

THE POTENTIAL ROLE OF THE COMPUTER ON THE NURSERY

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Computers have been in existence for over 50 years, but only within the past five years have they become cheap enough to play a part in the running of small businesses. Computing power that would have required a room full of electronics some ten years ago is now available within a unit no bigger than an electric typewriter. Cost, as well as size, has dropped dramatically, and complete small-business computer systems can be bought for as little as £1500. In the past, only a few large corporations could justify the cost of a computer — usually well over £20,000.

New technology is the key to the changing face of the computer industry — and especially the development eleven years ago of the first microprocessor. By using the descendants of this rather slow and ungainly (in comparison with modern equivalents) device, computer designers have been able to produce small, versatile, and powerful machines which have been dubbed “microcomputers”. Such is their popularity in business areas that the new generation are being designed as pieces of office furniture, and acquired the new name of “Business Computers”.

Whatever the technology, a computer is only as good as the programme it is running. In the past, computer programmes were like the computers they were written for — large and expensive. Programmes for large present-day computers still are, often costing tens of thousands of pounds. However, with the micro-computer came a similar revolution in programming — mass production and large markets allowed sophisticated packages to be sold at relatively low costs, just a few hundred pounds down to as little as ten pounds. Payroll, sales and purchase ledgers, letter and document production, stock control and invoicing are applicable to the majority of businesses and therefore have a vast market. Many such packages written for microcomputers have become available cheaply and the numbers are still increasing.

More specific business areas began to appear profitable to programme writers. Estate agents, solicitors, garages, and doctors all have their own custom-built packages and more will doubtless follow. But what of horticulture in general, and plant propagators in particular?

The computer as a management aid. Any small business, and the nursery is no exception, must consider the possibility of using a small computer to aid with management tasks and general running of the office. In some areas, because of the irregular nature of work on the nursery, a computer would be of even more value than to a factory or an estate agent.

For example, payroll packages can include complicated overtime allowances and casual labour — working out tax, National Insurance, etc. without danger of wrong calculation and with a great saving in time. Accounts can be automatically produced in the correct format for auditing or use in planning. Computer-based invoicing can save much confusion, and keep an eye on credit limits and payment times. Word processors can produce catalogues, catalogue updates, newsletters and advertising leaflets of excellent quality and in large quantities without resort to commercial printers, and can also make business communications look very professional — something that must not be overlooked in a competitive market. All these programmes can be bought off the shelf — or can be supplied as a complete system, together with computer and printer. Their cost is low — anything from £50 to £400 for a sophisticated programme, or about £4000 for the complete computer system plus a selection of business programmes.

Of the “general use” programmes, the one I have not mentioned is stock control. This poses a problem for the nurseryman, but also offers perhaps one of the most exciting possibilities for using computers on the nursery.

Stock control in general business is usually more simple than on the nursery. A small manufacturer may produce a hundred or so items — these can be handled easily with a small computer. A nurseryman may produce four or five hundred cultivars — not only that, but he may sell them at four or five different ages, and each age will have a different price. This means the computer will have to be bigger, and therefore costlier, and the programme is less standard and must be modified or even rewritten — again a costly procedure. The computer is pricing itself out of usefulness.

Another variation of use to the nurseryman would be the ability of the stock control system to categorise plant types and, if necessary, suggest alternatives that may fill the customer's requirements. In other industries this rarely happens — if a buyer wants a pump of a certain capacity or physical size, it's no use suggesting he buy one nearly the same size and the same colour, whereas if a buyer requires a *Cotoneaster simon-sii* for hedging, it may be that *Cotoneaster lacteus* would suit his purpose just as well.

Invoicing and credit control is best linked to stock control, and advertising discounted lines could be done at the same time.

Planning with computers. Farms have enjoyed access to planning programmes for some years now, and even market gardens have benefitted from a computer-planned planting and labour-use schedule. Nursery stock production is less fortunate, and again the reason is the variable nature of the industry. A farmer can punch in his acreage, whether arable and livestock, and out come several options over a five, ten or fifteen year period that detail crop types and times of planting and harvesting, expansion and labour needs. If this were applied to nursery production, all growers would soon be producing the same five or ten species and, of course, this is neither practical or desirable. However, in the more generalised field of economic planning, the nurseryman with a microcomputer can use such very sophisticated planning aids as the Visicalc package which can be adapted to handle many forecasting parameters, and can instantly perform, "If x changes then what happens to y?" type calculations. To apply it to a specific example, it could help a nursery manager to decide whether to sell off a line as small plants, or allow them to grow on for a year or two to become specimens. Allowances could be made for labour input, space costs, etc. The cost of this type of programme is as little as £100.

