

[Chairman: Mr. Oldring]

[10:02 a.m.]

MR. CHAIRMAN: Good morning, everyone, and welcome to another meeting of the Heritage Savings Trust Fund select committee.

We have the pleasure this morning of reviewing the Alberta Heritage Foundation for Medical Research. It's found on page 15 of the trust fund annual report. All members in the past have received copies of the Alberta Heritage Foundation for Medical Research's annual report. There are some extra copies here if members don't have theirs with them and would like one.

I'd like to begin by welcoming Mr. Geddes and Dr. McLeod. Mr. Geddes, of course, is chairman of the board of the foundation, and Dr. McLeod is president. We're pleased to have you with us again this year, gentlemen. As I was mentioning to you earlier, this is something that we take a great deal of pride in. We share the pride that you do in the foundation, and we're always pleased to have the opportunity to meet with you and hear some of the current success stories out of the foundation.

It still is customary to extend an opportunity to you to open with some opening remarks and comments, and then from there we'll turn it over to question period for the members.

MR. GEDDES: Thank you very much, Mr. Chairman, and thank you very much for those words of encouragement about the foundation's activities. I might suggest that we proceed in the manner which we have done in the past, and that is that I would make some opening remarks and then the president, Dr. McLeod, would follow, if that's agreeable, sir.

Mr. Chairman, we're appearing today before this committee for the fourth time. The legislation which brought this foundation into being required that we would appear at three-year intervals after the completion of a triennial report. Also, the Act requires at the end of the second triennial report that a report from the International Board of Review be prepared and included in the report for the second three-year period. As required by the legislation, annual reports have been prepared for each of the seven years ended March 31, 1987, and placed before the Legislative Assembly. Furthermore, copies of triennial reports, the second of which incorporated the report from the International Board of Review, have been furnished to all members of the Legislative Assembly.

Our appearance this morning, although not required by our legislation, is welcomed by us as an opportunity to continue with this committee the dialogue which has been of such value in previous years. At the same time, we continue to acknowledge that the assessment of progress in medical research requires much longer time frames than one year, and such progress should continue to be considered in three- and six-year intervals rather than annually.

The report of the International Board of Review, a distinguished panel of scientists of international reputation, which was received by you shortly after our appearance last year, was clear and unequivocal, and I'm sure that was your conviction as well. It spoke of the remarkable scientific milieu which has been created in Alberta through the foundation programs and of the growing international reputation of our two medical schools. The precise quotation from the report of the International Board of Review in speaking of the foundation's programs is that these programs

have had a remarkable and profound effect in improving the quality and status of medical research in Alberta and, indeed, the rest of Canada as well.

That's the end of the quote.

There is little which I can add to that report, which stands as an outstanding tribute to the leadership which has been provided by the senior members of the medical research community in our province, notably the deans of the two medical schools and their senior colleagues at the departmental level, working together with our own president, Dr. Lionel McLeod. Working together in a remarkable spirit of co-operation and responding effectively and intelligently through their recruitment activities and in the formulation of new research initiatives, it has been possible to reach levels of excellence in many areas of medical research in Alberta which probably would not have been possible without the support provided by the foundation's programs.

We in Alberta must not lose the momentum which has been created. We must capitalize on the investments that have been made in human resources and equipment. To accomplish this will require that we carry forward our programs in the future with the same dedication and determination as in the past. Clearly, there must be no lessening of our efforts. We must at the same time have confidence that we will have the necessary financial resources in the future to continue to recruit the best young scientists we possibly can and to provide them with the opportunity to operate at the leading edge of medical science, using modern equipment and having the appropriate working environment to carry out their work. This task will require steady, assured continuity of funding. We at the foundation are now and must continue making decisions about the funding of new programs which will cost money. Commitments are being made now which have financial ramifications into the future. In this spirit, I would like to confine the balance of my remarks today to the question of the adequacy of our endowment fund.

In addressing the question of our endowment fund, I would like to draw the attention of members of this committee to the provisions of section 24(5) of the Alberta Heritage Foundation for Medical Research Act, which reads as follows:

In reviewing the first triennial report received after the first review by the International Board of Review pursuant to section 23(4), the Select Standing Committee on the *Alberta Heritage Savings Trust Fund Act* shall reassess whether or not the amount of the Endowment Fund is adequate for the future requirements of the Foundation.

In other words, the Act contemplated, Mr. Chairman and gentlemen, that you would at this time conduct a reassessment. Although the matter has been the subject of discussion between us over that period, this is the appropriate time for reassessment to take place. Such a report having now been made available to you, I would like to request through you, Mr. Chairman, that such a reassessment be undertaken as soon as is practicable, taking into account the submission which I would now like to make to you.

First, let me place on the record one of the two major recommendations made in the International Board of Review report. We remind you that the other major recommendation was that care should be taken to ensure "the maintenance of vigour, innovation and excellence" in the foundation's programs. To accomplish this, there should be a rigorous review of all scholars after their initial five-year appointment. That was the first recommendation.

The second major recommendation made by the International Board of Review reads as follows:

The IBR strongly supports the Foundation's plans for a steady state group of approximately 200 Scholars, Scientists and Clinical Investigators with the ancillary training and research support programs [which have been] described above. At the beginning it was estimated that this enterprise could be main-

tained on the initial Endowment of \$300 million along with retained unexpended interest accumulated during the initial years and increased by the high earning rates of the early nineteen eighties. While in the early years the value of the Endowment increased to over \$400 million, unexpected changes in interest rates and the need to provide funds for the Heritage Medical Research Buildings have sharply reduced the rate of growth of the Foundation's Endowment and have raised questions as to whether or not it would be possible to maintain the Foundation's research and training programs at their initially projected levels. Based on our conviction that these programs, in their steady state, should support about 200 Scholars, Scientists and Clinical Investigators, we strongly recommend that every effort be made to increase the Endowment of the AHFMR to the appropriate level as soon as possible. Without such an increase, the rate of growth of the programs will be appreciably slowed, and the ultimate size of the entire enterprise will have to be scaled down. Given the remarkable impact that the AHFMR has already had on both basic and clinical research in the Province of Alberta, to slow its development and scale down the scope would be most unfortunate.

That is the conclusion of the quotation from the International Board of Review report.

Well, on September 6, 1984, when we first appeared before you, I provided you with the opinion that as matters then stood, it was clear to me at that time, over three years ago, that our endowment fund would require supplementation in order to maintain the integrity of our program of grants and awards in the decade of the 1990s and beyond. I added the following, which is found at page 116 of the transcript relating to our 1984 appearance:

I think I can safely predict that the question of our endowment fund will be a matter of great importance when our foundation appears before you at the time of our next appearance in 1987.

The 1987 appearance, of course, is that which is presently under way today. In fact, as stated earlier, we have appeared before you on two intervening occasions between the 1984 appearance and this one: on August 8, 1985, and on October 27, 1986. In 1985 I expressed my tentative opinion to you that the foundation's endowment fund should be supplemented by the amount of approximately \$150 million. In our 1986 appearance, page 13 of transcript 86-3, I again alluded to the question of supplementation in the same amount as in 1985 but added the observation that such funding should be in place by 1990. I would like to confirm today that these opinions continue to be valid and that these opinions as to both the amount and the timing of the needed supplementation should, I submit, form the basis of your deliberations.

During the past year we have expended a considerable amount of time and effort in analyzing our operations for the last seven years and making projections of expenditures and revenues as to the next five years and beyond. In addition, we have consulted widely with sources having particular experience and understanding of the question of endowment management. In order that we might benefit from the wealth of experience of institutions with long years of endowment management, careful reviews have been conducted co-operatively but independently with our colleagues in Alberta Treasury, who are responsible for the investment activities by which the foundation's endowment is managed. Our reviews included discussions with those Treasury officials and with personnel of the University of Alberta interested in endowment policy.

Because of the remarkable record of Harvard University in endowment management -- as you will know, the endowment fund of Harvard University in the United States is the largest of its kind -- visits were made to its vice-president, finance, and to Mr. Walter Cabot, senior officer of the Harvard Management

Company. The Harvard Management Company is responsible for the management of Harvard's endowment fund. Moreover, a great deal of insight was gained from the important report entitled *Funds for the Future*, which was produced by the Twentieth Century Fund, Task Force on College and Endowment Policy, a task force on which Mr. Cabot was an important contributor. That task force includes many distinguished financial managers, endowment fund managers in the United States, and the findings of that report are generally speaking accepted as an appropriate framework for the management of endowment funds.

The maintenance of the permanent value of our endowment fund and, therefore, the purchasing power of the foundation's endowment is essential to the success of the foundation's planning. It is important that the foundation work toward a plan which would not entail repeated requests by the foundation to Alberta's government for additional funding. Based on well-established endowment management principles, maintenance of the endowment's permanent value requires an adequate base and the establishment of a spending rate calculated to protect that base against the erosion of inflation. The spending rate must also, of course, permit the foundation to achieve its objectives. These principles require also an investment policy that favours the use of equity instruments and a spending formula that permits buffering the volatility of that investment policy.

