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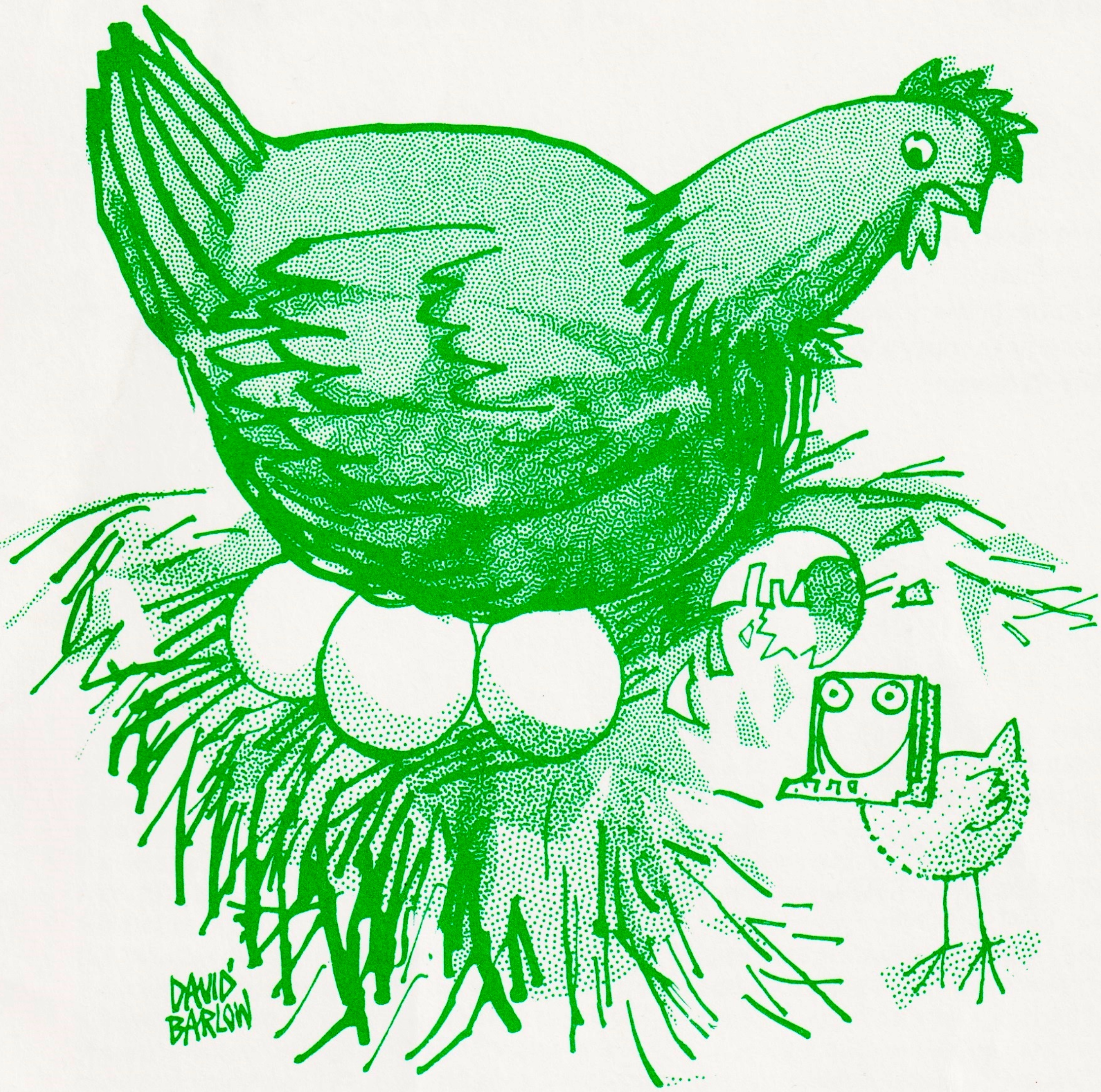

MICRO SCOPE

Newman College with MAPE

Contents

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Editorial

The DTI sponsorship scheme for primary schools has finally ended. The majority of schools have taken up the offer and now have at least one micro – yet this does not imply that the micro is being used correctly. In fact the majority of schools fall into one or more of the following categories, each designed to forestall the imaginative use of the hardware. Firstly there are those schools that still struggle on with a cassette recorder; if we had wanted to make the adoption of micros difficult for teachers then this primitive device would have taken the Oscar. It is a great credit to many teachers that they have persevered, but they should never have been asked to. I recommend that all schools should update to a disc drive today!

Secondly there are those schools who don't invest in software. Would you buy a car and not put petrol in it, or build a school library and not put books on the shelves? The hardware does nothing without good software to drive it, and that software is now available, (although many teachers can't see the wood for the trees). Has your school got a powerful information retrieval package, a word processor, a full version of LOGO, a couple of comprehensive simulations and a couple of imaginative adventure games? If not, why not – that list is sufficient to keep a micro fully occupied for the whole of a school year and represents an investment of between £100 and £200, and even less in authorities which purchase licences.

Finally, there are those schools who mismanage the resource, simply because they have adopted a policy of fair shares for all. If Mr Jones has the micro between 9.30 and 11.30 every Monday morning, and every child must have a turn, is it surprising if nothing worthwhile is achieved? It's a much better system if teachers bid for block time on the grounds of the educational value of what they plan to do with the micro. If children are to maximise the potential of a simulation or adventure game we must give them the resource for a substantial period of time.

The lessons are there. If we are using inferior hardware with virtually non-existent software, and allocating teachers unrealistic periods of time, we shouldn't be surprised if the micro is collecting dust in twelve months alongside the programmed learning machines. The potential is enormous – we have been helped to acquire the hardware – let's start reaching for the stars!

Roger Keeling
Vice Chairman MAPE

* * *

MAPE policy has always been that special issues are distributed to those people who are members on the day the address labels are printed. Also MAPE has no back issue service. This does mean that MAPE Tape II is no longer available to individuals. Local education authorities will be offered the opportunity to buy a licence for both MAPE tapes later this term. Further information about this will be included in the next edition of *MICRO-SCOPE*.

* * *

Final reminder! The MAPE Conference will take place in Cheltenham from March 29th (late afternoon) to March 31st. Details may be obtained from Reg Eyre, College of St. Paul and St. Mary, Cheltenham, Glos GL50 2RH.

Letters

AI, IT and child development

As one of the organizers of the recent conference AI (Artificial Intelligence), IT (Information Technology) and Child Development, I read your report of the event with interest. There is no disputing the conclusion that it was not the success one might have hoped for. However, I am left feeling the spirit of the enterprise still needs to be reinforced; your report provides a further stimulus to this, for it did display alarming symptoms of the very kind of single-mindedness the event was intended to challenge.

The stated aim was to bring together people working in artificial intelligence, in education and in developmental psychology so that we might reveal and explore our new areas of common interest. The catalyst was to be a programme of invited theoretical papers and submitted research reports. I believe it was the first attempt to gather the disciplines in this way.

Now I overlooked your reviewer's casual ascription of the event to a non-existent organisation, but when I saw the title had also been re-written to give precedence to 'Information Technology', then my 'factional interest' detectors went on alert. Sure enough, we soon read complaints about contributions that did not have relevance to education: '. . . certain delegates would rather have been sitting in the sun!' And why not? If at the same time they took advantage of discussion with some of the diverse people who attended – maybe to consider what is and is not relevant to education. But this kind of interchange was probably a non-starter if there were other delegates who regarded the conference as a 'course' and set the speakers up as 'lecturers'.

Let's put it behind us; what seems to me more important is that we must not let our disappointment with one particular meeting discourage us from continuing to cultivate an exchange between these various academic and professional disciplines. I am gratified that it was an organization of developmental psychologists taking the initiative in this instance, because we must accept that academic psychologists and educationalists have been extraordinarily slow in responding to the challenge of microcomputers in the classroom. Yet one must hope that they have a real contribution to make in terms of research expertise, as well as some modest theoretical insight. On the other hand, it is no encouragement to read your reviewer's judgement that 'the majority of teachers are very sceptical of findings of educational researchers and few would pay attention to any conclusions which ran counter to their own hunches.'

Well, let's hope at least everyone's hunches coincide. But I would rather see a lively tradition of research developing to check them out and build upon them. That will not be easy and it may, indeed, require more collaboration and mutual understanding than we have managed in the past. For my part, I hope it involves a little more compromise than that prescribed in your reviewer's scenario of jargon-laden researchers having to make 'a deliberate and substantial effort to persuade teachers that they have something to say'.

Deliberate and substantial effort needs to be made by everyone concerned. So, we should certainly exhort researchers to drop the defences that their 'jargon' may allow them to hide behind, while accepting that technical language at some level is likely to remain indispensible. In the same spirit, we should draw upon the intuitive understanding that comes from teaching experience while recognizing that extravagant appeal to chalkface hunches can also be just another way of defending against critical enquiry. Can we suspend our various prejudices and try to meet half way in a truly cooperative development of the information technology resource?

Charles Crook
Lecturer in Psychology
University of Durham

I would like to correspond with Mike Matson who wrote a very interesting article in *MICRO-SCOPE 13*. Would you be so kind as to inform me of his address. I would like to know also if there are members doing anything special in primary education with Commodore 64 computers.

John Oberman,
Kibbutz Lavi,
Mobile Post,
Lower Galilee,
Israel 15267

Editor's reply
Mike Matson may be contacted at 4MATION Educational Resources, Linden Lea, Rock Park, Barnstaple, Devon, EX32 9AQ.

Singing Turtles – Coda

I was sure there was some genuine reason for the enthusiasm of Janice's double-glazing salesmen colleagues (*MICRO-SCOPE 13*, p. 19). Were they trying to tell her something after all? It surely must be in that final sentence. 'To calculate sharps or flats, you simply find the half-way number'. That sounds much too simple for music. If musical intervals were that easy everyone would remember them and understand them.

Vague memories of a college lecture from (long) long ago suggested something logarithmic. In that case it could be that the simply calculated semitones were offending colleagues' ears.

In the end curiosity overwhelmed me and I rushed (turtle-fashion) to the nearest library.

Janice's librarian can almost be forgiven for giving up. The books I found gave conflicting opinions and many kinds of scales, all seemingly at different pitches. In case it might be helpful to future synthesisers of music the following is the result of my researches.

It appears that the most satisfactory and pleasing sound is provided by the diatonic scale. Here the key note is given the value 1 and the following notes are made from simple ratios of the frequency of that note. Hence for the key of C:

Note	C (key note)	D	E	F	G	A	B	C
Frequency	264	297	330	352	396	440	495	528
Relation to key note	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{3}$	$1\frac{1}{2}$	$1\frac{2}{3}$	$1\frac{7}{8}$	2

Notes an octave higher or lower than these have frequencies double or half those given (e.g. C can be 132, 264, 528, 1056 . . .).

The relation between each note and its preceding one is also a simple ratio:

Note	C	D	E	F	G	A	B	C
Freq.	264	297	330	352	396	440	495	528
Rel. to preceding freq.	–	$1\frac{1}{8}$	$1\frac{1}{9}$	$1\frac{1}{15}$	$1\frac{1}{9}$	$1\frac{1}{9}$	$1\frac{1}{8}$	$1\frac{1}{15}$

Students of arithmetic will note that two of these fractions are rather smaller than the others. The third and the seventh steps are semitones whilst the others are tones. In the diatonic scale, then, a frequency one semitone higher is obtained by multiplying the preceding note's frequency by $1\frac{1}{15}$ or $\frac{16}{15}$. So F#, one of Janice's examples, turns out to be $\frac{352 \times 16}{15}$ = 375.5 instead of $\frac{352 + 396}{2}$ = 374 and B♭ becomes $\frac{440 \times 16}{15}$ = 469.3 instead of 467.5. Enough difference to bring out the leaflets? Not at all. Anyone still following will realise that I have cheated. I have calculated A# not B♭. To do it correctly I should calculate $\frac{495 \times 15}{16}$ = 464.1. The difference between the 'A#' and the 'B♭' calculations results, is more than the difference using Janice's simple rule. Yet musically, we novices always believed A# and B♭ were identical notes. Apparently a piano was once invented with split black keys to take account of the difference but that was too confusing for the pianists. So now we all live with these anomalies without worrying too much. Anything around 464, 467 or 469 will do!

