

Data Entry

MIKE ALDRICH, Director, Marketing, was a guest speaker at the DEMA International Conference in San Diego, California, on 31st October. Mike Aldrich is a chartered member of DEMA. He read a paper on Data Entry and Distributed Processing in Europe and the Third World, highlighting the different levels of implementation and approach around the world. He was the only U.K. guest speaker.

To commemorate the conference the State of California declared November 1st "Data Entry Day."



DATA ENTRY and distributed processing are standard applications for mini and micro-computers in different parts of the world.

My purpose is to highlight some of the differences in user attitudes and implementations of these applications in three areas of the world outside of Continental North America.

While data entry and distributed processing are standard applications, it is interesting to note that they

are most widely used in the advanced Western Countries as supporting elements in the overall computerisation of information processing in Government, commerce, industry and finance. In the advanced Western Countries, computers are intrinsically bound into the fabric of society. Without computers, the standard of living would fall for the majority of people. Computers represent the second industrial revolution. Western civilisation is computer dependent.

Western Europe has followed the United States closely in data entry development. Card punching predominated in most countries although the U.K.

States. There were some indigenous products but their success was limited.

Data entry in Western Europe is very much the same as in the United States. Work is mainly carried out in centralised punch room environments and productivity is measured specifically for each operator. Pay is generally related directly to work rate. Ingenious work measurement arrangements have been devised for fixing pay and productivity rates for most complex tasks.

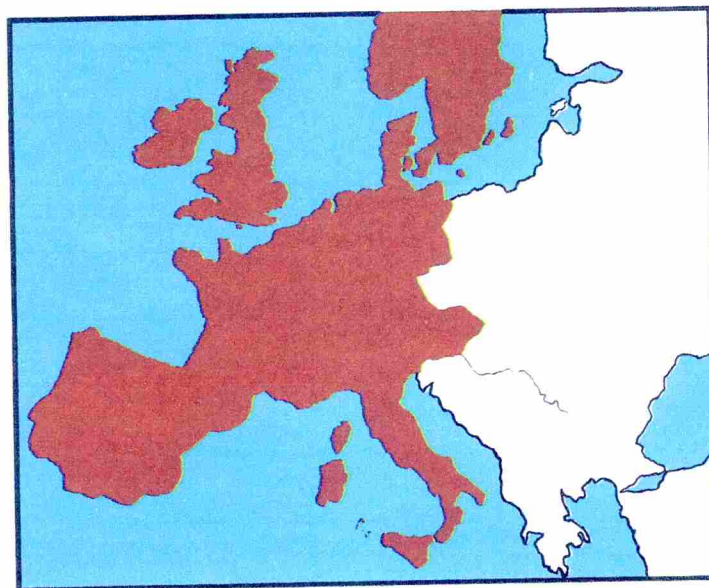
In these centralised data entry facilities operators and equipment generally work in excess of one shift. The average is probably 1½. Bureaux will often work two

inclination to devise systems to reduce keystrokes.

Recent years have seen, however, a noticeable trend away from verification towards validation and a trend to locate terminals or keystations outside of the punch room, usually back in the user department. Both changes indicate movement away from the traditional data preparation concepts.

Decentralisation of data entry is a strong force for both emotional and practical reasons. Siting the keystation in the user office directly involves the user in the computer activity and makes the user responsible for the accuracy of data entered as well as the scheduling of the work. The drawback is that the productivity of the operator, usually a clerk in the user office, is a fraction of the punch room operator. The disadvantage is to some extent off-set by the enhanced job satisfaction and efficiency of the clerk and the correction of errors at source. The value of the information processed has become more important than the encoding costs.

There is, in my mind, a somewhat hazy distinction between decentralised data entry and distributed processing. Most of the systems we ship to customers interface to another computer via a telephone line, use typewriter style keyboards rather than 029 keyboards and do some local processing. Their prime function, however, is data entry. Is this data entry or is it distributed processing? The distinction is also made more



for historical reasons continues as a sizeable user of paper-tape punching equipment. Key-to-tape and key-to-disk were technologies and products mainly imported from the United

shifts. Three shift working is rare.

