

## CITATION

Mr. Chancellor, I have the honour to present for the degree of Doctor of Science, *honoris, causa*, the **RIGHT HONOURABLE CLARENCE DECATUR HOWE**, whose vision in planning, and skill in marshalling our productive resources, in peace, for war, and for reconstruction, amply illustrate his own great gifts—and the value of engineering disciplines animated by a high sense of public duty. In presenting him, the Senate wishes to honour one who distinguished himself as a brilliant student, teacher and practitioner of engineering science before he mounted—or strayed—into what might be called the “Liberal” Arts.

# CONGREGATION ADDRESS

*of the Right Honourable C. D. Howe*

MAY 11, 1950

First, I would like to thank the President and Board of Governors of the University of British Columbia for the honour being paid to those of us who are receiving honorary degrees at today's convocation. An honorary degree may not carry with it the validity of an earned degree, but nevertheless it enables the recipient to be numbered among the graduates of this University. We, your most recent honorary graduates, are proud of our new association, and we look forward to close and frequent contacts with our fellow alumni.

I congratulate those of you who are being graduated here today. You are fortunate in having obtained your training in a young and dynamic university. I find it hard to believe that so much has taken place on this campus since I walked over the prospective site for the University with my friends Dean Weldon and Stanley Mackenzie, who had come to British Columbia from Dalhousie University in Halifax to advise on the location of the proposed University of British Columbia. Certainly the university of today is a credit to all those who had to do with its founding and its development over the years. Today will witness the opening of your new Applied-Science Building, which is a credit to the University and to the engineering profession.

Today also marks the retirement of your Dean of Science, my old friend John Finlayson. Dean Finlayson and I have a bond in common, in that we were each professors of Civil Engineering at Dalhousie. I will let you guess which of us succeeded the other in that capacity. I will also suggest that you may draw the wrong conclusion from the circumstance that Dean Finlayson is sensible enough to seek retirement, while I am not so sensible in that regard. I know that John Finlayson will be missed from this University, as he will be welcomed back into the engineering profession. He has made a great contribution of service to education over many years.

It has been suggested to me that the accent of this convocation is on science and engineering, and that it is in order for me to address my remarks more particularly to the engineers. Having spent all my private life in the profession of engineering, I find this a very convenient arrangement. Even then, I have had too much experience with young people to attempt to give you advice. When I tell you that I am old-fashioned enough to believe that

personal ambition, initiative, industry, faith, and the willingness to take a chance are still better avenues to personal and national success than the rigid adherence to security considerations and social and economic planning, you may well consider that I really have no advice worth offering to the modern generation. However, I will attempt to discuss one or two matters that I feel are very much on your minds.

The first of such matters is, what of the future? What will the years hold in the way of opportunity, for engineers and for other graduates, and incidentally, you are all in much the same boat as far as the future is concerned. What are your opportunities, not only to make a living, which, by the way, is no base motive, but, of more importance, opportunities to play a part in enterprises that will benefit the people as a whole?

These questions are undoubtedly very much in your minds today, just as they were uppermost in my mind when I was graduated 43 years ago. The same questions have probably been in the minds of all students from the time the first engineers were graduated. I am also sure that the same two types of answers have been given, year after year. There are those who take a pessimistic view, which they describe as realistic, and there are those who are optimistic. Personally, I have somewhat of a reputation for being optimistic. I believe that opportunities for young engineers, and for young graduates generally, are as good, or better than they were 40 years ago. I do think that Canadian industry, and the Canadian economy, will develop at a rate not less remarkable during the next quarter century than during the previous quarter century.

Please note that my belief in opportunities for graduates is an opinion, rather than a fact, but it does have the merit that I believe it to be true and, any way, I am entitled to the latitude usually granted speakers at convocation time. Perhaps I had better support my belief with a few random observations, based on my experience over the years.

When I was graduated in 1907, this continent was nearing the end of a great era of railroad building. To complicate matters further, 1907 was a depression year, the year of the so-called rich man's panic. In Canada, one great transcontinental railway had been completed and two others were nearing completion. At that time, engineering, to most young men, meant the survey, location, construction and operation of railways, and the construction of ancillary structures, such as bridges, terminal facilities, and harbour developments. It was not unusual, in those days, to hear wise and experienced men warn the universities that too many engineers were being graduated, that, with the completion of the transcontinental railways, there would be no more need for engineers. There were perhaps 1500 undergraduate engineering students in the whole of Canada at that time. Today, while the

population of Canada has only about doubled, there are about ten times as many engineering students, and engineering graduates are finding employment far easier to obtain than did the graduates of my day.