If it were only that one small difficulty that might have been the end of the story. Unfortunately, all these unequal intervals on the diatonic scale sound very fine if the instrument is only played in the key defined at the outset. Any change of key plays havoc with the arithmetic. Try starting the scale with D instead of C and work out the frequencies from 297 using the same ratios.

D	E	F#	G	A
297	334.1	371.25	396	444.5

Whoops! As everyone knows A *must* be 440 (Internationally agreed standard). Perhaps we had better work back from A to D. $\frac{440 \times 2}{3}$ = 293.3. Now to start again.

D	E	F#	G	A	B	C#	D
293.3	330	366.7	391.1	440	488.9	550	586.7

Compare this with our original C major scale and it becomes immediately obvious that some notes, though labelled the same, differ quite substantially. And we could start with each of the possible twelve starting notes.

Some instruments are played in a large number of keys during a performance and there is no chance of retuning between works. So we have the less satisfactory musically, but more satisfactory arithmetically, Equal Temperament Scale.

This scale evens out all the anomalies and makes each semitone step a factor of $2^{1/12}$ times the frequency of the previous note. So we have

C	C#	D	D#	E	F	F#
261.6	277.2	293.7	311.1	329.6	349.2	370

G	G#	A	A#	B	C
392	415.3	440	466.2	493.9	523.3

After 12 steps we have multiplied by

$2^{1/12} \times 2^{1/12} \times \ldots$ (12 times) $\ldots \times 2^{1/12} = 2^{12/12} = 2^1 = 2$. Again we find that notes an octave above or below can be found by multiplying or dividing by 2.

Keyboard instruments are tuned this way to make them sound reasonable in all keys. Is the Atari a keyboard instrument? I know it has a keyboard – but.

There is very little here about computers, but I would suggest, a wealth of material for computing, with calculators, as part of your musical mystery tour.

To save impecunious teachers the embarrassment of having to consult manuals in department stores a handy summary of frequencies is in G.W.C. Kaye and T.H. Laby, *Tables of Physical and Chemical Constants*, Longman. Most laboratories and libraries should have a copy as it is a standard reference work for science departments.

Tony Beauchamp
Bacton Middle School, Suffolk

The mind-forg'd manacles

Ann Wright
College of St Paul and St Mary, Cheltenham

Blake's vision of an existence where every response was negative and fearful to match a world leased out to commerce might well serve as a central metaphor for anyone who sees microtechnology as creating new shackles for teachers and children. However, the children who crowded into IBM's 'crystal arcade' (a portable structure designed by Renzo Piano) in the grounds of the Natural History Museum, London,[2] did not appear to be enslaved by machines though they showed a strong interest in the design and purpose of particular microcomputer applications. Similarly the concept of an information web which united the exhibition was probably best appreciated by the older children for whom the exhibition was designed. Nevertheless, when I was there children of primary school age were present in large numbers and were being given the first turn at many of the activities. These were very varied and ranged from designing your own comic strip to gaining an understanding of how a holographic scanner works in a supermarket checkout. The variety of applications demonstrated by IBM was thought-provoking and informative, particularly as an understanding of the technological process was as much part of the experience as the activity it produced or performed. This was especially well illustrated by the number of computer-based insights relating to the construction of the 'crystal arcade'. The link between intelligently selected and designed technological process and specific educational purpose was particularly impressive in an exhibit which showed how the IBM Scientific Centre in Paris had adapted a personal computer to help deaf-mute children who were learning to speak. The sound waves made by the teacher's voice created contours on the screen and by adjusting the level of his own sound the child learns to match his voice contours with his teacher's – thus learning by sight what he cannot learn aurally. Another program designed as a speech-training game required a deaf child to modulate his voice to guide a camel towards a water puddle while avoiding a palm tree. This proved very interesting to a number of young orthodox speakers. The research which produced these and other programs resulted in a perfect match of technological process and educational content, a balance by which a means of learning has evolved which is unique as well as humane. It will be interesting to compare IBM's applications with those of the Science Museum's *Launchpad* exhibition designed for children of five and upwards and scheduled to open in March 1986. Some of the intended items are already being rigorously tested during school holidays. This exhibition is being organised within specifically educational and scientific perspectives and may be a useful source of ideas for teachers.

The uses of microtechnology in mainstream primary classrooms do not often demonstrate the perfect unity of process and content which IBM's programs showed to be possible. However, as classroom experience proves, the extent to which programs match process and content determines their usefulness as aids to learning. *Facemaker*,[3] for example, is an excellent example of a program where computer graphics serve the significant vocabulary choices of all kinds of learners: the fact that the accompanying booklet merely suggests that the children attempt realistic descriptions is a limitation; this program's potential uses can be envisaged in imaginative and creative work as well, particularly with reluctant writers. *Dart*[4] (LOGO-based) is another example of an excellent program; this allows for the development of spatial concepts as well as exactitude in plotting figures and the children are stimulated by their mistakes as well as their successes which they see brought to life on the monitor. In the instance I observed I watched one group who were not able to produce the spiral design they chose, but as their attempt revealed itself (even in an imperfect state) somebody remarked, 'It's beautiful'. That reaction, which marks the union of intellectual and imaginative insight, is the forerunner of any adult mathematician's admiration for conceptual elegance. If microprocessors could help to encourage the early stages of such a response nobody's mind would be manacled despite the confusions and uncertainties which now seem endemic in primary mathematics. It is now widely recognized from teachers' own experience that LOGO seems to be the most likely means of achieving such a response. The discussion paper produced by HMI T.J. Fletcher[5] remarks on the keen discussion and impressive hand movements LOGO promotes together with 'a degree of involvement which it is hard to develop at this age (9–13) by other methods of teaching.'[6] With LOGO, microtechnology uniquely supports discovery, but does not determine the learning; the mind is therefore not manacled to the machine as it was in programmed learning.

What microtechnology in classrooms also needs is to become transparent[7] or at least unobtrusive; the learner's attention needs to focus on the content, but until technology is demystified and gadgetry de-throned, classroom benefits with CAL will be impoverished. The technical dimension of educational microtechnology needs to become the systematic study and practice of an art and until this happens most of the products will be uninspiring and the machine's potential reduced to a display of trivial tricks. What has happened to NDPCAL's learning paradigms? The very categories of revelatory, conjectural and emancipatory learning evoke a world scarcely glimpsed in most available programs. Speculative propositions about CAL now favour ideas of content-free programs and a variety of information-processing opportunities. In these the problem of process and content is neatly sidestepped in recognition of the machine's own strengths in the classroom and outside. This may well be a lasting solution to the present division between technical process and educational content.

Microprocessors can offer new ways of learning and teaching in a number of primary curriculum areas and children respond well to being allowed to generate and organize their own learning as part of their school experience. Among the multiple and competing classroom demands for microprocessor use, the unique qualities of CAL are probably most useful in educating children with all kinds of special needs and in introducing everyone to the microprocessor's role in the collection, organisation and interpretation of evidence. These kinds of educational applications do not literally depend on machines, but one that is appropriately programmed can make tasks easier in any number of defensible ways; it would also be a pity if teachers and children failed to benefit from one of the best matches between technological process and educational content – the opportunity to compile and use databases. The widespread educational and social implications of these suggest that information technology may, in the end, be more important than the kind of programs presently in use in classrooms. It has already been proposed[8] that future research into microcomputers in education should concentrate on two aspects: 1) Learning Processes and Information Technology and 2) Curriculum and the Information Society. These research programmes will demand a high degree of multi-disciplinary collaboration, but enhanced educational milieux will only be created if enlightened perception about necessary classroom practice is allied to technological virtuosity seeking to express educational insights.

Most classroom teachers would agree that microprocessors are useful in direct proportion to their reliability of function and the quality of programs available. So far quantity has ruled at the expense of quality even in the MEP program suites. The need for quantity has encouraged a spirit of merchandising which has cut across the demonstration of educational relevance and matching of needs. ITMA's painstaking procedures, varied planning groups, classroom trials and field experiments[9] have shown the way to produce good programs. Without this kind of preparation educational programs will not unite process and content to claim the equivalent value in a classroom of the best mathematical equipment or printed material of all kinds. Novelty palls and technical trickery does not motivate learners for long. Only the real satisfaction of an educational need or needs will ensure that microtechnology does not become one of the many innovations most teachers can do without.

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LOGO

Christopher Roper

Placing LOGO in its Cultural Context

> 'Then said Evangelist, pointing his finger over a very wide field, Do you see yonder wicker gate? The man said, No. Then said the other, Do you see yonder shining light? He said, I think I do. Then said Evangelist, Keep that light in your eyes, and go up directly thereto: so shalt thou see the gate; at which when thou knockest, it shall be told thee what thou shalt do.'[1]

The computer programming language LOGO has become the shining light of educational computing. We have been told by one and all that it's a 'good thing', and vastly superior to all other school computing activities, and hardly a voice is raised in dissent. If I write with a touch of asperity, it is because I have seen the LOGO bandwagon gathering speed over the past two years, and feel quite uncomfortable about some of my fellow passengers. Sir Keith Joseph has been heard to make approving comments about LOGO; the Daily Mail tells its readers that Princess Anne has chosen a school for her infants because it offers LOGO.

Can this be right? Is LOGO really as good as I thought? Part of my mistrust stems from the fact that very few of the new converts have actually explored LOGO beyond the initial steps of Turtle Graphics. In fact Turtle Graphics, as such, have very little to do with LOGO. They can be implemented in any programming language, and provide as good an introduction to PASCAL as to LOGO. Yet, if you ask most people what they know about LOGO, the answer's a turtle.

In fact, LOGO stakes its claim to our attention on a good deal more than Turtle Graphics. I think this claim can be stated in a number of different ways. The founders of the LOGO movement, Seymour Papert, Cynthia Solomon and Sylvia Weir, based their case for LOGO on the computer's potential as a medium for the exploration of abstract objects by the child user, offering experiences which cannot be had in other ways, and on the insight teachers can gain into the ways children think and respond to problems.

If you are interested in this approach, you should read Seymour Papert's book, *Mindstorms: Children, Computers and Powerful Ideas,* and Sylvia Weir's forthcoming book, *Cultivating Minds, a LOGO Casebook.* In this article, I am trying to make out a rather different case, which rests on four quite disputable propositions. I will leave the professional educationalists to discuss the cognitive development of children, a topic which lies quite outside my own field of competence.

My argument is rooted in a more general view of what is happening to our culture. Specifically:

1. LOGO offers a model of the child's interaction with the computer, which is totally different from the model implied by other educational software.
2. Learning to program a computer should be as much a part of a child's education as learning to write her own language, or learning arithmetic.
3. LOGO is a classical programming language which enshrines important programming principles, which can be applied in the context of other programming languages.
4. Within the culture of computing, the programming language LISP, the root whence LOGO sprang, still represents the best way forward, providing a polymorphous computing environment, able to assimilate and reproduce the best features of other programming languages.

My purpose in this article is to examine these propositions in the light of what we know about LOGO, and to suggest that teachers of the humanities should get involved in some of the issues raised.

As far as I know, LOGO was the first computer programming language to pay much attention to the psychology of the human-machine interface. Most computers present themselves as peremptory bureaucrats, ordering the user to do this or that, and handing down threatening and incomprehensible 'error messages', when instructions are not followed to the letter. The system always knows best, and the user is usually offered a limited number of choices from a menu, or a simple Y(es)/N(o). At the best one fills in a single word, and hopes it conforms to regulations.