The experience of others suggests that the annual spending rate of endowment funds should not exceed 4 to 5 percent of the market value of the endowment. Noteworthy in this regard is the observation that over a 10-year period the average spending rate of 10 major U.S. and Canadian university centres was 4.8 percent. Were this strategy applied immediately to our foundation, the annual spending rate of our regular grant and award programs would approximate \$30 million rather than the current \$37 million -- \$37 million representing a rate of approximately 7.5 percent on the endowment's current market value. The full achievement of the foundation's objectives in the long-term maintenance of two centres of medical research excellence is projected to require annual expenditures by 1990 in excess of \$45 million to \$46 million per annum. Of course, that is sharply in excess of the amount of \$30 million and \$37 million just referred to. It has been well demonstrated that the resulting scientific establishment will be able to attract the additional funds from other sources for later growth and development, and I think Dr. McLeod will have some encouraging things to tell you about the successes of Alberta-based medical scientists in attracting operating funds from sources outside of the province.

Therefore, for the long-term planning needs of the foundation and the maintenance of its remarkably successful momentum, an understanding must be reached on the future status of the foundation's endowment. The requested addition made last year of \$150 million, appropriately timetabled, would in our opinion place the foundation on a self-sustaining course. Alternative strategies are under careful consideration. It is not possible for the foundation to adopt a spending rate equal to 4 or 5 percent of the market value of the endowment. This would seriously limit the foundation's ability to pursue its objectives, and the setbacks in Alberta would prove dispiriting and lead ultimately to deterioration of the present level of achievement.

A compromise course of action has been contemplated whereby our foundation would continue to support the recruitment of new scientists, up to the projected number of 200, and to provide the establishment grants essential to recruitment. To do this, the foundation would be required to prune very carefully other programs, including the support of students and fellows,

infrastructure support, et cetera, and accept the consequence of the gradual loss of purchasing power. Now, we project that this would postpone the date of serious difficulty from 1991 to 1993. This is undoubtedly the least attractive of the options open to us.

Another alternative would be to proceed to spend at rates appropriate to the objectives and scientific merit of application proposals. It is projected that this would reduce the market value to the minimum level allowable under the Act, \$300 million, and result in a very serious problem at a future date. If, for example, a spending rate which is high -- perhaps as high as 7 percent -- is adopted, there is a significant danger that the real value of the endowment will be eroded over time. The Legislature of Alberta, which established the endowment, may well be willing to accept any erosion risk which is associated with 7 percent. The trustees of the foundation might well be unwilling to sustain such a high level of spending in the absence of any assurance as to what measures will be used in the future to prevent a sharp reversal of expenditures at some future date.

So the establishment of policies that cover both the investment of endowment assets and the allocation of total return between current and future needs is the central consideration before us. It is important that a long-range plan be developed for at least a five-year period, reconciling the foundation's expenditures, taking into account the activities presently contemplated in our development program, with the earnings from the development fund. The investment strategy to be followed by our investment managers, Alberta Treasury, should be compatible with that long-range plan. We agree emphatically with the conclusion of the Twentieth Century Fund task force, that spending needs should not dictate investment policy, nor should investment policy dictate conditions of spending. But trustees must be satisfied that the investment policy, the spending rule or policy, and the projected spending levels are consistent and achieve a balance between present and future needs of the medical research community.

So in conclusion, Mr. Chairman, the most important matter which I would like to convey to you and to the members of the committee is that the need to address this reassessment of the adequacy of our endowment fund is a critical and pressing need which needs to be undertaken almost right away. We will of course look forward to participating in that process. Clearly, to carry out this task will require an examination of our current and projected spending levels. The other side of the coin will be an examination of the investment policies because, as stated earlier, Alberta Treasury is responsible for the investment of the endowment fund. They in turn look to us for direction in respect of the determination of an appropriate spending rate. In turn, that spending rate could not be settled with any certainty until such time as investment guidelines are laid down about such very important matters as investment mix -- the mix between equities and debt instruments and other forms of endowment assets -- are settled upon. That task, in turn, depends upon the rate of spending. So we have what might be termed a circular relationship with Alberta Treasury.

At this time this committee, acting on behalf of the Legislature, who are the creators of this endowment, can play a critical role in carrying out this reassessment, which takes into account the competing needs of the organization requiring the funds and the investment managers responsible for the delivery of a flow of income into the future.

So with those remarks, Mr. Chairman, I would like to ask my colleague Dr. McLeod to provide some comments.

MR. CHAIRMAN: Thanks very much, Mr. Geddes. Dr. McLeod?

DR. McLEOD: Mr. Chairman, gentlemen, it is a timely point, I think, to review the progress of the foundation in that the International Board of Review report has been obtained, those visitations by distinguished scientists have been completed, and therefore it certainly seems timely from the point of view of the citizens of the province. I would like, therefore, to take some time and put in the record and present to you the observations which we've collected that, in part, include those of the International Board of Review but also those which, of course, are expressed by my colleagues in the medical research community of the province and the international scientific community.

One of the major tasks which we've undertaken is to build and maintain two major centres of excellence. Based upon the repeated recommendations of our own Scientific Advisory Council, we've hoped to build these upon multidisciplinary medical research groups. We would see these groups being built upon those areas of excellence within the province or at least those areas which could be developed quite quickly to excellence levels in order that the groups could be grafted to those bases.

We've wanted very desperately for the research to be from bench to bedside, from the cellular and molecular levels to those areas of research which include not only hospital-based patients but patients within the community or normal people who live within the community. That overall plan received the very strong endorsement of the International Board of Review, and that endorsement was expected in that the consensus within the world scientific community is that that is the direction which should be taken in order to exploit the remarkable levels of information that are presently in our hands.

In order that they be deemed excellent, and therefore have the productivity of excellence, there are a number of steps or achievements which are required by those groups. One is that they consist of first-class, independently capable scientists who are willing and able to work in a collaborative setting. Secondly, those scientists must be able to attract competitively their regular operating grant funding from the national agencies. There's no mystery about that. That is the way in which one determines that the best science is being conducted in the province or anywhere else; namely, that they are able to attract on a competitive basis the necessary funding. A third factor is that they should be able to attract very bright young people for training in research. That is one of the keystones of excellence; namely, that bright, young people are attracted to the scientists within those centres. Finally, in order that one can assure excellence, it is important that those scientists be able to operate in a setting which is intellectually stimulating, in which they have access to state-of-the-art technology.

That being the setting that we wish to achieve, it's interesting to reflect upon the state of progress of our research communities and ask ourselves: how well have we done? The first point that I would raise for you has been referred to by my chairman; namely, that we do believe 200 new medical scientists are an important milestone if combined with the strength that was present in the province of Alberta prior to the advent of the foundation. A serious problem confronted us two years ago when we found it was simply not possible for us to find the laboratory space within the province in which those multidisciplinary groups could be placed. So following discussion with government and finding no other sources of funding for building con-

struction, the foundation provided to the University of Alberta and the University of Calgary an infrastructure grant which totaled \$54.8 million. Those funds were sufficient to finance the planning and construction of buildings able to handle multidisciplinary research groups. Those buildings are nearing completion. The Calgary building has been officially opened. They will meet the foundation's requirements and leave a modest reserve for future expansion. Delightfully, both buildings are on time and on budget.

A number of the proposed multidisciplinary groups are already approved in principle and under way. For instance, at the University of Alberta, a lipid and lipoprotein group, a group of people dealing largely with fat metabolism and especially in an interest in the way in which that leads to hardening of the arteries in coronary artery disease, now has full commitments for a group which can be put in place as soon as the building is available and open. The other groups are proceeding very rapidly, and I would estimate that there will be four or even five groups in place before a 12-month period elapses. That, I think, is a tribute to the leadership which is being provided by the senior administration in the universities on the one hand, and the ability of the foundation to provide stipends, fringe benefits, and establishment grants on the other. Right now there are only a few places in North America where a bright young person can walk into a reasonably equipped laboratory and have start-up funds to put them in a competitive position with the national agencies. It's true that competition is increasing, as other provinces and countries are increasing their investment in medical research in order that they might gain from the technology transfer aspects. Therefore, we are very anxious to exploit the momentum that we have, which so clearly favours Alberta at the present time. That momentum, we were delighted to note, was recognized by that International Board of Review.

We've discussed in previous presentations whether or not Alberta's medical research is recognized in the international community. I would argue that great progress has been made. Alberta is now visited regularly and frequently by eminent scientists from across the world, as visiting lecturers, as visiting professors. Distinguished scientists from the Far East are coming to take sabbatical leaves in Alberta, a phenomenon not known in the last 25 years. The numbers of research presentations which are being made by Alberta scientists has been skyrocketing over the last five years. Similarly, the number of publications stemming from Alberta work and published in prestigious journals has been mounting in a regular fashion over the five years.