Nursery mechanisation and the computer. The new technology of microprocessors has also been swiftly adapted to other situations and, for the nurseryman, one of the most important applications is in the area of mechanisation of the nursery and environmental control. The computers involved in these applications are not only the sophisticated "business" computers, but also smaller units, also based on microprocessors, that can carry out a specific task repetitively and accurately.

Electronic controls for propagation equipment have been with us for years, but a small microprocessor unit could control multiple functions, such as misting devices, underbench heating, and drip irrigation. It could also take into account many things a simple electronic device could not, such as the amount of sunlight and the need for irrigation sequencing to avoid low water pressures in main supplies. The more sites of control, the cheaper microprocessor control becomes in comparison with older electronic devices. Irrigation of outside areas can be similarly governed, using information about soil moisture and sunlight to decide upon sprinkling or irrigation of soil-planted species.

Nurseries with large areas of polythene tunnels or glass-

houses can benefit by use of a computer control system for protected environments. These systems can provide much better control of growing conditions for the plants, and can integrate all control functions within one machine. They can also make use of fuel for heating more efficiently. Dutch glasshouse control systems have been available for five years now, and this year has seen British computer control systems for greenhouses arrive on the market.

At Wye College, we have developed a protected environment control system based on a microcomputer used widely for office work, the Commodore PET. Our machine controls the commercial glasshouses at Wye College, which include pot chrysanthemums and tomato growing areas. Adaptability of the system allows us to put not only environmental conditions under the control of the computer, but also CO₂ levels, thermal screens, automatic irrigation and hydroponic systems. Future additions could include mist propagation units, supplementary lighting and screens for daylength control, and nutrient mixing and distribution through drip irrigation systems. As the system incorporates a weather station, it may in the future be possible to predict high-risk periods for fungal diseases on outside-grown crops.

Control systems are more costly than office systems, not because they use larger computers, but because of the installation costs and associated hardware (such as sensors) that go with them. At present, a small control system for greenhouses costs around £5000, but larger systems get more economical compared with older electronic systems.

Small computers are best at doing one thing at a time, and separate systems are probably the wisest choice if both office and control functions are considered.

Plant propagators and computers. There are many nurseries that would benefit from computer systems that are available now, in terms of efficiency, office work, and possibly control applications. Many other nurseries may benefit from waiting until more specific packages become available. However, these specific packages will only become available if computer programmers and package designers are approached by nurserymen and told that a market exists. Standardisation of nursery practices will also play an important part in making computers more applicable to the industry, as standard operations are much easier to include in computer programmes than non-standard ones. Standardisation is appearing in certain areas — size bands for pricing lines, propagation and growing-on methods are all becoming less magical and more organised. Only a very large company can afford to have a computer consultant write a purpose-built programme package

— but other sources of programmes exist. Universities are an obvious place to look — if an interest can be created there, then both University and nurserymen can benefit. The Government itself has launched the MAPCON scheme, which in some cases gives grants for both development of microprocessor-based systems and consultations by possible users of such systems — this area should be exploited to the full by the nursery industry.

Fears are often expressed about cuts in employment where computers “take over” jobs previously carried out by the labour force. So far in horticulture, we have not seen this happen. In the office, the computer allows some areas to become more efficient and less arduous, or else accomplishes things that were not previously possible, and in the control field the computer replaces either electronic or mechanical devices, work that was not done manually anyway.

To sum up, the commercial plant propagator must now consider the use of computers for both office and control applications, and must exert pressure on the relevant institutions or industries to produce more specific computer-based products for his own needs. Whatever happens, the computer will continue to infiltrate the industry, and the plant propagator must take advantage of this versatile and useful tool.

T. WOOD: You were speaking of rooms full of equipment being reduced to a desk console. Does one still need clean air? We, in the nursery industry, work in a very dirty environment and could not get away from dust and sand.

J. VARLEY: It can be a problem. In the Wye glasshouse unit we have built a small room, which is isolated but not air-conditioned. The dust does not affect the computer, but does the data storage facilities such as disc storage. While not actually needing air conditioning, it does need a relatively dust-free environment. This does not apply to the control equipment.

**A COMPARISON OF CONTROLLED AND SLOW RELEASE
FERTILISERS FOR THE ESTABLISHMENT OF
LINERS UNDER GLASS.**

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This trial, winner of the Student Project Award 1981, was carried out at Hadlow College, Kent.