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McMaster, June 8, 1979

President Bourns, Prof. Thode, Ladies and Gentlemen:

It is a great pleasure for me to participate in this gathering in which we honour our friend Harry Thode on the accomplishment of forty years of research at McMaster University. I consider it a great privilege to be asked to say a few words on this festive occasion although I do so with some misgiving since after-dinner remarks have never been my strong suit.

There are a number of things that I feel I have in common with Harry Thode. We both laid down our administrative positions before being required by custom to do so, in order to return to full-time research. We are both convinced of the importance of basic research in the pursuit of science. We were both not called before the

Senate Committee on Science Policy, presumably because the Committee knew that neither of us would give the kind of statement they were seeking. We are both dependent in our scientific work on one particular instrument. My own work is mainly based on the optical spectrometer or spectrograph, in various forms. Harry Thode's work is based almost exclusively on a very different instrument with a similar name, the mass spectrometer. I understand that it was Harry Thode who built the first mass spectrometer in Canada. I cannot make a corresponding claim for the optical spectrometer.

Harry Thode's scientific achievements cover an enormous range. Even so, our two fields of interest and competence overlap only marginally and my remarks about

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Harry Thode's accomplishments must be considered as those of an "outsider" not familiar with the details of his work.

Harry Thode's interest in mass spectrometry arose from his work in Harold Urey's laboratory at Columbia University before he joined McMaster in 1939. Using the original mass spectrometer and its many modifications and improvements Harry Thode has made basic contributions to the study of the abundances of isotopes and their variation with physical, chemical, geological and biological conditions.

Harry Thode especially studied the natural variation of the sulphur isotopes and established for the first time the biological sulphur cycle. As he showed, not only do natural isotope fractionations arise by equilibrium and

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kinetic effects but sulphur oxidizing and reducing bacteria have an important influence on this cycle. It is even possible to get estimates of the age of these bacteria.

Thode has also studied the isotope anomalies in meteorites which throw important light on the origin and therefore on the history of the early solar system. It was natural that he became also involved in the study of the lunar materials brought back by the Apollo astronauts and showed that the variation of sulphur isotope ratios is much smaller than on earth because of the lack of the biological cycling that occurs here. He has studied the enrichment of isotopes not only of sulphur but also of oxygen and silicon in different lunar soils and rocks.

5.

These studies throw considerable light on the effect of the solar wind on the surface of the moon.

Harry Thode has also made use of the high sensitivity of the mass spectrometer in the study of isotopic abundances of fission products and has obtained important results about the nature of the fission processes in this way.

Another important field to which he contributed was not directly based on the mass spectrometer but still on the study of isotopes, namely, the use of radio-iodine in the study of thyroid function - work that has become extremely important and represents one of the "pay-offs" of his initiative in having a nuclear reactor built on the campus of McMaster University.

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When Harry Thode served on the Council of NRC I had an opportunity to learn about his views on what now is usually called "science policy". His ideas were in many ways similar to those of the late Ned Steacie and indeed, when Steacie died in office in 1962, most of us at NRC would have liked to see Harry Thode as Steacie's successor. It was a great disappointment to us when this turned out to be impossible because Harry Thode had just started his Presidency of McMaster University. Loyalty to McMaster was always a strong feeling with Harry Thode. Here at McMaster he practiced what he preached about science policy, e.g. the simple rule that if you want a successful research group in any science you have to find good people and let them do what they want to do. The result of this policy

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is here for everyone to see. The success of McMaster University in almost all fields of science is known throughout the world.

In spite of his administrative activities as President of McMaster University, pursued with his usual vigour, Harry Thode (like Steacie at Ottawa) managed to keep his basic research going with the help of several graduate students. He also managed to slip in a sabbatical year fully devoted to research activities at the University of California (at San Diego). This made it much easier for him when he retired from the presidency of McMaster to resume his full-time research.

Harry Thode's opinions about science policy were most forcefully expressed in an article on the Macdonald Report published in 'Science Forum' in 1969. He clearly stated the foolishness of the recommendation of the Macdonald Committee to separate the grants program completely from NRC and foresaw that it would lead to an added layer of bureaucracy which not only has to be paid for from the funds available for university grants but which also makes the whole grant application process more unwieldy and difficult for the university staff. Thode knew that, contrary to the opinion of the Macdonald Committee, there never had been any conflict of interest between the NRC laboratories and the grants program and none could be foreseen for the future because the two functions were based on separate votes in Parliament, and he appreciated the simplifications made possible by having available at

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NRC competent people to prepare the material for the meetings of the grants committees. He said "I thoroughly disagree with the proposal that the council be re-constituted and that the laboratory research and the university research support programs be separated and accommodated into two separate government agencies. In making this recommendation, the committee has ignored the historical development of the NRC, its superior record of achievement in raising the level of science in Canada and its reputation and prestige in all countries of the world" and, further on, "Surely the organization of science should provide the maximum liaison between all levels of research in universities, government and industry. The isolation of the university grants program from the senior

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government laboratory, with its general responsibility for the health and strength of science and technology in Canada, would be a step in the wrong direction. The interaction of NRC scientists with university scientists as at present [i.e. in 1969], through granting and selection committees and review committees, is of great assistance both to the NRC laboratories and the universities". As you all know, in spite of the objections of Thode and others the government proceeded with the setting up of a separate granting agency and the effects foreseen by Harry Thode are already becoming evident.