There is a growing awareness that punch room productivity is not a measure of input system efficiency. But there is as yet little

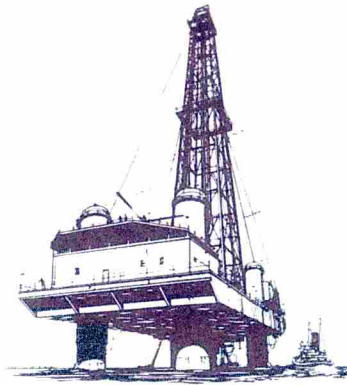
difficult because of the widespread use of validation, file access to look-up records and extensive local printing.

Whatever it is, it is being widely installed in Western Europe.

If we take distributed processing to mean that 80% of the processing is done locally, we find that many data entry systems are being used as distributed

writing more complex validation and processing programmes. New techniques are appearing to provide on-site training for new operators to counter the ever present problem of staff turnover, using the intelligence of the computer to control and pace the learning of the novice.

A new development in data entry in Europe is the



A third OCR device is the OCR Wand reader — a pistol shaped device for reading individual fields of machine print. These are connected to keystation terminals. One of the applications is on the North Sea Oil Rigs. As passengers disembark from helicopters on the rig heli-decks, they go into a small office where they run the Wand over their name tags to register their presence on the rig.

If Western Europe has some way to go towards computerised data entry, Eastern Europe has hardly started. In the West, the development of key-to-disk and key-to-tape was triggered by the advent of powerful computers with voracious appetites for data. In the West, these appeared in the late sixties and early seventies. In Eastern Europe, they have appeared only recently.

Eastern Europe uses few Western computers. An indigenous computer industry exists and thrives. The Russians, the Poles, the Hungarians, the East-Germans and the Czechs build their own computers within an overall model strategy, called the Riad Plan. Within this plan, no provision had been made for a locally produced data entry system. Poland therefore took a manufacturing licence



processors. While the equipment is virtually the same for both applications just about everything else is different. The distributed processor is installed in a normal office away from the disciplines of the punch room. Data control and job scheduling are in the hands of a clerk with little or no previous experience. The control and scheduling are often rudimentary. Even keyboard familiarisation is often non-existent. Whereas a key-to-disk system, in the past, would be installed in a punch room with minimal effort, installation of a distributed processor in a clerical office and the commissioning of the live application system are projects of some magnitude.

Perhaps at some time in the future punch rooms will disappear and punch operators will become the supervisors of distributed processors, transferring skills and disciplines to clerical workers.

In the interim, the data entry systems are daily growing more sophisticated. New software, new high level programming language capability, new file management techniques and new data communications protocols are extending the range of applications that are possible. Punch room supervisors once adept at format programming are now

concept of the Total Data entry system.

This is basically a multi-terminal key-to-disk system with a high speed OCR page reader as a peripheral.

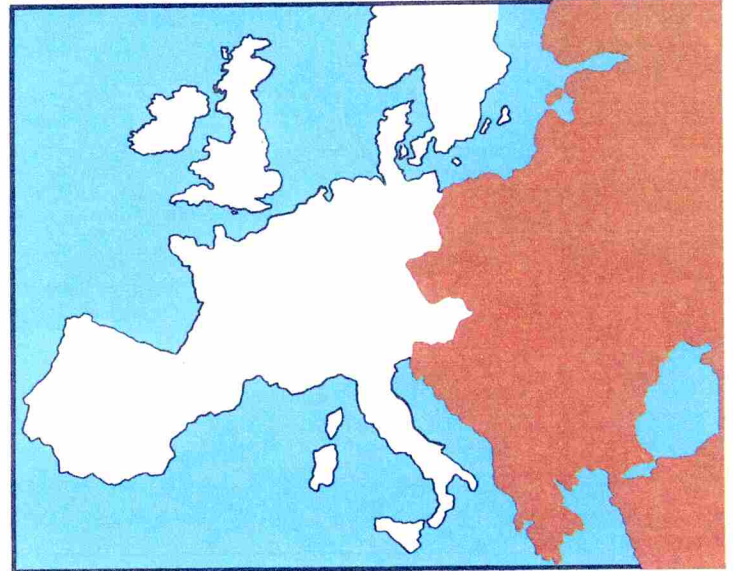
Documents are loaded into the OCR reader, and scanned line by line. Machine prints — OCR A, OCR B for example may be read or hand print can be read.

Once the documents have been read the data is passed to the disk on the key-to-disk system. Here operators can access data to correct any characters that the OCR reader has not been able to read.

