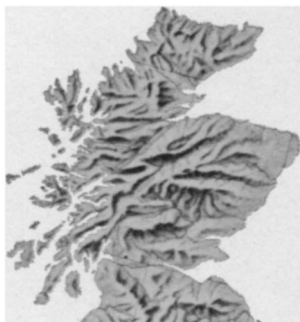## letter from Edinburgh

The computer in Europe

Nations and firms struggle to catch up in the field that symbolizes the technology gap

More than any other single non-military item, the computer has become the symbol for Europe of the so-called technology gap separating it from the United States. Despite the expanding European computer industry, American computer technology and marketing are still major forces here, and the 4,000 delegates from 40 countries meeting for the third Congress of the International Federation of Information Processing were aware of the slim prospects of catching up.

Such one-sidedness was not always the case. During the decade or so following World War II, British development of computers also was substantial. The British Government sponsored the design and development of computers for scientific testing, measuring and making mathematical calculations. The technology was competitive. But when computers leaped into the commercial market in 1960, Britain, like the rest of Europe, was left behind.

In 1960 International Business Machines produced its "1400" second-generation series, which signaled the take-off of commercial computers in contrast to the smaller-scale scientific machines. Taking advantage of its broad research base, as well as of its already-existing network of U.S. subsidiaries in Europe, IBM (soon to be followed by other American firms) established a lead which it has never come close to relinquishing.

Currently, IBM is estimated to fill more than three-fourths of the world market in computers, and seven other American manufacturers have substantial shares in the remainder. The U.S. is the richest market, and seems a greater inspiration to corporate growth. More than 42,000 computer systems were in use in the U.S. by the end of 1966, compared to fewer than 8,000 in Western Europe and the United Kingdom combined.

This does not mean that the non-U.S. computer industry is sitting on its hands.

By far the widest area of discussion at the IFIP meeting was new computer applications—a particularly vital topic to the European industry as it seeks to enlarge its market. A special panel was convened to discuss the interaction among users, designers and manufacturers, a problem on a continent of small nations trying to spread technology back and forth across national borders.

The realization of the need for expanded computer development is not new. In 1964, Britain's newly-established Ministry of Technology selected computation as one of four areas for concentrated development. A National Computer Center at Manchester and three regional centers were set up, and mergers within the industry were not only tolerated, but actively encouraged.

When English Electric-Leo-Marconi joined Eliott Automation, the resulting billion-dollar concern was, and still is, the most formidable computer contender in Western Europe.

From here, computer marketers are looking to the east. Czechoslovakia alone has already ordered more than $3.6 million worth of hardware. (Some observers, in fact, believe that Czechoslovakia may have gone so far as to shelve its own infant industry and accept instead dependence on British computers.) Britain has also made significant inroads into Poland and Bulgaria, with sales totalling some $16.8 million and expected to climb.

East Germany, on the other hand, has struck a more nationalistic pose. The country produces one of the more sophisticated computers in Eastern Europe, the Robotron 300. Yet the machine is considered relatively slow, especially for a second-generation design. East Germany seems content to ignore this, and plans to market the 300 not only at home but in the rest of Eastern Europe as well.

The true potential of computers, however, many at the meeting feel, will be realized by broadening their applications and by enhancing the art of programming. Development of software might also offer Europe the means of improving her position vis-a-vis the U.S. In France, for example, at least half a dozen software concerns are operating in the million-dollar bracket. More importantly, they are gathering vital experience in systems programming, in new kinds of compilers and in better usage of real time systems through development of such techniques as process control and message switching procedures.

Many European groups are concentrating on time-sharing, or multi-access systems, believing this to be the key to the next phase of computer development. The University of Edinburgh, for example, is working toward enabling computers to handle tasks for more than 200 remote terminals.

Political, technological and economic barriers will have to be overcome to give Europe the computer boost it needs. As the IFIP conference vividly demonstrates, efforts in this direction are becoming increasingly vigorous. The political problem remaining, however, is that each nation has pursued an independent determination of priorities, resulting in fragmentation of effort. To present a successful counterpoise to the U.S., Europe will have to cohere these fragments more effectively than it has. Without cooperation, the Continent may fall even farther behind.

The solution, Europeans feel, can't come too soon.

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