This rapid growth in the number of engineering graduates is not accidental, nor is it due to any one single factor, but rather to several factors that are still operating. The normal increase in population is, of course, one factor, although not a major one. The number of people employed in industry and production has only about doubled during the past 40 years. The freight carried on our railroads has only increased four times in the same period. On the other hand, the telephone business has increased eight times, but the increase in engineering students of ten times is still larger than the increase in most other activities. The only item that shows a comparable increase is the national debt, which has grown four times as fast as have engineering students, but I am sure that no one would suggest that there is any association between these two phenomena!

All these figures merely emphasize something that we all know very well, namely, that over the past decade engineers have taken over jobs in industry, in transportation, in general businesses, which are not strictly engineering in the narrow professional sense, but for which engineering is an excellent qualification. You may be surprised to know that when I was teaching and practising engineering in Halifax forty years ago, there were in Canada only a handful of engineers in all the industries of this country. Even the contracting industry employed only a few, and the same is true of the operating, executive and administrative positions of railroads, and government agencies.

The infiltration of engineers into the production departments of industry, into the operating departments of railways, and into the general administrative and executive fields of business, industry and government, has been most pronounced since 1920, with the result that today we find that most contracting companies are headed and staffed by engineers, while in the more technical chemical, electrical and metallurgical industries the same thing is true. Even in general industry and business, the majority of senior posts are now being filled by men with engineering training. I might even mention the fact that when I was first appointed a Cabinet Minister in 1935, I was the first professional engineer to hold such a position in any British government. Today, our Federal Government includes two professional engineers, while there are several professional engineers in our provincial governments. I am even beginning to think about a day when engineers may outnumber lawyers in governments, and I get some comfort from doing so.

Speaking seriously, this invasion by engineers of fields that are not strictly technical, is another proof of the great importance

of science and technology in the industrial and economic life of modern days. This movement will continue, and in Canada, just as happened in Germany, the United States and England, training in some phase of engineering or science will become more and more essential to high executive positions in industrial and business organizations.

In all walks of life, a college education, whether in engineering or otherwise, is much more highly regarded as a qualification for employment than was the case forty years ago. This means, for all of you, opportunity. With your background and education, I am confident that, given an opening into employment, you will not need to be told what to do next.

Many of you may feel, as I did back in 1907, that you were born a generation too late, that all the important engineering work has been finished before you enter the profession. I was interested in reading Burpee's *Life of Sir Sandford Fleming*, who came to this country as a young engineer in the summer of 1845, and looked about for a job. The account reads:

"Day after day his journal is a record of hope deferred. He called on Sir Allan MacNab, and other notabilities, with letters of introduction, but though politely received, he found little or no prospect of employment as an engineer or surveyor. The Canada Company's surveys were completed, and there was nothing to hope for in that direction. Mr. (afterwards Sir) Casimir Gzowski could offer no work in the Department of Roads and Harbours, in fact he threw cold water over the ambitious hopes of the young engineer, told him there was nothing in the province; that the great works were nearly all finished, funds exhausted, that they were paying off men instead of taking them on, that indeed he thought it a very bad country for professional men, and wound up by advising him to return to Scotland, advice which Sandford decided to put aside until every avenue of success in the new world had been explored."

You all know that Sir Sandford Fleming eventually found his opening, and went on to achieve fame and fortune in Canada. It is interesting to note that, one hundred years after his job-hunting experience, Canadian industry has been absorbing all the engineering graduates that the universities can turn out, and has been asking for more. Those of you who have the persistence of Sir Sandford Fleming need have no fear for your future in the Canada of today.

Perhaps some of you will say: "Yes, we are all right during this present period of expansion, but can this last? What guarantee have we that Canada will continue to expand, and thus provide opportunities for college graduates?" The answer is that you are among those upon whom Canada will depend to see to it that the

Canadian economy will continue to expand. In this university you have been given the tools for that job, and it will be up to you to take over and see that the job carries on. The materials for the job are here in abundance: timber, copper, zinc, lead, aluminum, nickel and more recently, petroleum and iron ore and titanium. We in Canada have such materials in abundance readily accessible.

