stifles the hopes of Canadians who want to benefit from that science and technology. We must evolve towards the betterment of our society.

Of course, efforts are being made. But what do we do, for instance, at the university level to encourage research? I have a document in my office, that was tabled here in the House, and which inevitably brings us to pose very serious questions on that point. In any event, Mr. Speaker, I express the hope that the minister will not only propose to the House a meaningful policy encouraging the support, financial and otherwise, of scientific and technical research but also consider with his government the methods which will enable human beings to live in spite of automation, since, as I said before, automation is here to stay. On the other hand, I feel that this minister must create an image in this House to prove his seriousness with regard to the administration of his department and particularly public works.

● (1620)

[*English*]

Mr. Frank Maine (Wellington): Mr. Speaker, I wish to draw the attention of hon. members to the critical position Canada is in as an international trading partner. This situation has come about because of the nature of our exports and imports. Canada has been able throughout her history to maintain a favourable balance of trade through the exportation of raw materials, products which contain no high technology input. Since the second world war agricultural products and raw materials have been forming a steadily decreasing proportion, not only of Canadian, but also of world trade.

Regardless of what we do in Canada, there is no doubt but that the world will orient itself toward the production of goods which contain a larger component of knowledge relative to the components of materials and semi skilled and unskilled labour. This trend will be accelerated as it becomes increasingly important that we moderate our use of natural resources.

An examination of Canada's past performance in technology intensive industries and of recent trends in our economic development is not particularly encouraging. First, on a per capita basis Canada is among the world's leading net exporters of raw materials and among the leading net importers of manufactured products.

Second, of seven technology based industrial sectors identified by the OECD as being of primary importance, Canada has the largest over-all net trade deficit of the seven taken collectively, and also the largest, or almost the largest deficit in each sector taken individually.

Third, of 12 minerals in which Canada ranks as one of the world's leading producers and exporters in the ore or primary refined forms, it is a net importer of the fabricated or processed forms in ten cases and a net exporter of the fabricated forms in only two.

Fourth, among OECD countries only Ireland has a smaller proportion than Canada of its work force employed in the secondary sector.

Fifth, among ten countries compared by the OECD for their performance in technological innovation, Canada ranked in the tenth and last position.

Sixth, Canada has a huge trade deficit in the category of management and technological services. Our deficit of trade in business services in engineering oriented industries is over $1 billion per year. Another indication of the extent of our dependence upon technology imports is in the findings of a study by the Professional Engineers of Ontario in which they report that Canada literally imports millions of pounds of engineering drawings each year.

In addition, recent trends in industrial research and development expenditures indicate that our industrial technological capability may be declining. Since 1969 research and development expenditures in Canadian industry have remained essentially constant at about $400 million per year, resulting in a substantial decline in the research and development to sales ratio. This has occurred during a period when the federal contribution was increasing. Industry's share of the gross expenditure on research and development has been declining steadily, from a high of 44 per cent in 1965 to 35 per cent in 1972, the latest year for which figures are available. Canada spends from two to five times less on industrial research than do the major countries of Europe, Japan and the United States.

It is this industrial research and development with which we must become concerned, as opposed to government and university research and development, because that activity is more readily translated into dollars and cents, thus increasing our gross national product. Our prime goal, therefore, should be to translate more of this research into commercial practice. There are two major impediments to accomplishing this in Canada on a large scale: the nature of the ownership of much of our industry, which is dominated by foreign controlled branch plants; and the lack of venture or risk capital available.

The best way to sell new technology is to solve a customer's particular problem. This is a very expensive and time consuming process involving trials and the development of prototypes before any sales occur. The area of market research has attracted little government consideration until recently, although the importance of this component of the innovation process is self-evident. There is no sense in performing the basic research and development if this work is not eventually going to be translated into earnings.

● (1630)

As I mentioned, the fact that Canada has a branch plant economy provides a large part of the answer to the present unfavourable trade position we find ourselves in with regard to high technology content products. The proportion of foreign ownership in the higher technology manufacturing industries places a severe handicap on the re-orientation of international trade, the goal toward which we should be striving.

Although it is true that much technology is transferred to Canada by foreign-owned subsidiaries, this technology almost always follows its development by the parent company in a foreign country, thus severely limiting our potential for world leadership in that area. While this is particularly true when research, development and design remain in the control of the foreign parent, recent experience with the United Aircraft Corporation shows the