The productivity of these Total Data Entry Systems is excellent. One of our OCR systems has a document read capability established by benchmark, equivalent to 50 key-to-disk operators producing 18,000 kdph.

The value of the system lies in its ability to be multi-purpose — Reading pages through OCR, basic key-to-disk, and data communications via IBM, Burroughs, Univac protocols to other machines, and the ability to insert and correct data, that the OCR reader cannot handle, from the key-to-disk terminals.

Another system, less sophisticated and less expensive has a productivity equivalent to 25 operators working at 18,000 kdph.



We foresee significant growth in this field of Total Data Entry.

While the data entry system has made heavy inroads into the high volume data preparation sites the overall penetration is small. In the U.K. for example, there are four electro-mechanical punch devices in use for every one keystation.

In Continental Western Europe, with some 60,000 installed keystations, the ratio is still about the same. Data entry has yet to embrace fully the era of electronics. Thousands of operators are in need of liberation from their noisy old punches. Card chips rather than potted plants dominate the work environment for most workers in data preparation.

with a U.K. company to build and market data entry systems and their product subsequently became part of the Riad Plan. Western Suppliers supply data entry systems to Eastern Europe, but not in great volume. Strangely enough, the most installed Western computer system is a U.K. produced data entry system.

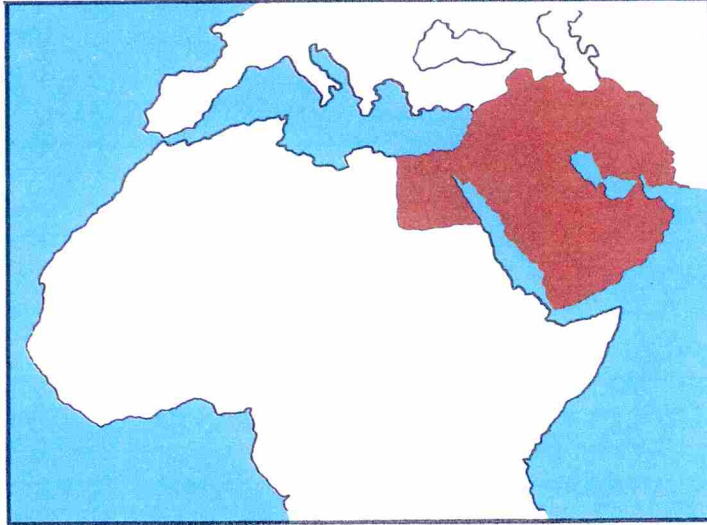
Installations of data entry systems in the Socialist countries are different. Two shift work is usual, three shift working is common. Equipment utilisation is very heavy.

Applications undertaken on data entry systems tend to be much more complex. The prime directive is to squeeze every possible ounce of productive work out of the system. I know of systems

doing processing jobs that one would hesitate to attempt on reasonable sized mainframes. Operation of these applications is usually inelegant, but the job somehow gets done.

In classic data entry applications the productivity of the best operators equals the best anywhere in the world. Bearing in mind that the work conditions are much poorer and that incentives rarely exist, this is a surprising situation. However, the percentage of marginal performers tends to be high. Punch room organisation is along the same lines as in the West. Knowledge of machine capabilities tends to be much greater. In Eastern Europe the users are interested in the system software and application potential of the equipment. Generally the equipment has been imported for hard currency and represents later technology than that locally available.

The user is determined to achieve the maximum benefit and normally has, in his organisation, skilled computer experts with good



theoretical training who are eager for experience with relatively high technology. They take the view that the data entry system is a mini-computer that runs a data entry application and can be used as a stand-alone computer — a notion that some Western users have recognised of late.

One other noticeable difference is that users invariably do their own maintenance. They employ engineers, often of a very high standard, who are trained by the manufacturers for the full range of preventative and remedial maintenance work. Spares

are purchased from the manufacturer. User knowledge of the system is thus far from superficial.