Perhaps one of the most important tools for ensuring that Canada will continue to have a dynamic economy may be found in our scientific laboratories, which have been expanded to ten times their prewar size. Certainly, the major opportunity factor for any country lies in the application of new scientific discoveries. This constitutes the "endless frontier" of your generation. Dr. Vannevar Bush, who during the late war was Director of American Scientific research activities, in reporting to the President of the United States, used these words: "Science offers a largely unexplored hinterland for the pioneer who has the tools for his task. The rewards of such exploration, both for the nation and for the individual, are great. Scientific progress is an essential key to our security as a nation, to our better health, to more jobs, to a higher standard of living, and to our cultural progress."

I like to think that the pioneer spirit is still vigorous in this country, and that, while there may be no territorial frontiers to push back in the second half of this century, the "unexplored hinterland" referred to by Dr. Bush offers fitting opportunities for the pioneering ambitions of the young man of today. To those who prefer to reflect on the bounty of the past, and worry about the future, my answer would be that, much as I have enjoyed my active life, and appreciate the good fortune that has been my lot, I would gladly trade it all for the opportunity which is yours, to start on the road to adventure and service with 1950 scientific equipment.

The building up of vast new technological empires on scientific research and discovery has been one of the outstanding marks of the last century. We all know that the colossal electrical industry of today, with its investments running into the billions of dollars and with its employees numbered in millions, came out of Faraday's experiment in electro-magnetic induction, and there are men now living who knew Faraday well. We all know that there was no chemical industry worth mentioning a hundred years ago, and that research is responsible for the great chemical industries, which today provide sustenance and opportunity for thousands of Canadians. The same has been true of the motor industry, which started its real growth less than forty years ago, and which brought in its train developments in highway construction, in travel, and in transportation, which have revolutionized our way of life, and now provide an abundant livelihood to many thousands of workers. Aviation, radio, and now television, all follow the same path—

scientific research, engineering development, vigorous and courageous exploitation—and they all have led to the same end, a higher standard of living, and more and better jobs for all.

I might mention the employment opportunities created by a wartime need for synthetic rubber. Back in 1941, the fall of Singapore made it clear that supplies of natural rubber could no longer be had. Our chemists had developed in the laboratory stage methods for making synthetic rubber, but their theories had never been tested on a production scale. The war was being fought on rubber, and every avenue to obtain rubber had to be explored. Therefore, the Government spent fifty million dollars in attempting to produce rubber from petroleum fractions. Fortunately, the chemists were right, and rubber was produced of quality and in quantity sufficient to replace natural rubber. That synthetic rubber plant is still operating at full capacity, making a variety of products that are finding ready acceptance in industry, even though natural rubber is freely to be had, at prices lower than prewar. However, the interesting thing is that, since the war, another fifty million dollars have been invested in facilities to utilize further the petroleum fractions surplus to requirements for synthetic rubber, and today we have, alongside the rubber plant, factories for making fiberglass, antifreeze, chlorine, and base material for plastics, with every indication that further application of research in the field of organic chemistry will continue the rapid growth of an industrial community which dates back only eight years.

What of Dr. Bush's "unexplored hinterland"? No one can spell out the future in detail, but in the field of atomic energy alone, we have possibilities for peaceful development that are almost beyond imagination. I rather think that atomic energy, today, is about where the electrical industry was at the time of Faraday, and that the development of its use will have at least as great an impact on society. We know full well that material progress for two hundred years has always been associated with the increase in available capital and available power, permitting the substitution of machines for human effort. First, the steam engine, then hydro electric engines, then internal combustion engines, made progress possible. Now we have this new and almost unbelievably great source of energy rapidly becoming available for use. The military implications of atomic energy have thrown a temporary cloud of secrecy over this development, but already the use of radio-isotopes, as a research tool gives promise of great things, making possible new discoveries in all fields of knowledge that mean a major advance in science and technology. The international situation may delay progress temporarily, but the day will surely come when the peaceful use and application of this new, and fantastically large, source of energy from atoms, will certainly open up a new and potentially great field of engineering, technology, industry and opportunity.

“Science offers a largely unexplored hinterland for the pioneer who has the tools for his task.” We, your elders, believe that we have provided the “tools for the task.” The task is one of exploiting, for the use and benefit of mankind, the potentials for good that abide in the application of science. I wish you joy in the task.

It is your great privilege today, ladies and gentlemen, not to finish the job, but to play your part in building a greater and better Canada.

