1961 INTERNATIONAL CONFERENCE ON MACHINE TRANSLATION OF
LANGUAGES AND APPLIED LANGUAGE ANALYSIS

OPENING ADDRESS

by

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I BID you all a very cordial welcome to the National Physical Laboratory
which, besides being a national laboratory for standards, for which it is
best known, does in fact, as you see, devote a good deal of its effort,
over 80% of its effort, to the application of physics to industry. For this
purpose we hold at least two symposia of this type each year. The very
first of these symposia was held in 1953, on the subject of Digital
Computers. I think, you will realise that at that date, digital computers
were probably in the same state as machine translation today. Two years ago
we held a conference on The Mechanisation of Thought Processes. This week's
conference follows in direct succession to that one and we hope to develop
this theme in the next few years by holding conferences on Character
Recognition and Adaptive Control. Note that these are in fields which are
just emerging and are not really practical yet from the industrial point of
view and a great deal of basic research has to be done. Most of this is
still carried out at universities. One of the functions of the National
Physical Laboratory is to provide the essential link, between universities
and industry, or, in the words of its founder, between theory and practice.
   In this connection I would hope that the universities in Britain and
other countries will devote much more attention to the subject of machine
translation. It has had a most promising beginning and I might say to the
representatives of British universities here that the Department of
Scientific and Industrial Research, of which we are a part, can finance
universities, and we ourselves, in a more limited way, can make grants to
universities.
   My first reaction to mechanical language translation is that the
political solution is so much simpler than the scientific one. Let each
country adopt a common second language in its educational system - prefer-
ably English. This has in fact happened in practice in many countries (I
think some of the Scandinavian scientists write better English than the
English scientists) but there is little doubt that the trend is now in the
other direction. For instance, in India, which really had English as a
common language, the political decision now is that Hindi will be the
common language. Latin and French nave had their day as intermediate
languages and, although English will still be a second language for many

peoples for many years, I think we must be realistic and face up to this problem of mechanising language translation.

   Now as the Director of a large laboratory which is always short of funds, one of my constant problems is in deciding how to allocate the inadequate resources that we have to the various subjects. I have had to think a lot about the effort we put into machine translation. I am told that there are now about 20,000 scientific journals in the world and to translate them all into one target language at ¾d. per word (the current cost, in Britain, for Russian to English) would cost about £20 million per year, and a rough estimate for the translation of books indicates rather more than this. Now you may say that we do not need all of these journals and books translated, but probably a reasonable figure for translations that we should be doing is about £20 million per year. However, even if we had the money to pay the translators, the translators are not there. In the United Kingdom at present we can only find enough people to do the abstracts of Russian papers, not the papers themselves. So there's a very real problem here and although machine translation, like space research and nuclear energy has become very fashionable, because it catches the imagination, I think there are two important differences in rating it against these other subjects.

   Firstly, in space research, the economic return is much more doubtful. I think that there isn't any question about the economic return in mechanical language translation and, of course, the cost is almost infinitesimal. I have some figures here; I don't know whether the United States would confirm them. We believe the United States is spending about 2 million dollars a year on mechanical language translation and, on the other hand, is spending about 2000 million dollars a year on space research. So there's a factor of a thousand to one.

   If we think of a comparison with nuclear power, which has also had a great deal of publicity and a great deal of money lavished on it, in Britain at any rate our experience has been that nuclear power has turned out to be much more expensive than we had anticipated. You may say that the same thing is going to turn out in machine translation; it is going to turn out to be far more expensive. I would think not, because it is done by computers, and I suspect that computers are going to get a bit cheaper; more and more of them are being used. So I think we're on fairly safe ground there. The other reason that turned the Nuclear programme sour was the cost of conventional power-stations has turned out to be very much less – the cost of producing power by conventional means has gone down a great deal in the last 10 years. I think that machine translation needn't worry about this. You're competing with a human being and one thing that is certain in the economics of this world is that the cost of human beings doing things goes up all the time.

   So on these grounds, I'm fairly happy to see that we do support this. It has a very justifiable place in our programme and both nationally and internationally I think more effort should be given to it; and of course, the problem's becoming more urgent, because, as you all know, the literature

of science doubles every 15 years or so. In Britain at present we translate about 20 million words of Russian to English per year, and I believe all the English-speaking nations do between them about 100 million words, and yet this is only 4% of the Russian scientific literature. So we are very, very far behind.

Now what is the progress so far? I have here, no doubt many of you will have seen it, what I believe is a more-or-less word-for-word translation done by IBM of a Russian newspaper - actually, the speech which Mr. Khrushchev made on the U2 flight*. It, of course, is not a good translation and I've no doubt that you, as professionals, would all criticise it pretty strongly; but to me as a non-professional, I find it extremely valuable and extremely interesting. I can get the full drift of what Khrushchev said - even the jokes come through quite well.

For some purposes this would do. I've got an estimate as to what this might cost but unfortunately I haven't been able to find Dr. Gilbert King this morning to check it with him, but our estimate of what it costs to do a word-for-word translation just based on computing time is about 1/60 of a penny per word. I mentioned earlier that the figure for the human translator is ¾d. per word. Now how much more is it going to cost before we get a really good translation? We don't know, but I suspect it'll be much closer to, say, 1/20 of a penny per word, perhaps a factor of 3 increase over the 1/60 of a penny per word. So, compared with ¾d. per word, there's at least an order of magnitude, perhaps even 15 or 20 factor of advantage in the economic cost that you are setting out to try and obtain for us. Your main problems I gather are really in syntactic analysis. The reading machine problem I gather is practically solved and the additional cost due to that will not be great. Of course, finally you've got your reconstruction into the target language. The problems are not easy, I realise that in reading some of the papers, and also that the whole subject becomes quite, at least to me, abstruse. In fact I might almost say that you have created a new language of your own, and hope perhaps that you will arrange for machine translation of that language so that I'll understand what you're doing. I'm sorry that I cannot be with you for the rest of this morning but I hope to look in from time to time and I now wish you every success with your conference.