There are no menus in LOGO, and no 'error messages'. The system knows very little unless you teach it. So, apart from the basic LOGO vocabulary of primitive procedures and operations, the user knows as much as the computer. The most famous LOGO procedure, the first learned by most users, is

```
TO SQUARE
REPEAT 4 [FORWARD 100 RIGHT 90]
END
```

If you then type SQUARE, the computer draws a square. But if you type TRIANGLE, without teaching the computer how to draw a triangle, the machine will respond:

```
   I DON'T KNOW HOW TO TRIANGLE
```

If you type

```
   SQRT 64
```

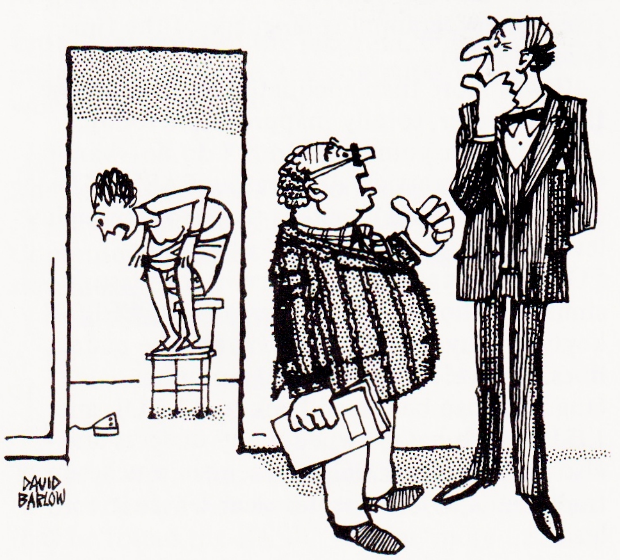
The computer responds

```
   I DON'T KNOW WHAT TO DO WITH 8
```

In other words, you have to type in

```
   PRINT SQRT 64
```

The LOGO machine remains firmly under the control of the user. Unless you teach it or tell it, the computer does not know what to do. You learn by teaching the computer. This is the reverse of the model implied by most educational software. Admittedly, teaching systems are less bad tempered than most computer operating systems, but the basic model is the same. The computer feeds you options, and you choose. If the answer is correct, it congratulates you. If you get it wrong you get patronising encouragement to try again, reducing teaching to the level of a multiple-choice test. It is this which led Seymour Papert to say that children must do the programming; otherwise they are being programmed by the computer.



'I think that computer mouse is going to cause problems.'

My belief in the need to teach children programming skills should not be taken to mean that I suppose they will all find jobs as computer programmers and systems analysts, the implied promise of cynical Tory politicians to increasingly desperate parents and teachers.

An analogy may be drawn with teaching children to write English, even though only a small proportion of school leavers will ever earn their living as journalists, or in other professions where they are required to write correct English prose. I believe one can draw a useful parallel between the invention and spread of printing at the end of the fifteenth century, and the development of the digital computer five hundred years later. It became essential, in the sixteenth century, to learn to read and write if one wished to play an active part in the political process, because the printed word was radically altering the political and social economy of Europe.

The centres of printing in Germany, Holland and England began to influence the cultural discourse of the whole of Europe. Today, the importance of the Boston metropolitan area and the San Francisco peninsular, as centres of academic influence in the United States, is inextricably linked to the development of the new computer culture around MIT and Stanford University. Linguists, psychologists, mathematicians, and philosophers are playing a more important part than engineers in the development of this computer culture. In this country, where our politicians often boast of the contributions made by the British to the development of computing, little or no attention is paid to the cultural dimension. We bewail a supposed shortage of systems analysts, artificial intelligence experts, software engineers and electronics specialists.

It is truly depressing that our government decided, on a whim as far as I can make out, to put a microcomputer in every primary school, without thinking for a moment about the kind of software which was available, or might be appropriate in the primary school environment.

It often seems that the whole purpose of computers in Britain today is to replace people, nasty messy things, who protest and make demands, with obedient, reliable and non-unionised machines. Mrs Thatcher is fond of saying: There Is No Alternative (TINA, for short). In this case, there is a clear alternative, which is to use computers to give human beings greater control over their own lives, by creating a more open society, by breaking down boundaries between the information 'haves' and the great majority of 'havenots'.

If computers are to be used in this way, programming must become a comprehensible activity. Computer programs must cease to be sealed black boxes. Few of us could ever write a book, but there is no mystery about how they come to be written. Programming must be as natural a process as writing English. The availability of packaged programs for many purposes, such as word processing or numerical manipulation, has no bearing on this general assertion that people should understand the activity we call programming.

If you accept this proposition, then the case for LOGO is partly made. It is the only widely available programming language, which presently offers the kind of easy entry points which are essential if programming is to become a universally accessible skill. Programming in LOGO is an activity which can begin in the kindergarten, and proceed quite naturally to higher levels of expressive skill.

To be sure, a child of seven will not write complex or profound programs, but then, the same child would not be expected to write a sonnet or a film review. But a child writing a story about visiting the circus is engaged in essentially the same activity as Graham Greene writing a novel.

Children cannot be introduced to programming simply by leaving them alone with the computer. That is to repeat the error of Charles II, who imagined that if children were brought up in a state of nature, without any contact with any speaking human being, they would naturally speak Hebrew, Latin or Greek. He carried out an experiment on an island in the Clyde to discover which was the truly original language.

Seymour Papert, the inventor of LOGO, has occasionally written as if teachers need not intervene in the child's experiments with LOGO. Anyone who has seen Seymour with children knows that he is a teacher of genius, who is able to establish instant warmth and rapport, guiding them in the encounter with the computer, and allowing their natural talents to find expression.

This stems in part from his own intimate knowledge of the language. There is no escape from this. If you want to introduce LOGO in your classroom, you must come to grips with the language yourself. We wouldn't dream of trying to teach French after a two week holiday in Paris, or philosophy after reading a bumper book of logical brainteasers. I am afraid LOGO is no different.

You can teach yourself, but this does involve long hours in front of the computer, writing programs; and then reading books, and talking about LOGO with people who have worked with the language in the classroom. There are plenty of people who really are not very fluent in the language making a career out of LOGO at present. Undoubtedly, the lack of fluent LOGO programmers in the average school does represent an obstacle to its universal use. Furthermore, unless we understand clearly what is involved and what is happening, it will lead to disappointments, as hopes are raised and then dashed to the ground, when LOGO does not turn out to be the well advertised painless cure-all.

My third proposition makes a very specific claim for LOGO, as a classical programming language which enshrines important principles of computer science. It is tougher to defend this proposition to readers who are not already involved in computing. But that raises the general point that serious discussion of the political and intellectual issues raised by the spread of microcomputers is almost impossible so long as teachers of the humanities stand aloof, and consider programming languages to be boring technical constructs without ideological implications.

The strongest argument against BASIC, which is solidly entrenched in our educational system as the *lingua franca* of microcomputers, is not that it is difficult to learn. The most telling argument is that it represents a dead end. None of the most interesting developments in computing can be said to derive from BASIC. Putting children to study BASIC is rather like having them study arithmetic using Roman rather than Arabic numerals. BASIC was designed for a particular purpose, to give engineering students at an American University access to a mainframe computer without their having to learn FORTRAN, which was the main scientific programming language of the time (early 1960s).

It was more than adequate for this purpose. It is, however, totally inappropriate today, especially for young children. I do not want to use up this article denigrating BASIC. The only point I would make is that modern high level languages derive from other roots. FORTRAN and COBOL survive for reasons similar to those which preserve the QWERTY keyboard layout on a typewriter. The main lines of development in programming languages can be traced back to ALGOL and LISP, which has spawned many dialects and also LOGO. PROLOG represents a much newer tradition, and it is not yet clear where it will lead us.

A feature of all the modern languages is that they are highly modular, and can be broken down into easily managed and understood units.

They are extensible, allowing the programmer to build up her own private toolkit of functions or procedures. It has to be relatively easy to alter a program, not only to get rid of its bugs, but also to fit it to changing needs and circumstances. In modern computing, the editorial and clerical problems of maintaining a program usually outweigh the algorithmic problems.

It may turn out that the orthodoxy of structured programming, which was first articulated in the 1960s, and became firmly established in the 1970s, will in its turn be overthrown. The most telling objection to the accepted wisdom is that it does not reflect the way people actually think. Many of us do not plan out a program before we start writing it, any more than we plan an article or a report. We only understand all the problems as we begin to meet them.

LOGO imposes a style of programming, which is considerably less rigid than that which is implicit in the dour Calvinism of PASCAL, but more structured than the idiomatic spontenaity of APL.

In defending my third proposition, I am not arguing that LOGO is the last word in programming languages. It will evolve. And quite possibly be replaced by a freer and more idiomatic language. But I do not believe that would create such a problem for someone reared on LOGO, as it would for someone who had grown up with BASIC or PASCAL.

One problem with both my third and fourth propositions is that discussing them requires an understanding both of LOGO and of its possible rivals as programming languages. One needs to understand not simply what is right with LOGO, but also what is wrong with the other languages.

In a recent article in *Personal Computer World,* a reviewer commented on the LOGO assignment statement. For example:

MAKE "X 3

From that point in the program, until it is instructed otherwise, the computer reads 3, whenever it finds :X. Or

MAKE "X :Y + 3

The computer meets :X, looks up the value of :Y, adds 3 and assigns that value to :X. Computer programs are full of assignment statements.

In BASIC you would write

LET X = 3

or

LET X = Y + 3

The reviewer, who was generally favourably (if ignorantly) disposed towards LOGO, said that he found the BASIC version 'more intuitive'. I found this odd, as I had always believed that one of the counter-intuitive features of BASIC programs was their habit of throwing up the line

LET X = X + 1

When I first learned to program, that seemed to be absolutely nonsensical, like saying LET 2 = 3.

I find the LOGO statement far more plausible. Not only does the word MAKE indicate that the programmer is making a change in the value of the variable, X, but it also distinguishes the name "X (with a preceding pair of inverted commas) from the thing which the name denotes :X (with a preceding colon).

Seymour Papert has a delightful way of explaining this distinction to children:

'MISSISSIPPI is the longest river in America. How do you spell it?'

'M-I-S-S-I-S-S-I-P-P-I'

'Wrong! I-T.'

Having caught them out with this hoary old chestnut, he can easily explain the difference between the word 'it' and what 'it' stands for. This difference would be signalled to the computer by "it or :it.

PRINT "IT would return IT

PRINT :IT would return MISSISSIPPI.

LOGO may not yet have hit on the best way of expressing these distinctions, but at least it is recognised that they exist, and in a way which can be explained to quite small children. Furthermore, if the question is posed in the terms used by Seymour, it can quickly turn into quite a lively discussion of languages and meaning.

Although I would not wish to minimise the scope of the problem, I would also insist that it is not beyond the reach of any averagely intelligent person to come to grips with the cultural content of the different programming languages. Two things are necessary. The first is unlimited access to a reasonably powerful microcomputer (say an Apple II or better) with an adequate library of software (including implementations of BASIC, PASCAL, FORTH and LOGO). The second is a determination not to be blinded by jargon, badly written text books and horrendously awful manuals.

It should be fairly evident that the best way to learn any language, including a programming language, is to use it. The direct method of learning by doing is the best way, yet relatively little progress has been made in developing courses, which introduce programming in a way which is readily comprehensible. Here again most progress is being made in Boston and California.

With some trepidation, I will now discuss my fourth proposition. My trepidation stems in part from the fact that it is the most controversial of the four, and that a thorough defence lies beyond the bounds of my technical competence.

It is important to understand that LOGO is a dialect of LISP; it is relatively easy to understand how LISP works if you are thoroughly acquainted with LOGO. The main difference between the languages is that LOGO's syntax has been greatly simplified. But LISP, too, is built around one very beautiful and simple idea.

This is that every list can be divided into two parts: its first element, and the rest of it (which can in turn be split into two parts: its first element, and the rest of it . . .). Lists are equally good at holding words, letters, numbers, and more lists. The name of the language is derived from LISt Processing, and computations in LISP consist of chopping up lists and stitching them back together again. It is easier to see how this works in LOGO than in LISP, and I will offer as an example a little program which reverses the elements of a list:

```
TO REVERSE :LIST
IF EMPTYP :LIST [OUTPUT [ ] ]
OUTPUT LIST REVERSE BUTFIRST :LIST
   FIRST :LIST
END
```

If one then constructed a list called "ALPHABET.

```
MAKE "ALPHABET [A B C D E F G H I J K
   L M N O P Q R S T U V W X Y Z]
```

And then typed

```
PRINT REVERSE :ALPHABET
```

The computer would respond:

```
Z Y X W V U T S R Q P O N M L K J I
   H G F E D C B A
```

I am not so much concerned that you should understand precisely how this works, as to make the point that the building blocks of LISP and LOGO programs are lists, which are linguistic rather than mathematical constructs. As I said earlier, LISP has spawned innumerable dialects, and has been used to generate complex programming environments. Like LOGO, LISP is extensible. You create new words to cope with new tasks. A program, needless to say, is itself a list, and no distinction is made between data and operations.

LISP has now survived for almost 25 years. The main objection to it in its early days was that it made impossible demands on hardware, eating up memory, and delivering answers exceedingly slowly.

That is now changing. Commercial interest in LISP is growing, as LISP is the language of expert systems and artificial intelligence. LISP has also been used to implement languages, PROLOG for example. This is what I mean when I describe LISP as a polymorphous computing environment, which is able to assimilate and reproduce the best features of other programming languages.