We are now competing very successfully for funds from outside the province. In 1979-80, for instance, the University of Alberta was ranked eighth in Canada in terms of the research funds acquired from outside. In 1985-86, the latest date for which we have figures, it's now fifth. It moved from eighth to fifth ranking in the country. The University of Calgary, a smaller school, was ranked 14th in '79-80, and it stood sixth in 1985-86.

The University of Alberta has increased its annual granting by some 200 percent from the Medical Research Council of Canada alone. That question has been raised by members of the committee in the past, and I thought that figure would be important for you to know. Interesting also is the fact that five years ago the University of Alberta, Faculty of Medicine, had but \$90,000 from private industry in support of industrially directed research. Last year it received \$2.1 million.

The University of Calgary's MRC grant total has increased

by 300 percent. It's moved from \$1.8 million to \$5.6 million. The nonfoundation funding in medical research at the University of Calgary in 1979-80, the year before the foundation was instituted, was a total of \$3.5 million, and last year it was \$12.63 million, which is a 360 percent increase. That's over the life span of the foundation.

Since 1979-80 the MRC granting to the province as a whole has undergone a fourfold increase. I've estimated that for every dollar we are investing in the stipends of scientists, we are now receiving \$2 back, which is, I think, a very favourable figure. That external funding goes into the salaries, chemicals, and supplies of the scientific establishment, and that infrastructure and those technologists which are being attracted accelerate the development of Alberta's medical research by attracting a considerable increase in investment from national agencies and the private sector and therefore should become a self-sustaining phenomenon.

There have been three rather striking instances in the last year of grants received in the province which I thought would interest you. Last year a Calgary group in the cardiovascular research area acquired a National Institutes of Health clinical trial award for the management of disturbances in cardiac rhythm. They received \$700,000 for this one award, and the United States National Institutes of Health, in its constrained mode, does not provide grants outside the United States unless they're exceptional applications.

The Canadian ileitis foundation has funded a major training research program in Alberta now, providing \$1.24 million. It's one of only three programs in the country. Very recently the Cystic Fibrosis Foundation of Canada, which has received a considerable increase in stature, has approved a major research grant of \$1.5 million for research into that debilitating component of cystic fibrosis, lung injury.

The point I'm trying to provide you is that there is now a remarkable buildup of outside funding which is being attracted by the foundation's investment in personnel.

I think it's important also, and particularly of interest to you, to know that there is now a considerable increase in funding to medical research from the private sector. It was the concern of all of us early on that if the foundation was put in place with a large amount of money, it might blunt the interest of that kind of investment. Instead, it has not blunted it; it seems to have stimulated it. For instance, there are now five if not six new professorships or chairs being established in the medical schools. They should be in place over the next short period. Over \$3 million from the private sector has been funded in a direct technology-related research investment. Therefore, it is my argument that the multidisciplinary groups are off and running and have every opportunity for remarkable success in the future.

I mentioned earlier that the students and postdoctoral fellows were an important component of whether or not one has achieved excellence. Prior to the advent of the foundation, the numbers of graduate students and postdoctoral fellows studying medical science in Alberta was very small. It was a matter of counting on fingers and toes. But now the province is a recognized major medical research training centre, and it's attracting candidates of high academic standards, more than we can fund, from our own undergraduate programs and from across the major centres of the world. We support some 400 graduate students and postdoctoral fellows annually. Those people play a very critical role in the implementation of the centres of excellence concept. The students, with the energy and excitement,

generate new ideas, aiding the maintenance of the system's vigour, and the fellows attracted from other centres bring new ideas, new technology, new approaches to Alberta's laboratories and act as a kind of constant renewal or reinvigoration of the quality of the science.

The young people are faring well upon completion of their training. They are undertaking career investigatorships in Alberta and elsewhere. Some, and in increasing numbers, appear to be entering industry. We have an active follow-up program to ensure that those newly trained are successful in gaining either further critical training or entering full-time career positions, and we will continue to monitor those programs.

In addition to the success of the graduate medical science students, increased numbers of our medical students are entering research training. As a result, I'm most hopeful that we'll make a very important contribution to a serious national and international problem; namely, the troublesome disappearance of the medically qualified scientist. That scientist is best able to bridge the problems of the patient into the newest molecular and cellular information, ensuring the earliest possible patient benefit. He or she also ensures that the basic scientist is kept well aware of the problems of patients and the importance of research progress. Sixty-five candidates are receiving or have received formal research training from that group.

It was not many weeks ago when a few of us sat around and reviewed the graduate lists of the University of Alberta, attempting to count and identify those people who had graduated and gone on to significant careers in medical research. Over the last recent number of years one could count a handful. Well, we've produced 65 in the last five years. Seven are now funded by our own foundation, in Alberta doing research. That number is expected to increase rapidly.

Recruitment of medical scientists has progressed rapidly by means of applications to personnel programs from both the universities and from the Alberta Cancer Board. The successful applications result in a commitment on our part to the stipends, fringe benefits, and the provision of start-up grants, what we call establishment grants. To the universities the foundation provides additional funds for the scientists' secretarial assistants and a 15 percent payment towards so-called infrastructure costs. The foundation also has provided physical renovation costs and assistance toward recruitment costs. We are also attempting to help out with the medical library acquisitions, the provision of technical workshops, special computer costs, and maintenance equipment.

We have three major programs in that area. One is the clinical investigator program, which is the very young person who has full clinical qualifications but has limited research training. These are the people who, we hope, will bridge that gap between the bench and the bedside to the greatest degree. They are also the people the medical schools and the faculties of science are hoping will provide a sounder scientific education for future health professionals. There are 11 young people now well established in that program. They're in internal medicine, pediatrics, surgery, and some forthcoming in psychiatry.

The second program of seniority was the heritage medical scholarship program, which is designed to provide well-trained young scientists who are entering their careers following their research training and are capable of independent activity. We have 121 of those people; approximately 28, or 23 percent, are medically qualified, again pointing to the importance we attach to having the medically qualified scientist in that group.

The senior program, the heritage medical scientist program,

is for those people who are experienced, proven, capable of providing leadership. We now have 10 of those people, and interestingly, four of them are medically qualified.

The impact of that research strength on Alberta's research productivity has been profound. In some departments of our medical schools a clear majority of the staff is now funded by the foundation, emphasizing the importance of the role of the foundation in the development of medical research in the province. This is more evident at the University of Calgary, only because of its smaller size. This point has been raised before, and I'd like to reassure you that both universities are taking full advantage of the opportunity.

By means of publications, attendance at major meetings, and through guest professorships, Alberta's research is now fairly well co-ordinated into the international effort. Because historically the greatest improvements in prevention of illness have stemmed from basic research, we are heartened by the new strength that we have in the province in this regard. One need only turn to the history of control of infectious disease, and especially the control of poliomyelitis or the remarkable benefits gained from organ transplantation, from coronary bypass surgery, the use of artificial substances, replacement devices to point to the importance of basic research.

A number of outstanding developments may be credited to Alberta scientists, and I would like to call some of them to your attention. In the neurosciences Albertans are now studying a wide range of questions that deal with improved understanding of the chemical and electrical processes underlying brain and nervous system function. The ability to observe one aspect of brain function from the outside world is noteworthy and has received international recognition, including comment by a Nobel laureate. Progress has been made on the control of nerve growth, including the discovery of two new compounds that encourage that growth. A study of these compounds is under way. In a related field we enjoy the presence of very active expertise in the application of robotics to the use of artificial limbs. Newer techniques for motor control that depend upon both sensory and positional information would appear promising to provide better use of artificial limbs with much greater levels of patient satisfaction.

We have scientists working on viral infections of the nervous system, using newer immunological tools that we hope are working on areas that will prove to be the basis for diseases like multiple sclerosis, MS, or amyotrophic lateral sclerosis, ALS. We have scientists who are participating in international attempts to better understand, treat, and control acquired immune deficiency syndrome, or so-called AIDS. There are studies of the use of antidepressant drugs in affective mental disorders, and we are mounting an epidemiological study dealing with mental health problems in Alberta, which I hope will be initiated in this forthcoming summer. There is a foundation-funded scientist studying the lesions of Alzheimer's, and there is established within the Foothills hospital a diagnostic and registry facility that provides a constant flow of assistance to family practitioners in establishing that very difficult diagnosis.

As other examples I could point to the studies of persistence in viral infections, scientists studying both local and foreign parasitic infections. We have a major study in so-called beaver fever, that disease which crops up in some of our communities from time to time. We have a scientist who's looking at ways of better producing beta lactim antibodies, ways of doing it more quickly, more expeditiously, and at lower cost. We have a scientist who's studying the reactivation of viruses after blood

transfusions and organ transplantations, an important problem to our medical community at the present time.