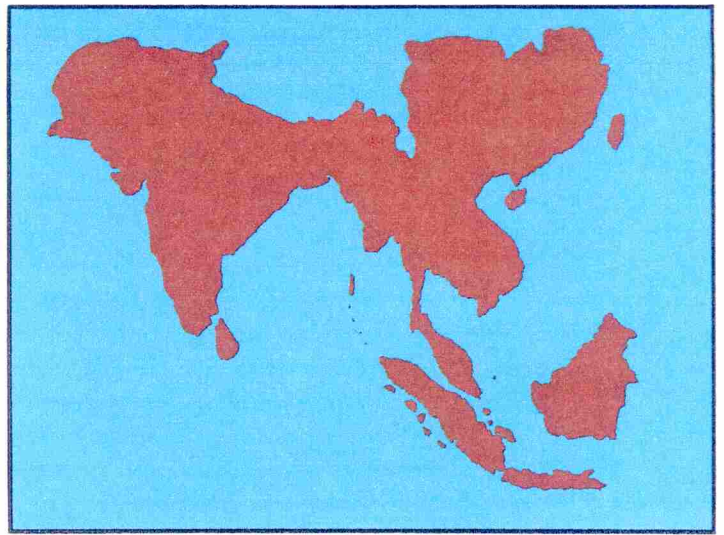
Eastern Europe is only just entering the era of computer-dependence. The industrialisation of the post-war era is being increasingly turned towards consumer goods and improvements in social infrastructure. Improvements in productivity capacity and the focus on quality and cost, demand better methods and improved productivity. The need to generate hard currency to pay for imports and repay trade credits compels the Socialist countries to seek the efficiency needed to compete in world markets with Western suppliers. Computers are a necessity.

At the same time, social pressures in states with entrenched bureaucracies force attention on reducing paper work and removing frustration. Computerising the bureaucracy is the next best thing to doing away with it.

Distributed processing is a long way off in Eastern Europe. The pre-requisite for

distributed processing is good telecommunications facilities. While much attention is given to improving voice communication, data communication is a secondary concern. The locally built mainframes do not have sophisticated communication software and the strategic embargo prohibits the sale of fast modems readily available in the West. The prime interface between data entry system and mainframe is still the magnetic tape. Cassettes and diskettes are less widely used.

For the Western supplier, business in Eastern Europe is difficult. Penetration of the



individual country markets is slow, trading is very different and contractual negotiations are always onerous. On the other hand, users are enthusiastic and innovative. Their exploitation of the total capabilities of their systems is impressive.

At this time there are probably 15-20 card punches in use for every keystation. It is unlikely that ratio will change substantially over the next few years.

If Eastern Europe has hardly started with data entry and distributed processing, the Third World (excluding Japan) must be in an embryonic state. It is wrong to generalise but certain trends are plain to see.

The Third World is in the pre-computer age. Where money is available the prime concerns are alleviation of hunger, poverty and the provision of housing and education coincident with changes from agrarian societies towards industrialisation.

The more societies move towards industrialisation and embark upon infrastructure development—water, electricity, roads, railways, ports, airports, telecommunications et al—the more they need computers.

The big difference between East/West and Third World is that the Third World needs to go faster. There is a race to catch up. The rich Third World countries have the money to race, the poorer ones can only watch and wait.

For the rich, the game is leap-frog. Bring standards of life up to the levels of the West and then leap ahead with investment to secure the future. Computers have a key role to play. They can

automate that which lack of skills cannot even organise or mechanise.

Education has made the Third World aware of the gap. In poorer countries such as India theoretical education in computers is excellent. Access to high technology products however, is limited for foreign exchange reasons. Data entry and distributed processing systems have a role to play. Technology leap-frog avoids mainframes and concentrates on mini and micro-computers, tomorrow's products which coincidentally are also less expensive. High technology data entry at this level is attractive to buy. The systems themselves have immediate and practical use. Because their software is sophisticated they lend themselves to wider use. The relatively low-cost enables numbers of systems to be purchased which can be used for familiarisation by large numbers of people. The technology transfer process can begin, and the Third World jumps the learning curve of the West in the advanced use of computers and misses the first industrial revolution in favour of the second.

The prime users in the Third World are Government, banks and the new industrial organisations. Because central Government is usually the instigator of social welfare programmes to attack fundamental problems and therefore require computerisation for fast concerted action, the computing expertise in a country often resides centrally. Decentralising data entry can then serve to distribute computer expertise relatively quickly. The same consideration applies to

banks and industrial organisation.

Distributed processing, however, is a non-starter. The telephone lines often do not exist. There is rarely enough expertise to put processing capability at the local site. Time factors are not critical. Information in the past was gathered and processed slowly. Now it can be done in a few days or weeks — a quantum improvement.

