of education the development of character will go hand in hand with the development of the intellect; when to be an educated man will mean also to be a good man?

Probably no one looks upon Plato's Ideal Republic as the basis for any effort in practical politics, nevertheless it ought to be true that civic virtue should be a part of the life and of the environment of our seats of learning, and that men, along with the training of their minds, should grow into some sort of appreciation of their duties to the State, and come to know that courage and patriotism and devotion rank higher in this world's service than scholarly finish or brilliant intellectual power.

When we look back on our own history as a nation we can but realize that in the crises of our national life this truth has been forced home to us. In the darkest hours of the revolution it was the courage, the never-failing patience, the unselfish devotion, in a word, the civic virtue of George Washington which was the real power upon which the people leaned.

In the agony of our civil war, when the fate of the nation trembled in the balance, the character of Abraham Lincoln, his devotion, his hopefulness—above all, his knowledge of and his faith in the plain people—counted more than all else in the decision. Neither of these men was the product of

university training, nor did they grow up in an academic environment; but each had learned in a school where devotion to the State was the cardinal virtue. When next a great crisis comes, no doubt there will be a Washington or a Lincoln to meet it, but will he come from a university?

When Washington came toward the close of his life he thought deeply over the dangers of the new State and the necessity for the cultivation of a spirit of intelligent patriotism. As a best means for inculcating this spirit he conceived the idea of a great national university. One of the main objects of this university was to afford to the youth of the country the opportunity for 'acquiring knowledge in the principles of politics and good government.' The idea was a splendid one, and while the need for a national university no longer exists (unless, indeed, one is needed to teach the principles of good politics), Washington's idea that the university is a place which should train not only the intellect, but the character; that it is a place where the student should find an atmosphere adapted not only to the development of accurate thought, but also to a wise and tolerant spirit; that in the university he should gain not only intellectual strength, but also a just conception of the duty to the State, was a right view.

And until this is recognized; until we bring into our college life and into our college training such influences as will strengthen the character as well as the intellect; until the time shall come that the educated man shall by reason of his training be not only more able than his untrained neighbor, but also more patriotic, more courageous, better informed concerning the service of the State, and more ready to take up its service; until such a spirit is a part of our system of higher education, that system will not have served the ends which education should serve in a free State and for a free people.

And in this connection I cannot refrain from a reference to the aim of those who founded the Institute of Technology, and to the conception of duty which they have impressed upon the institution. The recognition of the value of exact science as a means for the training of mind came slowly. Even after it did come men were slow to recognize the value to the race of the results of science. The spiritual side of scientific research is a matter which even to this day men are slow to comprehend, notwithstanding the powerful effect which it has had during the last generation upon the thought and upon the conscience of the world.

"Newton was a great man," writes Coleridge, "but you must excuse me if I think it would take many Newtons to make one Milton."

Forty years ago there were few men in this republic who appreciated in any clear way the value of science in the training of men. To William B. Rogers, and to those who labored with him, belongs the credit of anticipating the value of this training and the demand for it.

But outside and beyond all these considerations of fitness and of practical results attained, they also impressed upon the institution certain principles which are dominant in its life to-day. One of these concerns itself with the very situation and environment of the institute.

The Institute of Technology has its roots in the same soil which supports the industrial life of the city and of the nation. Its contact with the practical side of life is immediate and real. It not only draws its strength thence, but expresses as only that can which has a real and vital connection, the aspiration of those who labor in science for the upbuilding and the improvement of civilization. The Institute of Technology not only aims to serve the people: it is itself of the people.

One of the lessons which the study of

exact science leaves with the student is the necessity not only for exact work, but for a high ideal. Science is satisfied with nothing short of perfection, and this principle when it pervades a body of men comes to govern and control the spirit in which their work is done. No better heritage can be left to any institution than that which has been faithfully handed down to you, namely, in education it is not sufficient to be merely accurate, but it is necessary to hold fast to the highest ideal.

Once this idea gains control of a student life, that student will undertake faithfully and courageously whatsoever duties lie before him, whether they concern his professional life, his social life or his country's service.

Let me add, in conclusion, a word of personal greeting, speaking as one may when he addresses those who have come together, drawn by a common interest.

In the name of the corporation, and of the faculty, and of the students of the Institute of Technology, I thank those who represent here other institutions for your presence on this occasion. Your coming is not only a source of pleasure, but of encouragement to us, and helps to emphasize that spirit of common interest and of common helpfulness which ought ever to mark the relation of those who have to do with education. The Institute of Technology extends to you, and through you to the institutions which you represent, the assurance of its cordial good feeling.