There are scientists attempting to develop vaccines for certain infections such as sexually transmitted chlamydia infections and scientists working with vaccines attempting to control infectious lung injury of the elderly. For example, the University of Calgary microbiology unit now has a very important linkage established with the Wellcome Trust Unit in Thailand. This provides for very rapid assessment of the usefulness of new laboratory findings discovered in Calgary, to the benefit of both Thailand and our own country. That program's been extended to the Tribhuvan Medical School in Nepal, a school that's been supported by the University of Calgary and our province since its early beginnings.

In oncology we have a special effort being made to clarify our environmental and hereditary interaction in the origin and development of human cancer. A number of fundamental studies into the biology of malignancy are in progress, and several scientists are seeking ways to detect more rapidly the presence of malignancy and the ways in which effective drugs might be delivered directly to cancer cells and not smash in and damage normal cells. These studies are utilizing the most modern tools in immunology and radiobiology. One aspect of that program is being actively commercialized at the present in the province.

We have a very important sector of our research addressing problems of the heart and the cardiovascular system. As you know, death resulting from disturbed heart rhythm is not at all uncommon amongst our heart attack victims. Important basic and fundamental studies are addressing the causes and their prevention, but importantly, new drugs are being studied. One novel drug has been identified in the province and is under study in other centres. Basic physiological and biochemical studies are in process to try and explain why it is that those happenings occur.

Through an independent establishment grant we've enabled studies to be undertaken into the potential benefits of traditional Chinese medicine. A direct working link has been established between the University of Alberta and a major Chinese university, and initial studies have already yielded helpful information on drugs of potential usefulness in the lowering of elevated blood pressure.

We have new studies in occupational lung injury which are using a very sophisticated and expensive facility that includes the effects of sour gas, or hydrogen sulphide, on the lung. Another study attempts to control those people who lose life as a result of deep snoring. I never thought that happened, but it does, and in fact now one of our Calgary colleagues has commercialized a mask device which is believed to prevent that unfortunate happening.

We have a number of studies addressing respiratory function in newborn children, including an important clinical trial based in Edmonton and managing information from across Canada. We have studies in human infertility in all its aspects. We have a number of people working in the field of diabetes, two of which are striking and exciting, one dealing with the cause of juvenile diabetes by viral infections and the other attempting to transplant isolated islet cells from the pancreas into the diabetic and hence gain control of blood sugar.

In the leading-edge technology ventures we have a number of developments which I believe are striking and of interest, one of which you're familiar with; namely, the nuclear magnetic resonance imaging device, the whole body unit and an organ unit, which is at the University of Alberta. We've been

delighted that that unit is able now to provide, in spare time, to the needs of patient care in the province.

The use of X-ray crystallography to identify the structure of molecules and how they interact with cells is probably one of the more internationally renowned units in our province. Their next step is into genetic engineering. That looks very promising and has external funding, which is of great potential value to the economy of the province in the long run.

I could go on. There is a whole series of these high-technology ventures which I think are making major contributions; for instance, even one which includes the measurement of human joint dynamics by very sophisticated biomechanical measurements, which is resulting in the redesign of athletic devices, of course based in Calgary, with the Olympics in the offing.

I'd like now to turn briefly and quickly to the contributions that the foundation has made indirectly to diagnostic services and patient care. There is a very considerable number of examples I could provide you. They range from genetic screening for inherited diseases to an international service which identifies the antibodies of an unusual form of arthritis and blood disease, studies that test the presence of visual disorders in stroke and brain tumour patients, the screening for risk of cardiac arrhythmias, the elucidation of gastrointestinal disorders in children. The list is long, and I'll not provide it to you, for the sake of time, other than to indicate that it covers almost the entire range of tertiary care medicine in the province.

Finally, the technology transfer program. We've received and evaluated 47 applications -- 34 were from universities; 13 were from the private sector -- and 17 were funded. From that program we now can identify seven solid-looking patent applications, the formation of five Alberta companies, and a number -- though I'm not sure of the number, probably about 15 -- of licensing agreements which have been achieved through Alberta's universities. We've twice provided assistance to an important medically related Alberta company that was working on very frontier undertakings. We've noted the dramatic increase in private-sector investment in Alberta's medical research and are hopeful that this will skyrocket with the change in the federal legislation.

To conclude then, I'd like to argue that the foundation has played a unique early role in stimulating the interests of the medical academic community and the potential for commercialization, an interest that was simply not there five years ago. Furthermore, I would like to argue that that interest has been nurtured into the formation of Alberta companies and, perhaps more importantly, increased private-sector investment in Alberta's medical research. That program's only a little over a year old, and I believe it augurs well for the future.

Secondly, I would place before you that the universities of Alberta and Calgary and their major affiliated hospitals have become major medical research centres. Each has well-recognized areas of excellence and has the momentum now to become well-balanced, internationally recognized centres known the world over. These centres are now major Canadian research training centres in both basic and clinical research but with abundant room for considerable development of the clinical research programs.

Finally, a point which was not thought much of in the early days. The foundation's programs now are practically the most important mechanism through which Alberta acquires special expertise in tertiary care. This is done through the recruitment of medical scientists highly trained in the sophisticated clinical

specialties. These are clinician scientists who in seeking positions will always search for research opportunity for themselves or opportunity to be closely associated with this research. Only in this way will they be able to keep up with newer developments. In the tertiary care areas this is critical to the long-term quality of Alberta's patient care. As our strength in epidemiology and community medicine research increases, I believe our opportunities to create an attractive climate for practising expertise will also emerge. That should be especially true for geriatrics and ambulatory services.

Mr. Chairman, it's been an almost unbelievable opportunity to have been an Albertan and witness the changes that have been wrought in Alberta's programs over the past five years. It's a pleasure to present this to you for your interest.

MR. CHAIRMAN: Well, thanks very much, Mr. Geddes and Dr. McLeod, for a very exciting overview. Certainly if we weren't believers in the foundation before those comments, we would have to be now. It truly is a success story for Alberta and for Albertans.

On that note I'd like to turn it over for questions, and I'd begin by recognizing the Member for Edmonton-Kingsway.

MR. McEACHERN: Thank you, Mr. Chairman, and thank you, gentlemen, for that excellent overview. It was one of the longest introductory comments we've had, but I don't see how you could have said less, given the amount of stuff you had to cover and the importance of what you're asking us to do.

I've got to admit to being caught a little bit short. I don't have your international review study. It may have come across my desk at some point, but I don't have it. Bob doesn't have it. I don't know if anybody else here does. Anybody else got it?

DR. McLEOD: It was tabled approximately eight or nine months ago.

MR. McEACHERN: I guess that's our fault then.

DR. McLEOD: We can assure you that you will receive additional copies.

MR. McEACHERN: One's critique area is in another area, and probably we set it aside. I haven't seen it lately and haven't dug it out. I guess, with apologies then, I would suggest that while we might talk about the continued funding, perhaps we could ask you -- and also, in view of the short length of time we have left, that we think in terms of having you back again next week or in the near future. Because if you're asking for \$150 million at a time when the budgets are like they are, obviously we are not going to make a decision like that lightly or make a recommendation to the Treasurer lightly. It's a very important thing, and I think requires a lot of time and study. I certainly want to give it its due consideration and not make some kind of a decision . . . Again, with apologies that I haven't reviewed that study, which one should do, and probably ask you a few thousand questions. I've got enough questions about many of the things you raised to keep us going here for another two or three hours, let alone one hour. So with that opening comment, I'll start with a few questions then.

Is it a possibility that this \$150 million -- you were talking last year, I think, in terms of getting it by 1990. Would it be appropriate, in terms of a tight budget and the deficit reduction program that the Treasurer is trying to put in place, to think in

terms of \$50 million this year, \$50 million next year, \$50 million the year after? Is something of that sort an acceptable kind of alternative to a lump sum?

MR. GEDDES: Absolutely. Yes.

MR. McEACHERN: I'm not saying yet that that would be the proposal or that that's what this committee is committing itself to in any way.

I'm not quite sure which of these other questions to swing to. I wanted to get that point on the record first. Then I guess I'll start asking some questions about the specific things going on that Dr. McLeod was talking about.

In terms of the kinds of things that are happening in medicine these days, you mentioned something that twigged a thought in my mind: that you initiated some research into the benefits of traditional Chinese medicine. What attempt is there on the part of yourself or the university -- and I can see how these two institutions have kind of gotten to working together and blended, and I don't know who's responsible for what sometimes. Is there much work being done on the idea of holistic approach to medicine? Could Dr. McLeod maybe comment on that?

DR. McLEOD: Well, it depends a little bit on the definition, but yes, there are a number of people in the province who have committed themselves to a range of medical intervention that I think defines the whole aspect of illness. One can point to the programs, in fact, of faculties of nursing in the province, to the community health science personnel of both medical schools. The focus for their interest is on our ability to intervene and prevent illness. Of course, that's probably where most of us would hope that focus lies.