In Europe and Japan, LISP does not enjoy the same position it has in America. PASCAL is the most common teaching language in universities, and there is a growing commitment to PROLOG among researchers into future computing systems. The LISP community, in this country at least, is tiny. And relatively few computer scientists have access to adequate LISP facilities, which are still outrageously expensive. Perhaps the PROLOG folk are right.

My gut feeling that they are wrong has no technical foundation. It stems rather from my experiences meeting and interviewing leading members of the LISP and PROLOG communities. I felt that I lived in the same intellectual and cultural universe as the LISP programmers. I could understand their jokes, and preoccupations. This was in part a result of my deep engagement with LOGO. My conclusion is not that LISP is right and PROLOG wrong, but rather that the penetration of our schools by LOGO may eventually turn the tide in favour of LISP, as a generation reared on LOGO reaches the universities. This in turn will strengthen the pre-eminence of American academic centres in the constellations of western culture.

Unless one is convinced that cultural imports from America are an unmixed blessing, this should at least give us pause. It is not a reason for rejecting LOGO, but rather a motive for asking ourselves how we can contribute our own cultural values to the debate, and preserve our cultural autonomy.

In this context, I would assign particular importance to the activities of the British LOGO User Group (BLUG). I must declare my own interest as a member of its committee. BLUG has no official sponsorship or academic affiliation, as it was founded in 1982 by a group of enthusiasts for LOGO. It is an extremely open group, bringing together teachers, academics, professional programmers, journalists, and ordinary users. Its newsletter and annual conference provide the only independent forum in the country for discussing LOGO and its impact on our schools. BLUG can be reached c/o The Shell Mathematics Centre, School of Education, Nottingham University, Beeston, Nottingham.

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1. John Bunyan, *Pilgrim's Progress.*

Adventure games in the primary school

Pete Stewart
Primary Computing Team
Birmingham Educational Computing Centre

The mention of the word 'game' in conjunction with micros immediately conjures up images of beeping aliens, ghost-gobbling Pac-Men and frogs which seem so far removed from reality that they have forgotten how to swim. Combine this with a parental belief, encountered in varying degrees by most teachers, that using computers in schools will, in some indefinable way, provide pupils with guaranteed jobs when they leave. Add a pinch of the natural suspicion and reluctance which greets any innovation and we have a situation in which scepticism about the value of using adventure games in the classroom can be expected.

With this in mind I spent several weeks researching the use of such games with junior school children. The programs selected were *Colossal Cavern,*[1] *Flowers of Crystal,*[2] and *Adventure Island.*[3] These three items of software were chosen as representatives of particular types of adventure games: numerous text only adventures are available of varying levels of difficulty; adventures incorporating graphics are becoming increasingly common; *Adventure Island* bridges the gap between adventures and simulations, the main difference being that most simulations tend to be more specific in their content.

In each case the computer provided the central co-ordinating factor between a variety of studies and it also acted both as a motivating force and an aid in organising the activities carried out. These activities included the use of research skills, map making and interpretation, the use of grid references, personal writing, problem solving, oral language development, and artistic representation using a wide range of media and record keeping. My criterion for accepting the use of such programs as a useful part of the Primary School curriculum was that they should either provide the means for doing something which was not possible previously, or at least offer an alternative and improved way of carrying out familiar activities. I hope that the following opinions, formed after extensive research, go part of the way towards providing a justification for including micro-related adventures in the education of young children.

While this use of the computer is by no means the only motivation for research in the classroom, it is refreshing to find situations in which the results of research can influence decisions made and actions taken, and where the knowledge sought is of significant importance to the well-being, albeit imaginary, of individual pupils. The enthusiasm of the children taking part in these projects is reflected in the fact that much of the research was carried out from books at home or by the use of local libraries. This in itself indicates the success of this type of adventure as a motivating force for learning. As a means of practising record keeping, the value of an adventure program lies in the fact that there are several possible ways of recording the information. Therefore the pupils are able to experiment and adopt that method which they consider best. In addition, the need for clear, carefully thought-out records becomes apparent.

While the map reading skills used cannot replace experience in real life situations they do provide a valuable supplement to such a situation. In the case of the acquisition of advanced concepts, *Adventure Island* provides an acceptable alternative to real life where the practicalities of taking pupils to an appropriate spot containing all the required features, providing enough suitable maps (at a cost greater than that of this program) and ensuring the interest of all concerned often prove impossible.

Adventure games provide a unique stimulus to the child's imagination. It has always been possible, with varying degrees of success, to provide stimuli from literature to enable and encourage pupils to become involved in an imaginary world, and recently books which permit a certain amount of participation have become fairly common. These are divided into numbered sections and a choice of actions is offered at the end of each. Having used such a book, *The Warlock of Firetop Mountain,*[4] with a class of eleven year olds, I do know how popular these stories are with children. We explored an underground labyrinth for half a term without discovering the warlock's treasure, and without any apparent loss of interest. However, participation in this way is more restricted than it is with a micro and the organisation and monitoring of events is extremely difficult. With an adventure program the machine is a valuable assistant in ensuring that the correct sequence is followed and that events are properly ordered.

The micro is extremely useful in the organisation of the large variety of cross-curricular activities offered by adventure programs. Thus the busy teacher is allowed to get on with the job of teaching. For those of us who are in favour of integrated studies the micro offers what must be the least taxing way of dealing with this approach. There is the added advantage that the subjects dealt with are put into a meaningful context and often have a direct bearing on the outcome of the game.

The enthusiasm engendered by approaching these activities in this way cannot be ignored: as far as I was aware there was not one child who did not look forward to the sessions using the computer, an opinion confirmed by the teachers of the classes involved. Unfortunately it is impossible to assess how much of this enthusiasm stemmed from the novelty of the situation but I believe that several sessions of more limited programs would not have been greeted so eagerly.

I believe that the adventure program has much to offer in the use of spoken language and group co-operation. It provides a structure for children's talk even when the teacher is not present, and a stimulus which proves a major factor in developing spoken communication. Groups quickly learn that the game is more enjoyable and progresses more quickly if they co-operate with each other, and most of the groups I worked with devised their own system for taking turns in operating the equipment. Thus the micro helps to satisfy the need for social training and experiences within the school.

The development of logical thought and skills in problem solving play a major part in programs of this type and the way in which these skills are exercised contributes directly to the course the games will take.

This application of the micro should be met by little opposition by the majority of teachers because it is relatively easy to see where it fits into, and enhances, the present school curriculum. The more specialised uses of the computer must either replace existing curricular areas or place an unacceptable burden on the teacher.

In the present situation where the majority of teachers have little knowledge of the operation of computers and where many are nervous of using them, this type of program is extremely useful because it generally keeps to fairly familiar ground and requires little micro-computing skill in its use, as opposed to other applications such as word processing, LOGO and data handling which must involve a great deal of teacher time, allied with in-service training and personal practice to achieve competence. However the text-only adventure games produced for the home market are something of an exception here, as little information is supplied with them, and unless a teacher is prepared to discover and explore the fantasy world with the children he must spend several hours using the program himself, and also be prepared to accept that even then all the 'answers' may not be discovered.

Of course, nothing is ever perfect, and adventure games are no exception. There are certain disadvantages to using the micro in this way. Firstly, a great deal of machine time is required, even though a large percentage of the work involved takes place away from the computer. As far as I can see the only solution to this is for the school to buy more equipment because any program of real value is bound to occupy a considerable amount of time. The adventure game helps to justify the expenditure of the large sum required to do this – unfortunately it cannot actually provide the money.

Secondly, the cost of such programs may be regarded as a disadvantage because an adventure style simulation or straightforward simulation is usually priced at around thirty pounds and the other adventures at around ten pounds. However, when the number and variety of activities which can stem from their use is taken into account they do provide value for money.

All things considered, the advantages of using adventure programs in the classroom far outweigh the disadvantages but the last word should be left to Richard, a third year junior pupil who says of *Adventure Island*:

> 'I liked this program because it's the best lesson I've had I think, and you don't realise that you're working.'

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The view from Humpty Dumpty's wall

MEP National Primary Project: July–December 1984

Christine M. Robson
Deputy Director MEP Primary Project

Readers of *MICRO-SCOPE* were first introduced to the MEP National Primary Project in issue 10, when Anita Straker outlined our aims and objectives. In *MICRO-SCOPE 12*, she discussed some of the types of software required to integrate the computer into the primary school curriculum, and the steps we had already taken along this path. So what have all the King's horses and all the King's persons put together since then?

There have been some changes in personnel recently. Philip Fisher has left the project and is now working on a series of case studies in control technology. I joined the project in September, initially as Information Officer and now as Deputy Director with Christopher Schenk. Also in September the project welcomed a technician/programmer, Tom Bayley, a new administrative assistant, Sandra McCartney and clerical assistant, Sue Bougard.

The 'Language Development in the Primary School' training pack and its associated video 'Talking Point', were finally distributed to LEAs and teacher training institutions at the beginning of this term. The software in this pack was more tentative in nature than that of the mathematics pack and provides, we hope, material which teachers and teacher trainers can adapt, develop and alter to suit their own particular needs.

A large part of the last term's work was the 'Micros in Project Work' pack, edited by Jan Stewart. This package has been designed with the flexible nature of the primary project work in mind and includes, rather than programs with a pre-determined content, a selection of data files for use with some of the more widely available content free packages on the market. A commercial story writing program for younger children, *Story*, is also included along with *Mikefax*, a teletext simulation program. The background reader contains a number of articles by authors familiar to regular readers of *MICRO-SCOPE* and the whole pack will be ready for distribution early in 1985.

Four more packs are planned for 1985/6: one for infant/first schools and three around the theme 'Posing and Solving Problems'.

Included in the infant/first school pack will be slides, an audio tape, examples of children's work, course notes, a disc of software and a collection of articles. There will also be a catalogue of software and details of other available resources.

The first of the Problem Solving packs will be based on LOGO activities. The contents will include a booklet by Richard Noss comparing various LOGOs, a comparison of Turtle graphics packages by Berkshire teachers and a book of case studies compiled and edited by Beverly Anderson. The software will include four 'Microworlds' written in LOGO by Mike Sharples and Helen Finlayson. There will also be a set of problem cards suggesting investigations which children could undertake by writing a program either in LOGO or in BASIC.

The second Problem Solving pack is being prepared by Heather Govier, MEP Primary Co-ordinator for Capital Region. This will include at least three of the programs being developed by the Croydon Problem Solving Project, together with articles and other materials. A demonstration-only program in the pack is *Adventure Quest* written by Bob Hart, which allows children to construct *Quest* data files for use in an adventure game.

In a joint MEP/BST (British School Technology) venture Roy Richardson is developing technology/control technology materials for the third of these Problem Solving packs. Included in this will be a video covering the introduction of control technology to a group of teachers and their introduction of it into their classrooms. Videos of classroom activities are also planned for the other two Problem Solving Packs.

This term has also seen the publication of 'Teachers Learning' by Joan Dean, Chief Inspector of Surrey. We hope that this handbook will not only help the increasing number of teachers being seconded to assist on courses in microtechnology at the primary level, but also act as an aide-memoire to more experienced teacher trainers.

A fully updated version of the primary software catalogue was issued to all LEAs and teacher training institutions in September; this can also be obtained as a *Questd* file (on an 80-track disc only) for BBC, or for RML machines. LEA representatives wanting this file should send to us a formatted 80 track disc for BBC or formatted disc for RML. As the catalogue now contains some 650 entries and is increasing almost daily, it is unlikely that there will be another printed edition of the full catalogue, although we hope to publish smaller catalogues, perhaps for specific interest groups such as infant teachers or Spectrum users.

In 1984 an HMI/MEP invitation conference was held at Elcott Park, with the purpose of producing some guidelines for curriculum development and in-service training at the primary level. Each of the eight discussion groups produced a paper and the task of editing these is now complete. They will be published early in 1985 and distributed through our normal channels.

And where, you may ask, do all these space consuming activities take place? Visitors to our 'office suite' in Winchester stand back, not in amazement, but because there is little room for them to do otherwise!

Our 5 m x 5 m square office houses four of us and our desks, eight micro systems and other equipment, and all the materials for the packs prior to their assembly by anyone versed in the ways of slide binders. Sandra and Sue have their own smaller office complete with desks, photocopier, filing cabinets, micro system and modem and that most essential of all office equipment, the kettle and coffee mugs!