Two of those who sit upon this platform the President of Lehigh University and the President of Harvard came from the faculty of the institute. This fact gives to your presence here an additional element of interest, and we extend to you a special greeting.

To Lehigh University in the sturdy work which she has done and is doing, for the courage with which she has not hesitated to face difficulties, we extend our warm congratulations.

To our near neighbor, the oldest and largest of American universities, we offer most hearty greeting. We rejoice in the greatness and in the strength of Harvard University, and take courage in the thought that we join hands with her to-day—as an elder sister—in a work not only for this city and for this commonwealth, but for humanity.

Gentlemen of the Corporation: In accepting the responsibility which you have this day formally invited me to share with you, I do so hopefully and with full confidence in you, in this community, and in the future. There is no greater work committed to men's hands than that to which we are called.

As I think of those who have preceded me in this place, when I call to mind their splendid services to the institute, to the commonwealth and to the country, I accept this work with a feeling of great humility, but with the earnest hope that through our common effort the institution may grow not only in strength, but in usefulness; not only in facilities for work, but in the better understanding of what work means, and that it may ever seek to lead in all that concerns the rational and helpful teaching of applied science.

Gentlemen of the Instructing Staff: For the cordial welcome to your number I am most grateful. I come to you with no new message and as the herald of no new gospel. The same spirit of work and of devotion which has been the glory of your body in the past must be our source of strength for the future.

In all that leads to the uplifting of technical education in the development and extension of the work of the institution, in the suggestion of new means by which it can minister more directly to the work of education upon the one side, and to the

promotion of scientific research upon the other, I ask your hearty cooperation and assistance. An institution, like an individual, must grow in its experience, in its appreciation of truth, in comprehension of the meaning of art and of science and of life, if it is to minister to a growing civilization. The inspiration which shall stand back of this growth must rest, in large measure, upon your zeal and your effort.

Alumni of the Institute: To each of you has been mailed an invitation to this gathering. These missives have gone to every country and to every climate. Some are at this moment being borne on the backs of men or in snow-sledges to the interior of Alaska, to be read months hence amid the winter snows. Some will be read in the tropics, under the glare of a summer sun.

Your alma mater would gladly have welcomed each one of you this day to her fireside, though the fare be frugal and the feast modest. Since this cannot be, let her invitation carry at least this suggestion: How farsoever from her halls your path may lead, it can never take you beyond the circle of her affection.

The institute is proud of the men it has sent forth, and she counts upon their loyalty and their devotion. She invites your counsel, your suggestion, your friendly criticism, your help. And while she listens with willing ear to every voice which rings true, she asks you to remember that no greeting so thrills her as that which comes up from one of her own children who is doing a man's work in the world.

Students of the Institute: In a more real sense than any other body you are the Institute of Technology. As such I salute you to-day, and assure you not only of my earnest wish for your advancement and your success, but also of my wish for your friendship and for your help. I prefer to think of such an institution as that in which we work together, not as an empire governed by the few, but as a republic in which faculty and students alike are charged with the government of the whole body.

I congratulate you on taking up the study of engineering, using that term in the broadest sense. There was never a more opportune time to enter such work; nor was there ever a period in the history of our country when the trained engineer had open before him so attractive a field.

This is the day of the trained man, and to him the responsibilities and the rewards will go. To the American engineer a whole series of new problems of the highest interest have in recent years been presented. Railways are to be built, canals are to be cut, a whole empire of desert land is to blossom under his hand. The Pacific Ocean and the countries which border upon it are to be the theater of an enormous development.

Cables will be laid, cities will be developed, the tropics will be subdued. In all this development the engineer, the trained engineer, is to play a rôle that he has never yet played since civilization began. The next quarter-century is to belong preeminently to him, and in all these world problems and world enterprises you are to share.

May I hope that in your preparation you may bear in mind as your ideal of an engineer, not only one who works in steel and brick and timber, but one who by the quality of his manliness works also in the hearts of men; one who is great enough to appreciate his duty to his profession, but, likewise, and in a larger and deeper sense, his duty to a common country and to a common civilization. H. S. Pritchett.

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*ENGINEERING EDUCATION IN THE UNITED STATES AT THE END OF THE CENTURY.**

There is no reason apart from custom why any special significance should be at-

* Address of the President of the Society for the Promotion of Engineering Education.