Unfortunately, there are not large numbers of ways one can intervene. The best example we have before us, of course, is the relationship of smoking and emphysema and cancer. That becomes a question of: how does one influence whole populations of people? It would seem that is being undertaken in a way that might be promoted by medical science but becomes a public issue and a matter for those people who have expertise that are not normally found within the medical scientific community. So the important venture, I suppose, is an ability to link medical science in the way in which it's most readily understood with those people who fall into other professions. I think that is being undertaken, albeit in an early and not very well-formed way yet. But I think the attempts are evident, and I think real progress is being made.

MR. McEACHERN: Well, I guess what sort of prompts that kind of question is the idea that nurses provide most of the active medical care. I think that's a fairly reasonable thing to say. Yet research dollars tend to go into other projects, to the tune of about 200 to 1 in terms of research in nursing care.

We don't really get around very often to doing very much in the way of preventative medicine. You list the building of facilities and having the highest and latest technology and getting highly qualified doctors. Yet I hear a simple thing happened the other day -- we were just talking about it yesterday -- of a back conference being called, and the chiropractors aren't even informed or told or asked to come. So we are, it seems to me, a long way from looking at the whole picture. We're still concentrating on highly technical medicine with highly trained doctors and a very narrow definition of health.

We talk about sick care. I think one of the favourite terms that William Roberts, our critic for health care, uses is that we talk about sick care instead of health care. We think in terms of sickness instead of health. Perhaps you could follow up with a few more comments along that.

DR. McLEOD: I wouldn't wish to argue the case against Mr. Roberts' perception, because it's been my own for many years that we do need to do more in prevention; we do need to do more in behavioral medicine research. The dilemma, however, is that our mandate is to deal with medical research and not the delivery of health care. So anything I would say in the delivery side would be personal and not necessarily reflect the foundation's activities. The foundation is attempting to do what it was that Jonas Salk did with poliomyelitis: that if we can rationally understand how it is that, let's say, multiple sclerosis is generated, and if we can apply the same principles as were applied to poliomyelitis, we can eliminate multiple sclerosis. So the argument from the traditional medical research community is, "Give us the support to understand the disease, with the hope that we will prevent it." That, of course, would be the best solution.

Now, whether or not the productivity and the investment that is made in other forms of research -- that's an open question. It's very vigorously argued all the way across the world. I'm delighted that there is research effort in the nursing profession. I'm delighted that there are increased numbers of nurses who are undertaking research and are being supported to do research. How much further society can move in that direction, I don't know. Unfortunately, basic medical research is such an expensive undertaking. It's a very expensive but very important undertaking.

MR. CHAIRMAN: Calgary-Mountain View.

MR. HAWKESWORTH: Thank you, Mr. Chairman. I take from Mr. Geddes' opening comments that the investments in the endowment fund are managed through the Treasury Department. I wonder if you could give us just a general overview of what might be in that portfolio and how it's generally been managed. Has there been an emphasis, for example, on T-bills and government bonds as opposed to mutual funds or stocks and equity investments, that kind of thing? I wonder if you could maybe also give us an update on its value.

MR. GEDDES: You are quite correct, sir, that I said earlier that Alberta Treasury is responsible for both the investment and custody of the endowment fund, which is set up, as you may also know, by separate legislation. So it's not within our purview to report on that to you.

However, I'm pleased to give you the information that is provided to us, and I can indicate to you that at March 31, 1987 -- which is the period upon which we're reporting this morning -- of a total portfolio having a market value of some \$529 million, some 15.3 percent of that portfolio, or some \$81 million, was invested in common and preferred shares. As of the most recent date that that inquiry was made by us, which was the quarter ended September 30, 1987, out of a market value of some \$481 million the amount invested in common and preferred shares was \$89 million, representing some 18.6 percent of the total. So at the two dates upon which comment is being made, March 31, '87, and September 30, 15.3 and 18.6 percent respectively were invested in common and preferred shares. Of the remainder of the fund, 84.7 percent at March 31, 1987 --

they are distributed across a wide range of investment vehicles. However, by far the largest balance of the investment fund is in direct or guaranteed obligations of the government of Canada. You are correct in saying that consistent with proper investment management practice there are a range of investments, including mid-term money markets, securities, promissory notes, short-term money market instruments, treasury bills, and the like.

MR. CHAIRMAN: A supplementary?

MR. HAWKESWORTH: Yes, thank you, Mr. Chairman. Then is it fair to say -- I'm quickly doing my arithmetic as you're talking -- that the market value of the endowment fund dropped approximately \$48 million from March 31 to September 30 of this year?

MR. GEDDES: Yes. That gives me an opportunity to comment on something of an anomaly. There has been, as you know, I'm sure, a period of great volatility in financial markets around the world over the past 12 months. As it happened, at our year-end -- these quarterly dates have rather fascinated me in my analysis of the performance of our endowment fund -- at March 31, 1987, the Bank of Canada rate at that time stood at 7.05 percent, which was the lowest since 1973. It was the lowest point in 14 years at March 31, 1987, and of course other administered rates are in accordance with that inconformity rather with that rate. So the consequence of an extraordinarily low interest rate structure would be that the market value of the holdings would rise.

In a contrary fashion, at September 30, 1987, only six months later, the Bank of Canada rate had hit 9.60 percent. That rate is over 100 basis points higher than it is today, and in fact by mid-November the rate had declined back to 8.55. So it just happens that we were caught between two very interesting dates. We're talking about March and September of 1987. In March of 1987, the Bank of Canada rate very low; the portfolio very high. In September the Bank of Canada rate rose very sharply; the portfolio would tend to drop in market value. There has, of course, been a significant recovery since that date. That's a function of the very large component of the endowment fund, which is invested in government of Canada obligations, both direct obligations and guaranteed.

MR. HAWKESWORTH: Thank you. Mr. Chairman, I'm not sure whether I'll be able to get back in to pursue this particular question, so I'd like to use my final question to get into a slightly different area and leave others in the committee to pursue this question a bit fuller if they wish.

That has to do with the technology transfer grants and sort of pursuing the value of these technological innovations that we're making in Alberta as a result of this program. I believe you mentioned, Dr. McLeod, 15 licensing agreements and seven patent applications, and I see from the annual report that there have been eight technology transfer grants approved in both phase 1 and phase 2. I appreciated your opening comments on everything; I think you really covered the gamut. I would like you to maybe comment in a little more detail on this particular aspect and perhaps explain to us how funds which are realized through these licensing agreements or sale of technology -- I guess there are other options, including joint ventures, that might be pursued; there are a number of different models that could be followed -- how the money from that might flow back into, let's say, the endowment fund as a way of... We're talking about maintaining that value and ensuring that it continues over a long

period of time. Is there some mechanism to ensure that if considerable amounts of money are generated from these technology developments, somehow they could be flowed back into this endowment fund that was a catalyst for them in the first place?

MR. GEDDES: If I might answer that. There'd be no manner in which the moneys could be flowed back into the endowment fund. There will be mechanisms, which I'll describe in a minute, by which moneys might flow back into the hands of the foundation -- I suppose to the endowment fund.

Speaking first to the licensing agreements, those licensing agreements are entered into by the owners of the intellectual property that arise in the course of commercialization. The owners would be the respective universities, the University of Calgary and the University of Alberta. They would normally, as they have done for perhaps decades, enter into licensing agreements with commercial firms providing for the payment of moneys to the university. That money would flow back to the university and, in some instances, might provide for a share of the moneys paid to go to the individual investigator involved with the matter, a small percentage. So there is not any contemplation that any of those moneys would ever find their way back to the foundation.

As a condition of making our technology transfer grants, however, in virtually each case and having regard for the way in which the university's interest has been protected in the particular application, we have required the repayment of either one, two, or more times the amount of our grant out of successful efforts of the inventor. So it is in that way that we envisage the fund as having some vitality, that out of successful efforts hopefully moneys will be repaid. Hopefully a multiple of moneys advanced will be repaid and used to generate further opportunities.

As a general principle, we take the view that it is the primary responsibility of the institution to make the appropriate arrangements with the scientist who is housed in the institution and who is subject to an academic contract between the individual and the institution. We should, I think, place on the record before this committee the fact that we're very encouraged by the technology transfer activities of both of the universities. Those have sharply increased in the last two years particularly. Most notably, just a few days ago on January 1 the University of Alberta added to its complement Dr. Barrington-Leigh, who will, incidentally, be housed in the Faculty of Medicine and will have the mandate to work on technology transfer matters with respect to the faculties of Medicine, Dentistry, and pharmacy. That's a very important step forward in our judgment. Calgary has a very significant increase in staff complement, and they're doing a considerable amount of work in the field of technology transfer. We think that has something to do with the supportive environment that we've created in this area.

MR. CHAIRMAN: Member for Lethbridge-West, followed by the Member for Pincher Creek-Crowsnest.