However, pressure on this space is relieved at regular intervals when two or three of us load much of the equipment into a van and depart on our courses.

In the Summer term of 1984 we ran a total of six courses for both primary advisers/lecturers and computing advisers. The first group had a general introduction to computer use in schools with hands-on work using the Language pack and Maths Pack software and additional optional sessions on information retrieval and turtle graphics. Computing personnel had an introduction to good primary school practice given by John Coe (chairman of NAPE) with sessions on current thinking about language, maths and technology in primary schools.

This term we have held three one-week courses for people with both primary and computing experience at Newman College in Birmingham. The theme of these courses has been project work in primary schools, and has been largely based on the materials in the Project Work Pack. We are grateful to all the people who have assisted us on our courses, particularly Roger Keeling, Andrea Tapsfield and Senga Whiteman from Newman College, and Jan Stewart and Jon Coupland from ITMA who have played a major part in both the planning and running of these courses.

With the help of the Newman College team we also held a one week residential course for the newly appointed MEP Regional Primary Co-ordinators. Their role will be to help disseminate the project's materials within the MEP regions and feed back information about local activities and requirements. The size of the MEP/MAPE regions however precludes their knowing about all local developments, and they would welcome news of activities from any MAPE members. As Anita said in *MICRO-SCOPE 10*, 'If you have any exciting developments in your own area, why don't you write and tell us (or your regional primary co-ordinator) about them?'

Our 1985/86 courses will include two more on project work, two 'Introductory' ones for primary advisers/lecturers, and courses to support the LOGO and Control Technology packs.

Unfortunately, considerations of both finance and person-power have led us to restrict the number of our one week courses to roughly three per term and we apologise to all those whose applications were or will be unsuccessful. We try however to allocate places to as large a number of LEAs and HE establishments as we can and hope that the resultant 'cascade' will soak as many people as possible!

Perhaps this is a good opportunity to thank all those people who have written or spoken to us about the ways in which they have used our materials on their own courses. We don't see them as a complete answer to all in-service needs, but, like the computer, as a flexible tool which can be adapted and used to suit *your* particular circumstances. We welcome any feedback about them as this helps in the planning of future packs.

The exchange of ideas between people from different areas and LEAs has been a valuable part of all our courses, and I suspect of anyone else's. Many teachers, having surmounted the technical problems of what to plug into where, are beginning to ask 'What comes next?' With strict financial resources and limited time in which to browse the ever increasing number of programs, there has been an unprecedented demand for in-service support. Whilst no-one is expecting the needs to be met overnight, we hope that we have contributed, and will continue to provide some useful resources with which to tackle the problem. It has been encouraging to find that despite the variety of backgrounds of those concerned in in-service training, there is a consensus of opinion that whilst the micro is a powerful and versatile tool, its true potential is as a resource which can be called on to extend and develop good primary school practice.

Sinclair news

Chris Robinson
Newman College

The existence of Sinclair computers in schools is still often denied by many advisers and publishing houses who tend to stick rigidly to the facts that few were ordered under the D.T.I. initiative. The more enlightened, however, are becoming aware of the fact that there may be more of these machines in schools now than either of the other two 'official' computers. This is probably mainly due to their low cost and the fact that there is now a good selection of software available for them – see below.

Criticism has often been levelled at the machines because of their poor keyboards, but it appears Sir Clive *does* listen, though some feel that he still doesn't get it right. Other critics would have us believe that the machine will soon be superceded by a new model which will be totally incompatible and that when that occurs, the Spectrum will no longer be supported. That comment does not, however, appear justified in the light of recent developments and stated intentions of the company.

Hardware News

The new Spectrum + computer from Sinclair
The Spectrum Plus is essentially a 48K Spectrum in a new case featuring a better keyboard. Because the insides are unchanged and the expansion slots on the rear of the machine are arranged in identical position to those on the 'normal' Spectrum, all existing software and add-ons are fully compatible with this machine.

The new case looks more attractive than the older model being longer by about 6 centimetres and one and a half times the thickness of the previous casing. An extra 18 keys have been employed to facilitate typing, including a longer space bar and enlarged ENTER key and special function keys to obviate the need for multiple key juggling when entering a program. Thus it is no longer necessary to press SYMBOL SHIFT and CAPS SHIFT to get into extended mode.

For those not familiar with the Spectrum keyboard, it is possible to use most of the keys to perform seven different functions depending upon the mode the keyboard is in. The different keywords etc. are shown on a standard Spectrum on or around the keys in different colours so the programmer knows what functions they are capable of. However, on the new Spectrum Plus, these are all shown in white on the key allowing reduced space for the letters themselves to be displayed. This makes the keyboard look even more jumbled and confusing, with the letters (which is all that most child users are likely to need usually) harder to find.

The extra keys for delete, edit, break, caps lock, extended mode, inverse and true video, separate cursor keys, extra caps shift and symbol shift keys as well as separate keys for ; " . , certainly can make the machine easier to use, particularly with the word processing package, *Tasword*. These functions are still obtainable by using the relevant key juggles as before, though not shown as such on the keyboard, which can be a little disconcerting when, for instance, wishing to type the punctuation symbol ' (SYMBOL SHIFT + 7) and ending up with an upwards cursor movement instead through inadvertent use of CAPS SHIFT + 7.

The key spacing is also slightly reduced from the 20 mm of the standard model to the 19 mm of the BBC and QL machines (the latter of which it has been designed to resemble in many ways, though I found the keyboard needed more pressure than for the QL).

All in all I consider it a very nice little machine and many will no longer feel 'ashamed' to admit owning and using one. Personally, I am quite happy with the standard Spectrum and would not consider it worth the extra £50 for the nice looks. If the company had included their interface 1 within the casing as well, however, it could have been a different story.

For the £179.00[1] a customer has to spend, a free software pack of some excellent programs is included. These seem to compensate in part for the fact that the user's guide and introductory tape are a poor substitute for those originally offered. The review pack seen contained *VU 3D* (the excellent three dimensional graphics creation program which can offer so much to the teaching of mathematics at top junior level), *Tasword* 2 (a well-known, well respected 'What You See Is What You Get' word processor also suitable for children's use), *Scrabble* (which again has school uses), *Chess, Make-A-Chip* and the arcade game, *Chequered*

Flag. It has been noted, however, that the program selection offered with new Spectrums sometimes varies from the pack received.

The 1985 Spectrum Portable?
In recent interviews, Sir Clive has made no secret of the fact that the company are committed to continuing the Spectrum range and are developing a fully portable machine using the standard Spectrum as the basis with built-in microdrive and incorporating his flat screen display technology.

Hardware Add Ons
There is a wealth of available add-ons for the Spectrum from joysticks to modems, Ceefax decoders to voice chips, but the addition users are most likely to make is that of Interface 1 (permitting networking to other Spectrums and QLs and the operation of good quality printers) and a microdrive. Called the 'Spectrum expansion pack', these are now available together for £99.95 (inc VAT) with some very good software thrown in – including *Tasword 2* and the powerful database program *Masterfile.*

The QL, QL+ and the ICL OPD machines
The company has rightfully been criticised for releasing the QL before it was ready and the 'Sinclair knockers' have had a field day discovering faults (most of which have been eliminated from the latest production model). However, it is a very powerful machine. Its processor chip, whether it is correctly termed 16 bit or 32 bit is faster than the 8 bit chips in the other computers available for the same money and its storage capacity is vast at 128K standard (expandable to 640K). That ought to be worth £399 by itself but add to that the excellent suite of programs being given away free with the machine (word processor, database, spreadsheet and business graphics being sold for other business computers at £150) and the bargain looks almost irresistible. It seems petty to point out then that it uses microdrives as a storage media whereas many would have preferred standard discs. The microdrives are supplied free but anyone wanting discs instead can still add them. (Even Winchesters and Laser disc storage devices are now obtainable for the machine.)
I have been using microdrives with my Spectrums since August 1983 and have found them as reliable as discs, my two big grouses being the limited (90K) storage space and the expense (£4.95 per cartridge). It is to be hoped that now this medium has been accepted (microdrives are also employed in the new ICL 'One Per Desk' business computer) production may be increased permitting a price reduction in the near future.

Some have expressed dissatisfaction with the speed of operation of some of the software packages supplied and difficulty in transferring data from one program to another. New versions of the programs are due for release soon. Sinclair have also remarked that there will be a slightly more up market version of the QL incorporating the software packages in ROM.

LOGO
The 'standard' LCSI implementation of LOGO[2] for the Spectrum has been well acclaimed. Logotron, who are marketing the LCSI LOGO for the BBC computer, are to market a Sprite board for the Spectrum early in 1985, which will not only add the powerful facility of independent sprites but provide even more memory (and LOGO likes lots of memory space). Rumours abound that LOGO may soon be available on a ROM pack for the Spectrum leaving more memory available to give even more power to the Spectrum as a LOGO machine.

LOGO should also be available soon for the QL. Already *Turtle graphics* are available directly from its 'SuperBasic' with procedures built by DEF PROC called by name only. Whether the full LOGO language for the QL will be on ROM pack or microdrive is open to speculation. The power of that computer could make it an ideal LOGO machine. 1985 could well become the year of the QL!

Software News

A large range of educational software is available for the Spectrum. The Sinclair/MacMillan co-operative have released many new titles with more due for release in February.

The new programs fall into 3 main series:
1 The 'Science Horizons' series (which tie in with MacMillan publications and the West Sussex Science scheme).
2 The 'Learn to Read' series (which ties in with the 'Gay Way' reading scheme).
3 A new series: 'MacMan maths.'

Science Horizon Programs
Most of the programs in this series are excellent simulations with the addition of a games element making them attractive for both school and home use (though probably in different ways). The graphics and screen layout are superb, the programming having been carried out by Five Ways software.

Initial Titles:

Cargo

A simulation about shipping cargo around the world involving appreciation of world geography, principles of displacement, the meaning of the plimsole line and correct loading techniques.

Glider

An excellent program in which the children have to investigate an island by flying a glider over it. An appreciation of thermal air currents and their dependance upon the underlying terrain, time and weather conditions.

Survival

In this program, the children may take the role of one of six different creatures with the task of finding food and avoiding predators. They soon discover it is easier to survive as a hawk than a butterfly! This program is being included as one of the free programs being distributed with some new Spectrums.

Magnets

A clever board game where each side (one can be the computer) has magnets as playing pieces in a game of strategy, the aim of which is to overpower the others' magnets. Originally I gave only a passing glance to this program considering it to be nothing more than a game. However, when I started playing it, I soon realised that I was quickly learning to appreciate magnet forces of attraction and repulsion and how the addition of magnets may create more powerful magnets with a greater sphere of influence.

New Additions:

Oil Strike

This is an excellent program in which the user has to survey an area, drill for, and extract oil, maintaining production levels dependent upon world demand. The screen layout is excellent with the area being surveyed displayed as a grid of 100 squares to the left of the screen and the underlying rock strata as determined from seismological surveys displayed to the right. When drilling, the core sample obtained is also displayed plus, if successful, a gush of oil and a happy, dancing miner. Above the survey grid is another window which will display telex messages affecting the decisions to be made about the rate of production.

Weathermaster

My particular favourite of the suite (perhaps because, due to missing documentation, I spent longer with it experimenting to find which keys to use). The North Atlantic weather chart is displayed. The program develops slowly at first but gets faster as it progresses. After spending some time watching the slow progression of isobars towards and across the British Isles, a point flashes on the map to indicate an area is requesting a forecast. Calling up the local chart, the request is given for a local forecast for a particular time and date. The 'games' aspect of the program results in the user ultimately winning or losing areas depending upon the accuracy and speed of providing forecasts. For home use, this may be sufficient stimulus together with a scoring system that assesses performance. In a class it could prove an invaluable addition to a topic involving weather.

Planet Patrol

This is a complex game in which you travel from planet to planet within the solar system trying to outwit aliens who are attempting to overcome Earth's defences and overcome the planet. Much knowledge is acquired during the running of the program, relating to the positions of the planets and gravitational forces. However, I found it rather difficult to understand and feel, perhaps because of its fantastic graphics display, that it looks too much like a game to impress most teachers.

Disease Dodgers

I could not take this program seriously as a simulation. It involved making a little man run and jump, eat and take exercise with the objective of keeping him alive whilst all the time he was being bombarded by monster bacteria. The 'man' could be any member of a family – each of whom have different nutritional requirements – and in any continent where various vitamins etc. required to ward off the effects of the bacteria may be in meagre supply. It was a great game, but I feel far too many children, unless otherwise guided by an enthusiastic teacher, will take it to be only that.

