

The Address—Mr. Scott

the other day, namely the science of cybernetics, and its god and symbol, the electronic computer. Computers, for about a dozen years, have been doing amazing things. The progress in this science is so rapid that the first computer built 10 or 12 years ago is now on display at the Smithsonian institute as an historical relic. For the first time, these great electronic computers are able to replace human memory and human judgment. At the present time in the United States there are 20,000 in operation ranging in size from a small desk to a six-storey office building. The market potential last year was \$3.5 billion, whereas 10 years ago it was \$10 million.

These great electronic calculating systems perform tasks at fantastic speeds. They store information at the rate of 100,000 characters a second; they hold more than 100 million numbers; they are built to perform 10 billion operations without error. A recent article in the *News of the World* put it this way:

Computers are tools that get neither tired nor bored. They can solve, in minutes, problems that would require a lifetime of work by several scientists.

Computers at the social security administration in Baltimore keep track of 160 million records. In the memory core of one computer in New York city are stored more than a million law case references. A computer just installed at the national library of medicine, near Washington, D.C., is storing up medical reports by the tens of thousands and will issue regular indexes.

Computers are versatile. Some are at the heart of factory automation, cranking out orders to "slave" machines. Others make electronic data processing possible in business and industry. More and more, computers are performing such feats that they are being compared to real brains.

What are the employment implications of this huge revolution? If it is true that the service industries are going to have the same problem as the production industries are having, then there is not going to be a market for employment that many of the experts thought as few as four or five years ago. Let me give you a few examples. The federal department of health here in Ottawa processes three million family allowance cheques a month in 286 man hours instead of 15,000 and with the use of two clerks instead of 120.

Lord Halsbury of British national research says that one computer equals 100 clerks working for one year, and every \$5,000 worth of equipment replaces one clerk. The United States census in 1960 used 50 statisticians instead of the 4,100 in 1950. Then, this illustration will interest the members of my profession. It is a new computer law clerk. It can do in 10 minutes what it would take a law clerk seven hours of research to accomplish. In a recent demonstration a computer analysed 400 laws from 50 states and gave full statistics and citations in relation to them. The American Telephone and Telegraph

Company estimates that revenue from long distance telephone calls placed by machine will be larger in 1970 than from those placed by humans. The Radio Corporation of America has a computer under design to take voice translation and type it with such accuracy it will jeopardize the jobs of a million and a half secretaries.

I could go on endlessly giving examples of the fantastic technological change that is coming, not only in industry but in the service industries as well. My last remark will be this: It is going to get worse. The new computers for 1964 are described by Dr. Edward Teller in this way; they will become teachable, acquire experience, form judgments, develop emotions and take initiative. He believes that the machine can be given the power to make valued judgments as well as logical reasoning. What the physicists themselves are trying to do, he says, is simulate and surpass human intelligence. A surprising number of people believe they will succeed.

Now, Mr. Speaker, I have raised this problem this afternoon because, in my judgment, the technological changes in our production industries and service industries are going to hit Canada in the very near future. They will bring with them a wave of change. If we are prepared for it, if we are ready to meet the problem, it may be possible to meet the changes which it will introduce. I think it will change the nature of our lives and our society. It will force us to remould our whole ideas of training, of education and perhaps of the quality of life itself. It will force us to decide to make use of the leisure which we are likely to get on an unprecedented scale. We do not need to be afraid of it if we prepare for it intelligently. If we integrate it wisely, if we make the massive effort necessary now to harness it to our own development, then, we can hold out hope for progress and affluence undreamed of a few years ago, and ultimately leisure on an unprecedented scale.

However, Mr. Speaker, if this great technological revolution is left to work itself out as is the case in free enterprise societies, then I think we will have just enough automation to create widespread unemployment, but insufficient to make the great technological breakthroughs which are necessary to open new industries and new markets. We should be beginning now to plan ahead to try to decide what Canada is going to look like 15 years from now, what industries are going to exist, what jobs are going to disappear, who is going to have to be retrained and what kind of skills are going to be necessary. Then, we must project this back into our present planning, into our educational system