MR. GOGO: Thank you, Mr. Chairman. Mr. Geddes, I very much appreciate your overview. I wish to direct some questions to your president. Dr. McLeod is a former dean of medicine and a practising physician and I think understands perhaps better than the chairman the portion of section 3 of the Act, and I simply quote: "and the application of that knowledge to improve [both] health and the quality of health" to Albertans. In other words, I want to deal perhaps not so much with the research that

Dr. Geddes has talked about and the funding side but the application of that knowledge.

Dr. McLeod, you're well aware that the health care costs now are exceeding \$3 billion in this province through two departments not dealing at all with the health element of social services, so I guess in many ways the activities that you carry out as president of the foundation in a substantive way increase those costs. In other words, you do the research and then, according to the statute, you attempt to apply that. So in some ways you're the villain for the ever-increasing health care costs in this province.

I'm very pleased to hear that you're dealing with some of those elements that I, not just as a member of the committee but as a representative of my constituents -- they continually seem to raise with me; for example, Alzheimer's. As you reported, there is something going on at the Foothills hospital in that regard. That obviously is an ever-increasing problem. One only wonders, with the announcement of the government the other day of the Northern Alberta Children's hospital of \$100 million -- and we know, and you know full well, Doctor, that normal hospital operating budgets are 40 percent of capital. Heaven only knows what a children's hospital, in terms of specialty, is going to cost. The Alberta children's hospital is \$1,350 a day in your home city of Calgary. So in many ways what you're doing I think ends up in an ever-exploding health care system. Fine; you're doing your job.

I wonder, with regard to the area of geriatrics -- the medical component or health component of that -- if you could give the committee some indication. I've read the report and I don't see any reference to it. We know, quoting Mr. Moore, our minister, that by the year 2010, I think it is, we'll have approaching 20 percent of our citizens as seniors, and we know that they utilize the system perhaps five times as much as the 20- to 25-year-old.

The first question, Doctor: could you inform the committee as to what is happening with regard to Alzheimer's, both in terms of research and the practical application of that?

DR. McLEOD: Firstly, that's the kind of villain I'd like to be, the one which you painted. To be able to introduce something dramatic to the benefit of the health care of people would be a delightful villainous role. It's someone else's villainous role to deal with, I guess, the impact of that Act, and I'm amongst that group of people who believe that it should be and is possible to deal with those impacts within reasonable dollar investments.

With respect to Alzheimer's, there are two major problems. One is that it's very difficult to say who has Alzheimer's and who has other forms of senile dementia which have been with us for many years. Perhaps much of what we see now and call Alzheimer's was once called senile dementia by reason of an inability to correctly label the losses of memories and so forth. So one of the most important undertakings has been to try and improve the ability of the practising physician to distinguish between the two, because they have different outcomes in terms of time and difficulty, and especially difficulty for families. Presently there is no easy test; it's a clinical judgment call, which means that we need people who regularly see, in a scholarly way, new patients and try and distinguish the clinical triad, or the clinical complex, that is Alzheimer's. So that's one thing that's going on.

The second thing is an attempt to even just know where they are, who has Alzheimer's, and an ability to follow up those people so that one can learn more about the natural history of the disease, because very often historically, natural histories have

pointed to causes. If one can examine the ongoing pattern of a disease, one can sometimes find trails back to causation. So that's important.

The third undertaking at the present is a biological form of research whereby, using specimens from deceased people, they are attempting to learn what is the lesion, how does it progress, is there anything about it that you can identify and in which you might intervene?

There are some trials of new agents. One was summarily discontinued recently because none of the drugs and agents has had a profound benefit. If there's been benefit, it's been a very limited benefit. Unfortunately, one of the newer agents that's been tried has had side effects which are more troublesome than the potential benefit, and so therefore the drug, I understand, has been withdrawn.

At the moment, Mr. Gogo, I would think that's a summary of where it is with Alzheimer's. I currently know of no potential brilliant insight. I know of no one at the present time who has an innovative, unique idea about how to approach that disease. I'm only really truly happy about the fact that some very able people are now working in that area, because five to 10 years ago it was not possible to find more than a handful of people with a diligent attack upon the disease. The numbers are now growing, and that I think offers some hope for the future.

MR. GOGO: Dr. McLeod, for those who believe that your foundation only operates in an esoteric way with research, I simply point to page 12 in your report which deals with quality of life items -- for example, the artificial leg and arthritis. There's a great tendency, I think, to look at you in a vacuum, as only inventing and creating theoretical things, but very clearly that's an application that I'm sure has made the improvement of life for many Albertans much better.

DR. McLEOD: There is a calculation, Mr. Gogo, that the investment made in one of the groups has resulted in life for Albertans who would not have lived, and there is a calculation that that's a significant population of people. There's another calculation that in that same group of people I'm talking about -- those who have disturbance of their heart rhythms -- the quality of life of a larger number of people has been significantly benefited by that investment. So I hope that point is very clear. I estimate that something in the order of 50 percent of our effort now has a patient direction.

There's one other point I would wish to make. Because of the nature of the multidisciplinary groups -- namely, where clinician-scientists, medically qualified scientists, mix with PhD scientists and work on neighbouring benches -- we can at the moment identify 25 basic scientists who are doing significant clinical work in collaboration with clinician-scientists. Now, that's almost unique. In the past, some clinicians would hire PhDs to do research for the clinician, and that normally in the past has not been terribly productive. But now we can identify, because of the nature of those groups, another role for the PhD scientist, which, I think, increases the probability of direct benefit from their actions.

MR. GOGO: Doctor, the fact remains that in my community there's a lineup for two years of those who want hip replacements. But that's not your problem. You perhaps invented that; now it's the problem of the health care system to deliver.

My final question, Mr. Chairman, comes into the area of quality of life as well, and that's pain control. We saw a couple

of years ago, for example, that dispute within the medical community over the use of morphine and heroin for terminal patients with cancer. At the CMA conference held here, I think in '85 -- and Dr. McLeod I'm sure you're aware -- the most vociferous opponents of heroin were members of the Alberta Medical Association; not for the relief of pain, in my view, but perhaps for discipline problems within their own profession. Could you, Doctor, in a very brief outlay -- because I raised this question a year ago, and I feel very strongly about pain control, where so many thousands of Albertans are in constant pain -- update what's happening with regard to research and the application of that with regard to pain control?

DR. McLEOD: Well, I think the major concern that most of us have held for pain management has been the need for a collective examination of the problem and a collective approach to its control. That collective approach required people who were concerned for behavioural work. It required the interests of people like anesthetists. It required neurosurgeons. You can list the numbers of potential participants. The major breakthroughs that I'm aware of in the country have taken place where there has been a collection of wisdom and expertise brought together, and that's happening. That's now present in Calgary and is now present in Edmonton.

In addition to that, there is now in Edmonton an individual who is focusing specifically upon pain control by mechanical devices, by the use of constant injections. There are nurse researchers participating in work whereby patients are provided with the responsibility for self-administration in a monitored system to determine what it is that they do with their drugs under those circumstances. There are, in other words, I think some very significant developments in that area.

MR. CHAIRMAN: Member for Pincher Creek-Crowsnest, followed by the Member for Lacombe, and then the Member for Little Bow.

MR. BRADLEY: Thank you, Mr. Chairman. I would like to congratulate Mr. Geddes and Dr. McLeod for the excellent presentation they've made and congratulate them on the efforts and work of the foundation over the past number of years. I think there's been some excellent results. I'm perhaps coming from a biased point of view this morning: I'm suffering from that malady known as the common cold. Perhaps you've noticed that, and I know that with all the efforts of the foundation they haven't been able to come up with a cure for that particular malady.

With regard to the essential point of your presentation and request that in the future there will be the necessity for an infusion of funds into the endowment -- I think the figure that's been used is some \$150 million, and looking at the year 1990 or 1991 -- I guess from the perspective of the heritage fund the fact that there's been a cap put on in terms of any further revenues flowing into the fund, the fact that we are now moving in the direction of getting close to the 20 percent cap that is put on the amount of spending from the capital projects division, a request for \$150 million, particularly from the capital projects division, may be very difficult for the government to provide at this point in time. I think Mr. McEachern suggested one perspective as to how your funding requirements may be met.

Looking at some of the suggestions you made, looking at spending 5 or 7 percent of the endowment on an annual basis to meet your requirements, is there an option that an annual grant

from either general revenues or an annual grant from the heritage fund to make up that shortfall . . . Just in my own calculations, that would mean somewhere \$10 million to \$50 million a year. Is that the range if we were to go the route of, say, a five-year commitment, 1990 to 1995, with an infusion on an annual basis of \$10 million or \$15 million? Would that meet your requirements to carry out the research program that you have envisioned to maintain that world-class feature of your endeavours?