'Learn to Read' Series

An excellent series of programs to support the 'Gay Way' reading scheme. The programs have been well thought out and offer a good progression from simple letter recognition to a reasonable vocabulary. The graphics are excellent – practically identical to those in the books. Each program has two or three other programs within it, usually with different degrees of difficulty. The programs are very easy to use, usually requiring one key only to be pressed (except where spelling is required), and helpful, simply worded, instructions are available when needed. Unfortunately, lack of space precludes full reviews of each program in the series so I have picked, as a sample, *Bodyswop* to describe in detail and provide simple headings only to indicate the content of the others.

Original series:	New Titles:
Learn to read 1	*Alphabetter*
Learn to read 2	*Wordsetter*
Learn to read 3	*Spellbod*
Learn to read 4	*Soundabout*
Learn to read 5	

Bodyswop: The program is designed to reinforce the vocabulary for different parts of the body (viz: body, head, tail, leg, ear, eye). Three 'games' are offered: 'Look', 'Spell' and 'Boggle' and the choice is made by pressing a key when a moving box has positioned itself around the item to be selected.

'Look' shows a picture of one of the characters (e.g. Jip the cat) with one of his body parts highlighted (he may be wagging his tail). Large print would then say 'This is my tail'. The word 'tail' would then be covered and a choice of words offered along the bottom of the screen. Pressing any key when the correct answer is highlighted produces a tune and the word is replaced. A wrong selection just makes a discouraging tone and waits for the user to make the correct solution.

'Spell' offers the choice of 'Help' or 'No help'. For 'Help' the words for the parts of the body are presented on the right hand of the screen for constant referral. The picture may then show Meg the rat with a leg missing and the question posed, 'What's missing?'. When the correct answer is supplied the part is replaced and the creature says thank you. In addition, points are scored by up to two asterisks (if accurate and fast) moving from the bottom line and piling themselves up on the right.

'Boggle' is like the game of beetle. The user may first see instructions showing how a boggle is built of a body, head, 2 eyes, 2 ears, a tail and 6 legs. There is the option to build one boggle or two players may work at the same time each building a different boggle on their own half of the screen. The computer offers body parts by name and the children have to select what they require by pressing a relevant key. As in the game of beetle, the player has to have a body first and a head before eyes may be placed and so on. If a piece is requested that is of no use, it might be lost. Upon completion, a 'happy boggle' is the reward as it changes colour, smiles, wags its tail and rolls its eyes in glee.

MacMan Maths (new series)
I wasn't so impressed with this series. The graphics are good, as are the tuneful rewards, and the character, MacMan, is amusing, but the programs are generally just another collection of drill practices of which we have seen such a lot. However, having said that, the programs seemed to fit the bill for a colleague who teaches slow learners and my five year old niece particularly enjoyed Macman and the Caber Eater, where blocks are earned, for correctly answering simple addition and subtraction sums, that build up to make a caber. If the child is too slow, however, a devil-like creature creeps out from under a trestle and snatches a block away. My niece liked this in particular, which probably means the reward works the wrong way round. Another interesting observation is that when an 'illegal' key is pressed, a note is played. Holding down the key to auto repeat, the notes combine to produce a recognisable tune. The game involves picking up the correct answer from a list of numbers. If it is wrong, MacMan will drop it and move to the next number. My niece soon discovered the easiest way to play this was to pick up all the numbers in turn until the correct answer is accidentally hit on.

Macman and the caber eater deals with numbers up to 20 within five levels of difficulty.

Macman in the treasure caves deals with numbers up to 50 within 5 levels of difficulty in a game where MacMan climbs ladders and avoids bats.

MacMan's magic mirror has five progressive sections where images upon the left have to be mirrored on the right, or below and above, or a combination of both.

MacMan and the great escape is also concerned with shape, matching shapes to 'holes' that appear in a wall and have to be filled before a prisoner can escape. There are six levels of difficulty available from within this program.

Generally speaking this is a very creditable collection of software from Sinclair/MacMillan which should be well accepted for both home and school use. More software is expected in February. Titles are: *Space Scan, Quiztime, The Sunflower Number Show, Tops and Tails, Castles and Clowns* and *Snapplehopper.* I'm looking forward to seeing them. Watch this space for further details.
(N.B. The new software for release in February is being produced independently of the Sinclair/Macmillan collaboration and BBC versions will aso be available.)

* * *

Notes
Further details about the software may be obtained from Primary Product Manager, MacMillan Education Limited, Houndsmills, Basingstoke, Hampshire RG21 2XS.

1 At the time of going to press, Sinclair has just announced a price reduction of the Spectrum Plus to £129.95 coupled with a phasing out of the rubber button version, making it look very attractive alongside its competition. An upgrade kit is also being introduced for existing Spectrum owners.

2 Sinclair LOGO is published by Sinclair Research Ltd, 25 Willis Road, Cambridge, CB1 2AQ.

Book reviews

Title: **New Horizons in Educational Computing**
Author: Masoud Yazdani
Publisher: Ellis Horwood Series: Artificial Intelligence, 1984.
Price: £16.50.

This interesting book stems from the A.I.S.B. Easter Conference 1983 entitled 'Artificial Intelligence and Education', and is a collection of papers on LOGO, PROLOG and POP. The book is dedicated to the late Professor Max Clowes who was one of the founder members of the Sussex University Cognitive Studies Programme which brought together Psychology, Linguistics, Philosophy, and Artificial Intelligence to the study of Mind.

One of the exciting things about the use of computers in our primary schools is that we have not been dictated to by Professors of Education in their ivory towers, but anyone seriously involved with the use of computers in education would be foolish to stick to BASIC and CAL whilst ignoring LOGO, PROLOG and the kind of computing environment provided by POP-11.

Some expect there to be an argument between LOGO and PROLOG. This book, which should be on the shelves of colleges of education and of those deeply involved in educational computing, presents an alternative philosophy to that implied by BASIC, and points out the importance of a rich and powerful computing environment.

'Tomorrow's Classrooms' by Seymour Papert argues the case for the role of subversion in education, and looks forward to the time when 'The school, defined as a place where the three R's are imposed by force, will no longer be necessary. Society will be able to face the task of inventing environments in which children can develop as social, loving, honest human beings without distorting this goal by the crudely technical one of stuffing the multiplication tables into their heads.'

In 'Why LOGO?', Brian Harvey gives a careful explanation of the difference between LOGO, a language for learning how to think, and BASIC, FORTRAN, APL and C. He shows how LOGO makes explicit many of the fundamental ideas of computer programming. LOGO is procedural (one procedure can use another procedure as a subprocedure to do part of its work), interactive, recursive (a procedure can be a subprocedure of itself), not typed (any variable can take on any value, numerical or string), extensible (a user defined procedure 'looks like' a primitive procedure), has list processing, and is user friendly. 'LOGO is easy enough for anyone to use, but it is powerful enough for any project; it's not a toy language.' 'LOGO is a door into the territory of the computer as an object for intellectual exploration.'

Bob Lawler discusses:– polyspirals, a beach filled with sprites and turtles, and plotting functions in 'Designing Computer-Based Microworlds.' The five remaining papers in the World of LOGO section contain the Edinburgh University interpretation of LOGO and reports on the use of SOLO, a declarative database-dependent language, by the O.U. in their D303 Cognitive Psychology course.

Part two of the book is entitled 'The PROLOG Phenomenon'. Bob Kowalski asserts 'Logic as a computer language for children'. Marek Sergot in 'A query-the-user facility for logic programming', admits to one of PROLOG's shortcomings, but confidently shows how PROLOG can be extended to cope with new users and improve the dialogue between human and computer. In twelve pages Richard Ennals summarises 'Teaching logic as computer language in schools', and stresses that it is the children's understanding of their own logic programming which is important, not how PROLOG arrives at the results.

Jon Nichol and Jackie Dean explain in computer-free language how BOGBOD, written in micro-PROLOG, has the pupils simulating the work of the historian, searching for and evaluating evidence in order to reach a conclusion. Micro-PROLOG allows the representation of historical information as a database which pupils can explore and manipulate. Exciting stuff this 'Pupils, Computers and History Teaching'.

Kenneth Kahn describes 'A Grammar Kit in PROLOG' before section three; 'The POP-11 Experience.'

Aaron Sloman, incorporating essays by Steve Hardy and the late Max Clowes, gives a brief introduction to the educational philosophy associated with POP-11.

Probably just the bare titles may invoke some feeling of the visions of the authors. 'Beginners need powerful systems' by Aaron Sloman. 'POP-11 for everyone' and 'Unix and the naive user' by Marcus Gray. The book ends with 'Creating a good programming language for beginners' by Michael Coker.

Ellis Horwood have added to their already impressive list of titles this book filled with often complex yet important ideas from dedicated experts trying hard to see clearly through the rapidly swirling fog as we rush headlong into the 'Communication Revolution'.

Henry Liebling
The Beacon School
Amersham

Title: **Micros in Control**
Author: Gerald Bettridge
Publisher: Longman, 1984.
Price: £4.95.

Control technology is a modern development, well established in some secondary schools as part of an examined course. In the primary sector there is a small but growing interest in practical problem solving, design and technology, which has arisen as a kind of offshoot from Craft, Design and Technology (CDT). This has been led by a few teachers who have an interest in the relevance of CDT to the science area of the primary curriculum. Possibilities for control technology in the upper primary school have been further increased by the arrival of the microcomputer, one of which, the BBC, comes complete with an analogue to digital converter. However, the great majority of teachers who have an interest in microcomputers are probably unaware of the various sockets hidden from view at the back or on the underside of their micro.

Computers can be used in three ways when linked to devices in the 'outside' world. Firstly, they can be used to measure and 'log' data coming from either simple switches or more complex devices that measure temperature or light intensity; secondly, the computer can actively regulate devices like motors or lamps; thirdly, the computer may both respond to incoming data and then send out information to regulate active devices. This third case is control technology in the most complete sense of the word, and is obviously the basis of robotics, since a robot is no more than a self-contained control system with an on-board computer.

There are two approaches to control technology so far as interested primary teachers are concerned: an easy one and a rather more difficult one. The easy approach is to purchase a ready-made interface; the DCP Microdevelopmentals interface for Spectrum and BBC micro is an excellent example, very suitable for use in the primary school. All that the teacher then requires is a basic understanding of direct current electricity and minimal expertise in BASIC programming. The more difficult and more demanding approach is to build interface circuits using electronic components and integrated circuits with the object of using them to make specific measurements or control a particular device. This approach requires knowledge and enthusiasm from the teacher; it has the advantage of being relatively cheap and of giving a great deal of flexibility. Gerald Bettridge's book is written to answer the needs of a teacher who is confident enough to want to 'go it alone'. It is only fair to say that the publisher's comment on the back of the book: 'only elementary knowledge of programming . . . and of electronics is necessary' is rather misleading. I suppose it all depends on what one means by 'elementary'. The author has made a real attempt to keep the language as simple as possible and has isolated detailed explanations in boxes within the text, these being optional reading. Nevertheless, inevitably, the main text assumes concepts and uses terminology which will only be familiar to those who have followed (and enjoyed) courses in electricity and electronics, or who have developed an interest personally. The same comment must be made about the circuit diagrams in the book; they also need well established concepts for the reader to be able to understand them.

Having defined the specialised readership of the book one can say that it is, nevertheless, a very useful source of information. Seven chapters are included together with three useful appendices. Each chapter gives an explanation of a particular topic and then describes one or more relevant projects. The sequence of chapters is more or less developmental: the first chapter deals with ports and the second covers the specialised 6522 VIA chip found in the BBC micro. Subsequent chapters cover the control of lamps and motors, stepper motors, producing and measuring analogue voltages, the measurement of time and frequency and finally direct interfacing to the Z80 bus; this last chapter is especially relevant for the ZX81 and the Spectrum. Most projects and driving programs are written with one particular machine in mind but in some cases adaptations are given for other machines.

An obvious criticism of the book is that it tries to accomplish too much and is too wide ranging for such a short text of only 94 pages. In all, seven different microcomputers are referred to in the text, although, admittedly, the RML 380Z, the BBC and the ZX81/Spectrum are mentioned most frequently. One feels that the author would have done better to concentrate on one machine at a time and to produce a slightly larger book with say three sections, one for each micro; that would also have made easier and more productive reading for the beginner.