Another important and crucial point that Thode made concerns the general policy of the award system. He said:

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"Although the committee recommends the continuation of the merit system of awards, their main emphasis is on administration rather than philosophy and the means of ensuring excellence in our research programs. For 50 years it has been NRC's policy to support research where the greatest competence lies. Any other basis would be wasteful of our limited resources and encourage mediocrity, and yet the committee questions this policy. Their contention is that NRC considers the merit of the man rather than the merits of the projects and that this policy has led to many errors. This is of course nonsense. How in the world can you go wrong by supporting an outstanding scientist with a long list of successes? It is well known that you cannot separate the merits of the

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man from the merits of the project, since a really first-class man is likely to have the best ideas and seldom proposes trivial projects".

There is one objection of Harry Thode's to the Macdonald Report which apparently was accepted by the government, and that relates to the so-called Presidents' Fund. Harry Thode said: "This fund, provided to the universities by the NRC, has a value out of all proportion to its size and I am opposed to its elimination. I believe it is essential that there be undesignated funds which can be used by the institution to support new people and back exciting new programs. The fund provides the kind of flexibility that a research institution must have to take advantage of exceptional opportunities". As far as I can

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find out, in spite of Macdonald's recommendations the Presidents' Fund still exists as an oasis in the otherwise increasingly bureaucratic arrangement of the new grants system. I would not be surprised if this fund were to suffer the same fate as other enlightened rules and gradually be made less and less flexible for the sake of better accounting.

It seems to me a worldwide phenomenon that committees and governments always increase the bureaucratic part of almost all organizations. In the United States there has been a recent attempt by the Office of Management of the Budget to introduce further restrictions aimed at removing any remaining flexibility. This move caused Dr. Jerome Wiesner, the President of M.I.T., to make in a

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recent speech an almost desperate plea to the American Congress and the American government to remove some of the rules that make the whole system so inflexible, and to abstain from the threatened introduction of further crippling rules. He said, among other things, "Neither effective education nor creative acts, be they scientific discovery or technical innovation, can be easily evaluated, least of all by accounting. Nor can they be purchased by the pound or paid for by the hour", and, further on, "The foremost purpose of a university is to nurture the creative mind, to foster the spirit of innovation and invention. The organization and its rules should be directed to that purpose. The great universities are in a state of continuous evolution."

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To shackle them to a detailed and rigid set of nationally administered rules and regulations is to swap progress for administrative convenience. And that, in anyone's calculus, is a bad bargain." One wished one could make our politicians understand this thought and act accordingly.

We are nowadays so worried about accountability, about the possibility of the misuse of funds, that we are willing to spend a multiple of the imagined savings on the additional bureaucracy necessary to eliminate the very few incidents of misuse. I say "imagined savings" since our accountants never include in their calculations the time that research workers spend on the additional book-keeping. As Wiesner expresses it, these measures

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"reflect and reinforce the current trend to evaluate and measure research in terms of pure cost accounting". Accounting is certainly necessary but it is a necessary evil and should not be the guiding principle. Canadian governments are fond of giving accountants the main function in government organization, as was evident when they appointed the late Mr. Glassco, an accountant, to be chairman of the Royal Commission to advise them on government organization. We are still suffering from the aftermath of Mr. Glassco's report which successive governments have felt compelled to implement. It has led to such crazy practices as "PPB", meaning Program Planning and Budgeting. Any research that can be put down in a specific program will not lead to new developments.

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I don't believe that anyone can produce evidence that reorganization can lead to better science, to new discoveries, to new innovations, yet that is what governments, politicians and newspapers seem to be constantly concerned with. Quite apart from the fact that our politicians do not understand how science works and how scientists work and what the best conditions for their work are, they also do not understand why scientists do science, what motivates them in their most creative moments. I remember on a visit to India 3 years ago that the newspapers reported a statement by Mrs. Gandhi saying that the only purpose of science is economic and social advance. I would counter that statement with a quotation from the famous 19th century

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mathematician Jacobi, who said "the sole aim of science is the glory of the human spirit". Even if one were to accept Mrs. Gandhi's position, as do most politicians, it is clear that in order to obtain the best results from the scientists one must take account of their real motivation and must not shackle them by introducing more and more bureaucratic rules.

On the whole I feel rather pessimistic with regard to the future of science in Canada and elsewhere, just because of the tendency of governments to introduce more regulations, more bureaucracy. Our only hope is that the new generation of scientists will develop new Harry Thodes who apart from an ability to fight bureaucracy will have the initiative and the creative thought that

so characterize our friend Harry Thode. They will be able to produce new insights and new developments in science in spite of all obstacles. In the meantime all of us hope that Harry Thode will continue his creative work and enrich science with many new ideas and results. Canada is indeed fortunate in having had a man of his calibre to help in establishing the high regard in which Canadian science is held throughout the world. We owe him a great deal and we expect even more from him. He has been, and will continue to be, a shining example of what a scientist should be and what he can accomplish for science in this country and throughout the world.