MR. GEDDES: Yes, the possibility of an annual grant in the fashion you suggest is exactly what I had concluded might be one very proper alternative or choice. I haven't done the arithmetic to come up with the appropriate number. We're in an unusual position. This foundation was endowed with a large capital sum, but as important -- in the view of many, more importantly -- was given a great deal of independence in decision-making. I think that fact is underscored by our appearance before you today in the way that no other manifestation of the Legislature appears before you. So this is the only route that we have, in a sense, to make requests of government or have our progress and financial needs assessed. And so, when I began to look at the particular subsection of the Act which requires that reassessment to be made, I supposed it's implicit that funding would go into the endowment fund. But that's by no means a certainty, from a reading of the Act, and one alternative might well be some type of annual supplementation. Certainly an understanding on the part of the Legislature as a whole of the consequences of adopting one policy or the other is important as well; that participation in the making of that decision, if it were consciously agreed that a spending rate, perhaps higher than that which would be prudent, is adopted -- as long as the consequences of that are understood -- and following that would be the need to do something on an annual basis at some time down the road. But I'm glad you have raised that issue, because it has given me the opportunity to perhaps make an extended reply that touches on two or three other related matters.

MR. BRADLEY: Well, I thought perhaps that option might provide you with the ability to maintain the endowment in the long term, and a five-year period may be sufficient in terms of the future revenues of the province. We may be in a different position in terms of surplus funds at that point, that a further larger endowment might be able to be provided to you.

In terms of the report of the international review board and their recommendations to continue a commitment of funding -- I think it was in the area of 200 positions or scientists endeavoured -- does that seem to be the critical mass which would maintain the effort as being a world-class research effort? If the other options we looked at -- perhaps we're not able to proceed with an annual grant or an additional endowment at this time. Over time, I would see there would be obviously a fewer number of scientists being able to support it. What would be the minimum effort you'd be looking at, and what would that mean?

DR. McLEOD: Well, I think the 200 figure, Mr. Bradley, arose from the discussions on the importance of groupings. It's emphasized by, for instance, the Cancer Board -- the cancer people; let's say that. The cancer people are looking at a group that could become highly effective, where the probability of benefit would be increased -- and independently; I mean, we haven't influenced that discussion. It's interesting that they come up with the kinds of figures, the kinds of numbers of scientists you need for a group to really have the momentum to attract the out-

side funds to permit continuing operation. I think it's sufficiently well worked out that my own bias would be to maintain the foundation's expenditure toward the 200 at the expense of other programs, and that of course brings in the whole difficulty of pruning programs that are well established, have momentum, have spirit and enthusiasm. So my feeling is that we should continue to work toward the 200 because of the importance of that number against those groups.

MR. BRADLEY: Okay.

Finally, Mr. Chairman, obviously the primary goal of the Heritage Foundation for Medical Research is in the area of medical research and improving quality of life. There's obviously -- and there's been some illusion to that today -- the Member for Calgary-Mountain View asked about technology transfer. I'm particularly interested in commercialization of the research work you've been able to undertake so far. I know it's very early in terms of the number of years the foundation's been operating to actually see solid results in commercialization, but could you perhaps give us some examples where commercialization has taken place as a result of your research? Has there been an emphasis in particular in terms of the people who come here? Obviously, one of the benefits I would see as a member of the Legislature is that we see some commercialization taking place here in Alberta. Has there been an emphasis with these scientists in terms of this technology transfer and commercialization that it could take place here in Alberta? I'm thinking of pharmaceuticals. You've mentioned robotics and other medical equipment, et cetera.

MR. GEDDES: Well, there have been early indications of success in a number of areas from those who have received the technology transfer grants leading to formation of corporations. I speak more directly about events at the University of Alberta because I'm more closely in touch with those. I could indicate that perhaps one of the earliest recipients of technology transfer granting, Dr. John Tulip -- who happens to be actually sited in the Department of Electrical Engineering; nevertheless he's received the largest amount of technology transfer funding from our foundation -- has moved to quite an advanced state in his work. He has developed surgical lasers that are used in endoscopic surgery as well as a dental laser which has a very distinctive feature in respect of miniaturization. He has moved to form a corporation in this province called Aurora Lasers and is moving well along the commercial curve. The devices are in use in surgery, and it remains for development of wider markets for that product.

Another of our early technology transfer grants went to Drs. Hodges and Parker at the University of Alberta, who are doing very important work in synthetic peptides. They have moved to form a company called SPI, Synthetic Peptide, and they are also in the stage of attempting to develop a network of international markets and secure funding.

Another recipient of technology transfer funding was Dr. Ronald Micetich. He has perhaps been one of the most successful university investigators in history, in this province at least. He has successfully arranged for the movement to Edmonton of a very significant portion of the total research effort of Tai Ho Pharmaceuticals of Tokyo. Two companies have been formed here, and there are now as many people working in the R and D companies in Edmonton as there are in Tokyo of this very large and important Japanese pharmaceutical company.

We've had a modest association, I might say, with Raylo

Chemicals, also a recipient of our technology transfer grants. As you know, they received a great deal of press coverage with respect to work done in Azidothymidine, AZT. Most recently, within a matter of days in fact, important publicity has been given to their work in being the company chosen by the National Institutes of Health in the United States to produce a very important compound called DDA, which is another compound used in AIDS.

So those are examples of some of them. With a program that's only been active for two or three years, I am very gratified by what has happened to date. There is a new climate in our Alberta universities, a new feeling of encouragement about the formation of companies, the development of industry based in this province. It's something that we are in principle very, very supportive of and would hope that with the activities that have been undertaken at the universities -- and I mentioned those significant investments by the universities in technology transfer resources, in both Calgary and Edmonton, with the availability of our grants. We're quite hopeful that results will be very encouraging.

Do you have anything further to say, Dr. McLeod, about anything I might not have touched on?

DR. McLEOD: No. You've used good examples. There are others.

MR. BRADLEY: Thank you very much.

MR. CHAIRMAN: Member for Lacombe, followed by the Member for Little Bow.

MR. R. MOORE: Thanks, Mr. Chairman. Gentlemen, as usual, you've given an excellent overview of your work. I don't think there is any Albertan that would say it wasn't a very, very worthwhile endeavour. However, it all has to be paid for, and that's what you're here talking about.

I have some concerns in this area, inasmuch as we have now assembled a great number of academics and researchers of world class here. Unfortunately, those individuals cost money; they're very expensive. They live in a little isolated world, away from the world of reality and the economies you and I and the citizens of Alberta have to live in. It bothers me to have people come here and say, you know, here's Alberta providing them with the best facilities -- state of the art, you have said, and I'm sure they are. We're opening another facility, you say, a \$54 million one in Calgary, shortly for these people. I often wonder: do these people really have any concern about what it costs the citizens of Alberta? To me, an average citizen, I think they're out of touch with that. I think the average citizen knows what we've lived through in the last two or three years and what we're looking at ahead. We aren't out of this recession yet, and yet we see this go on and it bothers me.

MR. GEDDES: Well, it's difficult, I suppose, for both Dr. McLeod and myself to tell you what's inside the minds of these people. I could indicate just a few things, and I'm sure Dr. McLeod will give a more full and more complete answer.

These talented young men and women are in a whirlpool of scientists. They have other career opportunities. We regard ourselves to be very blessed to be able to attract them to Alberta at this time, having the ability to provide them with the appropriate kinds of facilities. One thing that is quite striking is that the stipend levels paid to our young scientists are not extraor-

dinarily high; they're in the same ballpark as national granting agencies. I can assure you that on a human scale, whilst they might in some sense live in an isolated world scientifically, they live in the same world you and I do and they have the same daily problems you and I do. They have difficulties in many instances in providing a proper life for themselves and their families on the sorts of stipends we're able to provide.

So I would simply say that what we're dealing with, largely speaking, is a commodity, and I hope that isn't taken as being too impersonal a reflection on it. They are people who could be attracted to other universities, to other cities, to other places. Their careers would flourish in many other settings. We regard ourselves as very lucky to be able to attract them to this province, hopefully to integrate them into the fabric of life here. We know how enthusiastic they are when they come to our province and how grateful they are for the opportunities provided to them to work in a province with the sort of environment that we have.

That's perhaps all I should say, and it might be that Dr. McLeod has . . .

DR. McLEOD: Number one, I would like to point out that the moneys that were provided for buildings were for two buildings, one in Edmonton and one in Calgary.

At the moment the other point that went through my mind was that we're about two-thirds of the way, I would think, toward the total numbers of the critical mass we would hope for. But beyond that, I would argue that I don't know a clinician that isn't part of the real world. I mean, he or she still has to see patients for part of their time. At least 40 percent of the people we're funding are, you know, regular, active participants in the real world in that sense.

I would certainly underscore the enthusiasm of their approach to their work and their citizenship in the province. It's very strong because of this opportunity that's been presented to them as young people.

MR. R. MOORE: Well, Mr. Chairman, I certainly think they should be enthusiastic, with the facilities we're providing them. Really, that's incentive. They can maybe pursue their professions in other universities, but I don't think they'd have the facilities and the climate that we have here.