In conclusion one should say that the book is very welcome and is a useful addition to the growing set of books on control hardware. It is a book that can be 'dipped into' for information when necessary. In addition to circuits, explanations and programs for control, the book also includes several other useful bits of knowledge, for example: a machine code timing loop for the RML 380Z (which can be adapted for the 480Z), a circuit for a suitable power supply and a final appendix explaining how to use circuit boards and make soldered and wound-on connections.

Michael Negus
Newman College

Title: **Forward 100 LOGO and your Child: A New Way of Learning.**
Author: Ray Hammond.
Publisher: Viking (Penguin Books), 1984.
Price: £12.95.

'How should parents equip their children for the computer age? How should teachers respond now that knowledge is available from machines? What is the best way of learning with computers?' These are questions FORWARD 100 purports to answer. This is a tall order but Ray Hammond certainly has something of interest to say on all these topics.

This is certainly not a book for those who want a programming manual. It is a book for parents who realise that something is happening to education and want to know more, but it is rather doubtful whether it will get onto many home bookshelves or even those of libraries at its current hardback price. It is also a book for primary teachers. Although it is openly critical of them at times, it deals with many questions they are asking, and problems they face, in a very informed way. The book is extremely well-researched and thoroughly covers areas that I for one had not previously seen covered in such depth. With a constant eye to the future, a wide range of topics are bravely tackled including, for example, Papert's concern about the possible effects of presenting information technology to very young children.

LOGO is kept in context throughout the book which begins with an overview of the status quo regarding computer use and ownership and the background to the development of LOGO. The third chapter is recommended as a starting point for those totally unfamiliar with computers. All types of floor and screen turtle (including BigTrak and the Buggy) are described and evaluated. Because the book is aimed at such a wide readership there is the occasional feeling that some readers might feel that there is too much detail whilst others might be annoyed by the 'Turtle Tips'. However, there is no doubt whatsoever that there are some people who will be eternally grateful to know what to do when their Turtle pen-collar works loose (If you are still wondering look on page 99. Better still, tear it out and use it as a wedge!)

Chapter 6 courageously attempts an explanation of the various types of sprites available and the concept of microworlds. Ray Hammond then plunges into the ideas involved in list processing and its applications.

Next he undertakes a deep and lengthy comparison of Apple and MIT LOGO, and includes a thorough description of TI LOGO. It is obvious that the book was completed early last year before the creation of the BBC LOGO minefield, but the discussion provides an interesting backcloth from which points can be extrapolated. List processing, documentation and sprite facilities are all assessed with particular regard to the likelihood of children 'growing out of them'. Hammond gives a useful explanation of the difference between turtle graphics programs and full LOGO, and an overview of LOGO's local dialects for those in need of this type of information.

There is even a discussion of the main makes of hardware for which LOGO is available. All this is done on the basic premise that a LOGO should be chosen before the hardware is bought. It is easy to see sense in this but for many it comes too late unless they are prepared to invest in LOGO-dedicated machines.

The next chapter deals with LOGO 'in action' and contains some half a dozen case histories, some old favourites and some new. The next section on LOGO 'around the world' contains some rarer points of interest.

Finally there is some crystal-ball gazing. FORWARD 100 with a different connotation but here, as throughout, an informed, evenly balanced approach is maintained.

A hardback, it includes two buyer's guides (which are bound to date quickly), numerous addresses of interest groups both in Britain and abroad, and a fund of 'turtle tips' in addition to its twelve meaty chapters. This does go some way towards justifying the price. As far as teachers are concerned it is an informative, highly readable volume which would update anyone fairly new to the area who wanted a wider understanding of the role of technology in education in order to prepare their children, be they pupils or offspring, as best they can.

Sarah Wells
Newman College

Title: **Micro Guide**
Authors: Peter Morse and Brian Hancock
Publisher: Century Communications Ltd.
Price: £1.95.

Here is an excellent little pocket book that is an ideal replacement for that bulky well-worn BBC User Guide. Century Communications have published a 44-page quick reference guide which gives a summary of the necessary information required to be at every programmer's fingertips.

Apart from the usual BASIC commands, graphics, sound and VDU codes, the authors, Professor Morse and Brian Hancock, have included useful information for the more advanced programmer.

Clearly laid out, this hardback book, priced at £1.95, is excellent value for money.

Barrie Edwards
Newman College

Software reviews

Series Title: **How We Used to Live 1902–1926**
Publisher: Yorkshire TV Enterprises Ltd., TV Centre, Leeds.
Machine: Acorn BBC B (disc and cassette).
Price: £34.50.

This suite of programs has been developed by Yorkshire Television to complement their successful schools broadcasts. The four programs are:

'Making ends meet?'
'Making sacrifices?'
'Making a profit?'
'Making a move?'

The TV programmes present the story of two families in a serial of 20 episodes over two terms and highlight conditions, problems and events of the period. The computer programs which are text-only (except for the occasional shoddy map) concern a third family, not featured on the TV programmes.

The programs come with comprehensive documentation. This includes teachers' notes, pupils' worksheets and program operating instructions. Within the limitations of the programs, these are quite good; the programs always loaded according to instruction, but then we were using disc. We assumed that the pupils worksheets could be photocopied since only one of each is provided. No statement is made as to whether this is permissible or where additional copies may be obtained.

All of the programs were trialled with a class of mixed ability fourth year juniors who had been following the TV series since September. The children are each required to follow up the programs themselves and to research from reference books either individually or in a group. Children worked on the computer programs in groups of three and they were able to provide an additional resource for the children's written work.

1. *Making ends meet? 1906*

The objectives for this program are stated as;

1. To foster problem solving through discussion;
2. To further the understanding of poorer families;
3. To further an awareness of budget problems.

At the start of the program, the group is required to allocate weekly amounts of money for food, fuel, transport, etc.; the rent is fixed. As the year progresses, a number of unexpected developments, usually unpleasant, ensue and the group has to modify its spending accordingly. The money is decimal currency which we found a nuisance as all of our reference books quote proper money; i.e. £-s-d. The children enjoyed using this program and a large number produced an interesting piece of written work after the discussion.

2. *Making sacrifices? 1915–16*

The idea behind this is quite good but the program is awful! Children work in groups of four, each playing the part of one character. Decisions are made in response to a number of choices. Children are required to type in these decisions and also to note them on paper. The former is a pointless exercise as the computer pays no heed at all to any of the reasoning. In fact, and worse, the program grinds on even if rubbish is entered. Naturally, this is something children soon discover. The objectives of this program are:

1. 'To foster empathy through the experiences placed before the members of the group arising from the British entering the First World War'.

2. To foster decision-making skills.

As to the first, a visit to the Imperial War Museum would do that better and as for the second, there are much better offerings for decision-making. The program runs from beginning to end; there is no facility to save data in order for the children to write up a portion of their diary (the concrete end product). Consequently each group is at the computer for about an hour, studiously entering their decisions and reasoning in duplicate. Then they're faced with a huge amount of writing up. This compares very unfavourably with another diary-writing program *Adventure Island.* [1]

3. *Making a profit? 1919–22*

Technically, this is a much better program, although again, it would be much improved if it did not have to be completed in one large chunk. The stated objectives are:

1. To foster problem-solving through discussion.
2. To foster an understanding of the problems of the employers during this period.
3. To encourage careful recording.

Children work as a group, playing the role of the manager of a textile mill. Decisions have to be made about the number of workers, the number of machines and the distribution of profits. An elaborate set of worksheets is provided for use with this program, and the notes made thus are used for the written follow up.

Our children found both the program and the worksheets very confusing and complicated. There was confusion as to how many men and machines were actually working. Only one child was able to produce a written account of a reasonable standard and no-one made a profit. Groups floundered on the computer for as long as an hour and a half, and had far too much to remember for any effective follow up. There was too little time to discuss decisions, as children were always conscious that they had been on the computer for a long time and others were waiting. One group had the frustration of almost completing their alloted span when the BREAK key was pressed!

4. *Making a move? 1926*

Again the objectives are similar to those above. This program takes the form of an interview between the Duncan family and their M.P. The group plays the part of the family, and they have to answer questions about their proposed move to the town. Unlike *Making Ends Meet?* the program does respond to certain key words typed in by the children, but only a limited way. The real value of the program is in an assessment of town life and country life.

Quite good creative writing can follow use of this material, but only if the responses are noted on paper, as well as typed in. However the computer refuses to accept more than three lines for each answer, yet much more was recorded on paper. Perhaps better results could be obtained if the interview was acted 'live' with children following guidelines prepared by the teacher. Children asked why it was not possible to make use of the printer in order to follow the course of the interview afterwards.

The programs made some contribution to the project 'How we used to live'; topics on balancing the budget and diet were enhanced. However we were left with a feeling of disappointment. Technically, they are extremely lack-lustre and the content and structure leave much to be desired. Program 1 offered scope for creative writing and this was in our opinion, the best of the four. At over £30.00 they are hardly a snip, and schools with that amount of money to spend would do well to look elsewhere, especially if the acquisition of problem-solving skills is high on your list of objectives. Many of the Ginn simulations have been criticised for being expensive but those I have seen represent better value for money.

Nikki Sullivan
Stephen Booth
St Peter's CE Primary School
Bury

1 Published by Ginn & Co. Ltd., Prebendal House, Parson's Fee, Aylesbury, Bucks. HP20 2QZ.

Title: **Picture Book**
Publisher: Learning and Training Systems Ltd., Haydon House, Alcester Road, Studley, Warwickshire, B80 7AP.
Machine: Acorn BBC B (disk).
Price: £11.95 (for schools), £14.95 (retail).

The widest application of the computer in primary classrooms still tends to be with the drill and practice type of program and this package of three disks falls into this category. However, unlike many, the set comprising *Picture Book* has much to offer the primary teacher.

It is divided into three sections:

Picture Book 1. A child or group of children, construct a simple sentence to describe the picture displayed on the screen by using the space bar and return key to select nouns and relationships from the words given. The sentences are of the form 'The NOUN is

RELATIONSHIP the noun'. Once the sentence is correct the relationship disappears and three alternatives are presented, from which the most suitable must be selected in the same way as before.

Picture Book 2 allows the teacher, or children, to create their own scenes and short sentences. Up to fifteen scenes may be created. *Picture Book 3* presents these scenes in the same way as in *Picture Book 1.*

Picture Books 4 and 5

These are a development of the previous section. Here the pictures appear as a reward rather than a stimulus.

A summary of each child's results may be displayed on the screen or on paper if a printer is connected to the micro. The programs come with full documentation which includes a discussion of the educational aims and detailed information of how to make back-up copies of the discs so that teachers own collections may be stored. The teachers found the documentation quite easy to follow and coped with the task of copying the disc.

The limited vocabulary and constant repetition make the programs suitable for middle infants and slow learners. The package has much to offer in early learning: word matching is good; many of the relationships identified in most early mathematics projects may be reinforced in addition to the more obvious word recognition. The difference between the small and large versions of the same picture is such that children would have to have quite advanced visual discrimination for this to be meaningful.

The program, using teacher-prepared material, has been used with middle and top infant children working in 'twos' and supervised by a selection of parents who work voluntarily in the classroom. The teachers feel that much of the potential of the programs would be lost if children were simply to do them in turn without the presence of an adult to stimulate discussion. It is possible for more able, older children to create the sentences and scenes and this should prove valuable in helping to develop their speaking and listening skills. However, this approach has not been tried yet.

The package may be recommended as a superior example of the popular drill and practice variety of program. The flexibility in allowing the teacher to prepare tailor-made material makes a contribution in developing and reinforcing the skill areas discussed for younger children and slower learners.

S.J. Booth
Headmaster
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Bury, Lancs

Title: **Dinosaurs**
Authors: Barry Holmes and Ian Whittington
Publisher: Cambridgeshire Software House, The Town Hall, St. Ives, Huntingdon, Cambs. PE17 4AL.
Machine: Acorn BBC B (disc and cassette), RML 480Z (disc and cassette).
Price: £16 + VAT + post and packing
Reviewed on: Acorn BBC B

Dinosaurs is a simulation for top infant and first year juniors which continues in the Holmes/ Whittington tradition of clear consistent screen layout and input, robustness of design and classroom-oriented provision for saving data. It comes with helpful documentation and a set of eight drawings of dinosaur skeletons with the unusual but useful provision of a set of transparent overlays.