One of the differences in data entry system usage in the Third World compared with East/West is in the operators. Womens' liberation has not reached some of the more remote parts of the world. The operators will often be male, and the productivity will be very different to Western standards. But then these operators have never known a keypunch.

The achievement of the rich Third World is nonetheless remarkable. In one generation people are changing from peasants to computer operators. The social, cultural, educational and technological gap is being closed. The process, however, is necessarily slow for the majority of people.

The data entry system in the Third World is rarely a replacement. It is often the beginning. The user and the operators join the computer revolution in the late seventies. For them the computer is the symbol of a new and better life.

Data entry and distributed processing systems operate in the normal work environment — the office, the factory, the store-rooms. These systems are used by people who are not computer experts. The systems are tools, aids to improving efficiency.

In the advanced industrial societies the use of these tools is an evolutionary process replacing older technology. In the Third World, it is more of a revolutionary change.

The rich Third World countries can afford to import technology and skills to transform their societies. The poorer countries can afford neither.

There is no solution in sending superannuated card punches to the Third World. The need is for the

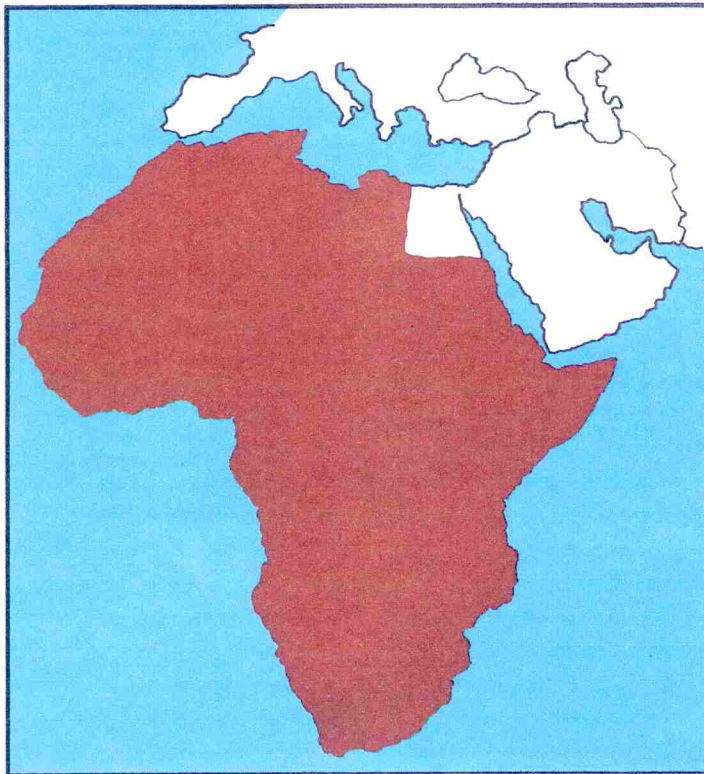
latest and the best, which are often the cheapest.

Since the second world war, we have seen the industrial modernisation of Eastern Europe helped

considerably by Western Trade credits and loans. Arguably, those credits have done as much to keep the peace as all the military spending. The standard of living gap between East and West is no longer expanding.

Similarly in the poor Third World, loans and credits are needed to bridge the rich/poor gap. In time, that gap will come to dominate our thinking just as much as the East/West situation.

The significance of data entry and distributed processing, is that they are the hall marks of advanced societies. When they become, as they eventually will, world-wide phenomena, we can then be confident that the computer has been harnessed to the service of mankind. For in the hierarchy of computers, data entry and distributed processing systems are the computers nearest to the people.



THE next General Meeting of SEARCH will be held on Wednesday 6th December, 1978, and will include the Redifon 'Open Day.'

The first SEARCH meeting of 1979 will be on Wednesday, 21st March at the Albany Hotel, Birmingham, at 2.00 p.m. A Meeting Room has been offered by Couchmeads (Consultants to the Computer Industry) who are organising Computer Market 1979 at the Hotel on 20th to 22nd March inclusive.

If you would like to know more about SEARCH and what it can offer you, then please complete the following details and return to: Gil Lewis Esq., Rolls Royce Limited, Parkside, Coventry. Tel: 0203 27666, ext. 232.

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