The other thing coming on this funding end . . . I just brought that up because I see so many people asked to reduce their expectations for funding and so on, people in other professions. You and the doctors know. We're having a battle to hold that down. I'm just wondering if these people aren't just sailing; that's the concern I have.

Where's the federal government in this, in the funding? Alberta's done a tremendous job. We provided a large fund to start with; we gave you the independence to operate. It benefits not only Alberta but all Canada and the world, as far as that goes, what results from this. I think Canada benefits just as much as Alberta from this in world prestige and so on that we're all so proud of. What's the federal government doing? Are they coming in matching our funds or anywhere near it, or are they even interested? Or are you pursuing them to match the Alberta funds?

MR. GEDDES: I think Dr. McLeod alluded to that in his presentation. The growing amount of funding that is coming to Alberta from national granting councils I think was referred to. Would you like to . . .

DR. McLEOD: Yeah, as I mentioned earlier, the Medical Research Council of Canada -- which is the major instrument through which the federal government provides support -- their investment in Alberta now is 200 and 300 percent greater than it was when we started. The overall is a fourfold increase. Now, the other figure I was intrigued by was that for every salary dollar we put into scientists, there is now about \$2 coming back. So in that sense the federal government is making a fairly direct role. They obviously are also involved in whatever the arrangement is for the funding of advanced education between the provinces and the federal government, because they participate in the overhead costs by whatever that formula is, with which I'm not familiar.

We were very anxious about the federal role in the support of research, because we were concerned five years ago that with the advent of these kinds of moneys, perhaps the federal government and its agencies might find themselves less interested. I'm delighted to say that as far as I can judge, the funds flow according to quality of the research. If the quality is there, the Medical Research Council of Canada is providing the funds, and that's evident in the increase that's being provided. Now, it's important that that continue. That now, of course, is the greater part of my concern. How does one ensure that that continues? We are very anxious to ensure that our scientists have an equal access opportunity to any pharmaceutical funds that come about in support of research as a result of the change to the federal legislation. They are here and most of the larger pharmaceutical firms are in eastern Canada, so we're very anxious to ensure that our scientists have equal opportunity.

MR. R. MOORE: Well, I'm glad to hear that, Mr. Chairman, because usually, as soon as the province takes over something, the feds back out an equal amount. Usually they say, "Well, fine, the province is in there; we'll just withdraw from here and let them take over rather than let the province complement federal dollars." So hopefully you're going to keep the pressure on the federal people to keep some flow of funds into this, because they benefit too.

MR. GEDDES: We're very sensitive to that problem, and we can assure you that it is very much at the forefront of our thinking at all times.

MR. CHAIRMAN: Member for Little Bow, followed by the Member for Ponoka-Rimbey.

MR. R. SPEAKER: Mr. Chairman, to Mr. Geddes and Dr. McLeod. As I see it, our responsibilities in the committee are twofold. One is naturally to appraise the program, and secondly, to look at funding. Addressing the first responsibility, I want to say -- and I refer to your earlier remarks, Mr. Geddes, the fact that you made the presentation here so well back in '85 and '86 and again today, and as well, Dr. McLeod -- that I'm very enthused about the program. I see that the program at this point has reached maturity, where all of a sudden it's starting to function as you want it to function and you can see that certain results are possible. In the earlier presentations you weren't just completely sure as to what interactions could happen to maybe distract us from the first ideal goals that were established, but I see a somewhat mature organization at this time, and I compliment both of you gentlemen for that on behalf of my constituents and Albertans. I'm sure the medical community has placed the accolades properly in your direction as well.

I want to say this. Since your first presentation with regards to additional funding, as members of the Legislature we often carry certain burning problems in our repertoire in our minds. I must say that's been one of the questions that sat in my mind over the last two to three years, saying we haven't answered that as a Legislature, nor have we really addressed that question, I guess partially because of our funding capability and a bit of the uncertainty that has gone along in terms of the Heritage Savings Trust Fund and the General Revenue Fund as well. I believe it is time that we address that. That's the second responsibility that we have here.

I do appreciate that you've made yourselves available to the committee and given us the information as readily as you have. Government, from my experience over many years, doesn't always react to the positive in this type of program and the good benefits that are provided to its citizens. We are often crisis oriented -- I'm sorry, Mr. Chairman, I'll try and be short -- or we react to put out a fire of some kind at a point in time. I would think your presentation earlier was very positive in terms of the elements of the program, which we needed here. But what I'd like to ask you to do, Mr. Geddes -- and I think this would assist us as legislators to address the question and also maybe hasten the addressing of the question in terms of funding -- is just in a short set of points summarize the worst scenario or the worst set of consequences that'll result if the \$150 million is not provided by that 1990-1991 date that you said on your first remarks.

MR. GEDDES: I would take it that if that were so, there might be some indication that the foundation were to be capped. You see, we started this foundation with a very clear appreciation of what was said in debates in the Legislature. We recall very clearly the comments of the then Premier Lougheed, who outlined the concept that the \$300 million would be applied to the purpose of the foundation -- I was just looking a day or two ago at his actual comments, the appropriateness of that sum of money, which was only an approximation; it was not an exact determination that that was the correct amount of funding -- and at the end of six years, there would be an opportunity to reassess it and take such actions as were necessary to place the appropriate funds at the disposal of the foundation. So we have operated in our spending with that kind of understanding, that between the foundation on one hand and the Legislature on the other, there was that implicit understanding that there would be a re-examination of the appropriate funding mechanisms on into the future. As a result of that, we adopted certain spending policies which even at the end of March '87 have left us with an endowment fund with a book value of some \$430 million and with a market value of those assets at \$529 million. We still get to there under certain spending policies.

Now, if we take the position not to supplement the fund in any way, either by the manner which Mr. Bradley alluded to earlier or by a further allotment out of the heritage fund, there is some kind of signal there that the fund is in some sense capped. Then we have a different kind of problem facing us. We have a finite sum of money. It is not like a university endowment fund, for example, which is replenished by gifts from alumni and other sources. We have only this finite sum of money, and we then have to take cognizance of our responsibility to the Legislature, which is to carry on a program of medical research into the future, almost in perpetuity. We have a fixed, finite sum of money with which to do that, and we then have to take into account very long-range considerations about inflation and about

protecting the integrity of the programs. We would have to start adopting conservative spending rules which would see us spending 4 or 5 percent of the market value of the endowment.

As I said earlier, we are presently making commitments on into the future for five years, and we'll continue making them at our meeting next week and so forth. We are continuing to make expenditures, and it's not possible to reverse those commitments very soon. So it's going to be a difficult and painful task for us to cut back to the sorts of spending rates that would be appropriate in the worst-case scenario, which I think, Mr. Chairman, is what you are painting, a worst-case scenario. We would then have to fall back into a very defensive mode, and clearly we could not envisage any further growth. Indeed, there would have to be a trimming back of the programs as we now see them.

The consequence of that in the short run would be demoralization. We deal with a community of people who are already faced with a great deal of insecurity and instability in their lives, because we didn't make a great deal of the fact that these people have to compete in a national forum; they have to compete for their operating funds. [interjection] Yes, and as Dr. McLeod reminds me, most of them do not have tenure at the university. Their job security, if one wanted to use that word, is somewhat tenuous, and so to place these other concerns into the system would have very serious results. It would make it very difficult to bring new people into the province, and new people are required all the time. It would be a very sharp reversal of what we've seen in the past. Right now there's a great deal of enthusiasm, and any department head at the University of Calgary or U of A would tell you that. There's a sense of excitement and challenge that young people are coming to a province that has had the wisdom and foresight to put mechanisms in place that create opportunities for good careers here.

MR. R. SPEAKER: Two very quick questions? One?

MR. CHAIRMAN: Quickly.

MR. R. SPEAKER: We'll have to look at options in terms of funding. One of the funds that does have some money at the present time in surplus is the lottery funds. Are you in any way adverse to that? [interjection] So you have no concern about source, eh? All right.

MR. GEDDES: [Inaudible] in that regard. I don't think our constituents are either.

MR. R. SPEAKER: Good. Just as long as there's security with it. That's the main thing.

MR. CHAIRMAN: It comes with money.

Mr. Geddes and Dr. McLeod, I want to thank you very much for once again appearing before the committee. It was an excellent morning. It was extremely informative and obviously very stimulating as well in light of the number of questions that were asked.

MR. HAWKESWORTH: Mr. Chairman, is it possible that over the weekend or in the next few days you could ensure that copies of the International Board of Review's report is available to members of the committee?

MR. CHAIRMAN: Sure, we can track that down as quickly as possible.

MR. GEDDES: You received a report, did you?

MR. CHAIRMAN: Yes. I would again remind all members that we reconvene Monday at 1:30 p.m. in room 312.

[The committee adjourned at 12:01 p.m.]