After considerable preliminary activities the children embark on the screen-based element of the work. In groups of between two and four they start at the top left-hand corner of the area to be explored. The aim is to find one of the eight sites concealed on it. They are actually on a 20 by 20 grid but this is not immediately apparent. A small figure is moved by pressing the first letter of the direction in which you want to go (North, South, East or West) so there is plenty of reinforcement of compass work here. A trail of dots is left to indicate positions visited. Children can easily be encouraged to be a little more systematic about their exploration if they are provided with an additional worksheet/plan with the grid lines on it. This would help them to keep a record of where they have been and even if the outcome is not 100% accurate it cultivates good habits for the future. I found that the children *had* to talk about what they were going to do if they were to achieve anything and they soon realised this.

When they find a site the message 'You have found Site A.' (for example) appears at the bottom of the screen. They are allowed unlimited exploration until they find a site and attempt five 'digs' at it in one session. Then they are told 'No more digging for today' and they should press 'F' to Finish. Their position on the 20 by 20 grid can then be saved for the 'next day's' digging.

When the children have found a site they can either press 'D' for Dig or choose to explore further. If they press 'D' when they are not at a site they just get the message 'There is no site here.' The documentation suggests that the children are given a 5 by 5 grid sheet upon which to record these finds. Search of the sites takes very much the same format as searching the main grid. If part of a dinosaur is found the message 'Find 6B (for example) is here' is displayed. If the rectangle is empty then they are told 'Nothing is there'. The documentation alerts you to the need to impress upon the children, by the use of pictures, the fact that dinosaur bones are not usually found in the neat diagrammatic positions used in the program.

As the children have to hypothesize about where the next best place to dig would be and were quite often mistaken, it would have been interesting to have had the chance to have the bones in a scrambled arrangement, sections of which the children could transfer onto card and re-arrange as a kind of jigsaw puzzle. This would have incorporated another skill and increased authenticity although some children might find it difficult. The program would have greater potential if it included the facility for using data files other than the dinosaur one provided. (Perhaps this is where the idea for *Archaeology* came from.)

The authors envisage that when the children have 'dug up' a whole skeleton they should be given the drawing of it to help identify it from reference books. They can then use the appropriate transparent overlay to check their hypothesis themselves. The work can be developed when the children find out more about their discovery. The drawings and overlays are additional materials which are useful both alongside the program and in other, related, activities.

The value in this work lies mainly in the cultivation of observational skills and language development through the discussion generated by speculation during the uncovering of the various sections of the skeleton and again, when identification has been made, about the special features of a particular dinosaur and how it differs from others.

As mentioned before, the children have to stop after five digs. This gives them the opportunity to go away from the computer to write up a log of their progress. It is suggested that in addition to this 'daily' record, the children draw and write about their 'finds' in both a factual and creative way. How much you get out of this depends on teacher input beforehand. I found that the children needed considerable material on methods of travel, tools and equipment, dinosaur bones and fossils, and encouragement if they were to get the most from the program. Useful link materials can be found in level 8 of the Ginn reading scheme and there is the 'Dino' file for FACTFILE too. However, although this is often a popular topic for this age group, should we be concentrating more on topics based more closely on first-hand experience?

The documentation states that 'The program aims to stimulate group discussion and decision-making as well as providing a framework for an extended topic on dinosaurs.' The children certainly liked it, the level of co-operation and the skills required were totally appropriate to the first year juniors with whom I tried the program. They had to discuss what they ought to do, and the implications of taking certain decisions, in order to get anywhere. There is no opportunity here for the side by side individual work which often mistakenly passes for group effort. *Dinosaurs* achieves its stated aims.

Sarah Wells
Newman College

Title: **Leaves and Pond Animals**
Publisher: SMDP Heinemann, (1983),
22 Bedford Square, London WC1B 3HH.
Machine: Acorn BBC B (disc and cassette),
Apple II, RML 380Z.
Price: £9.95 + VAT.

Intended for age 8 years upwards.

Skills in observation and classification are fundamental to the science curriculum of the primary school. They are important in themselves and also for the role they play in the development of language and logic. Tree studies and investigation of 'minibeasts' are favourite ecological topics chosen by teachers and in each case there is the inevitable problem of identification. *Leaves and Pond Animals* are simple

'Does he byte?'

programs with unsophisticated screen displays which are intended to enable children to identify leaves from broadleafed trees and British pond invertebrates, without assistance. The programs are dichotomous keys and operate by asking the child to select one matching statement from a pair of statements that appear on the screen. The paired statements form a series of choices that gradually lead the child through the key, eventually arriving at the identity of the particular leaf or pond invertebrate. Problems resulting from the meaning of descriptive words (like 'smooth', 'crinkled' or 'toothed') are overcome by providing the children with an illustrated factsheet and a screen prompt which indicates that they should refer to the factsheet. *Leaves* identifies 40 different broadleafed trees. *Pond Animals* can distinguish between 30 different kinds of pond invertebrate. The program pack includes a 12 paged booklet giving basic information on running the programs, lists of organisms that can be identified and some that cannot; there are also some useful references. The programs will be useful in overcoming the tedious task of identification and has the advantage of focusing the children's attention on one pair of statements at a time. Use of the programs should also improve the detailed observational skills of children. The only annoying aspect of the pack is that the factsheets, on ordinary paper – therefore soon worn out or lost – bear a copyright mark.

Michael Negus
Newman College

Title: **The Estimation Series**
Publisher: Hodder and Stoughton, FREEPOST, Mill Road, Dunton Green, Sevenoaks, Kent TN13 1YY
Machine: Acorn BBC B, Sinclair Spectrum 48K.
Price: Per pack of two programs, BBC B £8.95, Spectrum £6.95.
Reviewed on: Acorn BBC B.

Butterflies/Putting, Time Flies/Tanker, Tiles/Fence. This series of programs is designed to encourage, give practice at and improve the skill of estimation in number work. It consists of six programs, each of which uses numbers in a different context: *Butterflies* – 'how many?': *Putting* – length; Time Flies – time; *Tanker* – angles; *Tiles* – area; *Fence* – perimeters.

Due to the concepts involved, (perimeters, areas, angles), most of these programs are aimed at the mid-junior age range, although the handbook does suggest that two of them, *Butterflies* and *Putting,* could be used by lower infants. Indeed, all these programs have a fairly high degree of flexibility as they allow the teacher to define the limits of the estimation range.

Tanker is particularly good. It is about a stricken oil tanker which must be sunk before its leaking cargo pollutes the sea and kills a friendly whale. The child is in charge of a submarine which can be instructed to turn towards the ship and fire a torpedo. If the child has correctly estimated the number of degrees the submarine must turn through and fired a torpedo at it, the ship disappears in an explosion and the whale expresses its gratitude by spouting a plume of water.

The program is very flexible in that it allows the teacher to set the upper and lower limits to give selected practice in one particular quadrant, e.g., 0 to 90 degrees or 90 to 180 degrees, and to control the position of the tanker in terms of step size, for example if 5 is chosen the tanker will only appear at positions which are multiples of 5 degrees.

After playing *Tanker* with a group of nine year olds there was a noticeable improvement in their ability to estimate angles. Their enjoyment carried over into complementary work using worksheets. Whether their improvement is long term remains to be seen!

Of the six programs in The Estimation Series, I thought *Tanker, Fence* and *Putting* were the most worthwhile, together with *Butterflies* which is an adequate infant program. By far the most useful feature of the programs is their flexibility, both in the number of children who could be involved, (one to a whole class), and in the way that the teacher can define the learning stages experienced by the children in an ordered and controlled way.

Philip Mate
Newman College

Title: **Infant Maths I**
Publisher: MRH Systems and Software, 20 Highfield Road, Kidderminster, Worcs DY10 2TL.
Machine: Acorn BBC B 1.20S/Electron.
Price: £7.95 cassette. £9.95 disc per program but the price reduces if you buy more than one. The complete suite of four programs costs £24.95.

This first infant series from MRH Software contains four programs: *Ordering* – according to size with two levels of difficulty; *Odd-one-out; Position* – left, right, up, down; *Shapes* – using shapes to create simple pictures. The first three present pictures of familiar objects for the child to sort or select, like a teddy bear or racing car.

There were some initial problems loading the programs from disc but, once loaded, they were clearly presented, easy for the children to operate and educationally sound. A few of the pictures could have been more exciting.

Children between five and seven years of age used the programs. *Ordering* and *Odd-one-out* worked equally well with groups or individuals, and *Position* and *Shapes* were particularly good for promoting discussion and problem-solving within a group (although younger children – three to five year olds – would probably need adult help to gain most benefit).

The programs successfully achieve their aims and are worthy of consideration for addition to any infant school software library.

Belinda Winroope
Abbey Infant School, Sandwell

Title: **Word Skill**
Publisher: Chalksoft Ltd, P.O. Box 49, Spalding, Lincs PE11 1NZ.
Machine: Acorn BBC B (disc)
Price: £12.25

Word Skill is the latest offspring of a generation of educational computer programs that attempt to concentrate children's minds on the content and context of the letters and words in a sentence. Needless to say, the claims for the program are impressive: '. . . designed to exercise spelling, reasoning, and deductive skills. . . . to improve vocabulary and comprehension . . . to encourage discussion and co-operative play . . .'. Unfortunately, the reality is a little different.

Basically the program resembles an elaborate version of 'Hangman', using whole sentences rather than single words. The missing lower case letters are represented by a _, the missing upper case letters by a *. The significant missing element is the gallows. As the user types in a guess the appropriate dash is filled in and the chosen letter disappears from the alphabet display on the screen. The user is able to control both the selection of words and the way the sentence is put together. Also, the computer has a set of words stored away if needed . . . mostly they're not.

Word Skill boasts '. . . there are over 4,000,000 sentences possible. . . .' O.K., but why do so many of them contain the word hippopotamus? There is also a 'Fun' option. Here the computer randomly mixes words, then contructs the various elements of a sentence with them. How well 'Joe's simple dinner lady sat down' will be received remains to be seen.

The reward, if all the missing letters are found before time runs out, is to hear the first few bars of various well-known tunes heavily disguised by the cunning use of an eccentric metronome. Incentives to finish include the score, which can be compared with other users' scores; beating the clock; and of course the sheer pleasure of the concept.

That said, despite the occasional foibles, extensive use of the program reveals a lot of potential and its main strength lies in the wide range of options available. The teacher/parent/child has tremendous control over the content and level of the program and it is extremely easy to use with excellent editing facilities. By careful use of these extensive facilities the teacher/parent can use the program for a wide range of reading applications, limited only by his/her imagination and inventiveness. If you do not have a reading/spelling program of this type and can afford £12.25, then this program comes highly recommended.

Geoff Turrell
Newman College

Title: **Rhythm and Pitch**
Publisher: Chalksoft Ltd, P.O. Box 49, Spalding, Lincs PE11 1NZ.
Machine: Acorn BBC B (disc)
Price: £14.25

For pupils taking music examinations, aural tests often present a daunting prospect out of all proportion to their intrinsic difficulty or importance. Classroom music teachers understandingly find it difficult to devote sufficient time to individuals whilst they have whole classes to deal with, and peripatetic instrument teachers, with perhaps little more than an average of ten minutes per week for each pupil, are rightly loath to squander scarce resources on preparing pupils for such tests.

Ill-prepared or nervous examinees may well find that this program provides them with just what they need to give them sufficient confidence to achieve results which truly reflect their ability.

Rhythm tests are provided ranging from the simplest which involves listening to, and then completing on the screen, a single bar in 3/4 or 4/4 time using crotchets and quavers, to, at the most difficult level, writing four bars, using in addition dotted crotchets, minims and semibreves.

Pitch tests cover a range of difficulty from identifying a single repeated note after a sequence of four, to writing on the screen a five note phrase after, but not necessarily taken from, the notes of the appropriate key-chord which are also played.

There are six levels of pitch tests and seven levels of rhythm tests. The pupil or teacher may initially choose the level of difficulty, but any succeeding tests' levels are determined by the scores obtained on the current ones. Alternatively the program may be rebooted from the start.

The two types of tests may be combined, though if this is done pupils must revert to the use of manuscript paper to record pitch, and they are trusted to enter their pitch scores correctly rather than have the scores recorded automatically. The facility for automatic recording of test scores against a pupil's name will be found useful by teachers wishing to check on their performance. The scores are easily called up from the disc via the main menu.

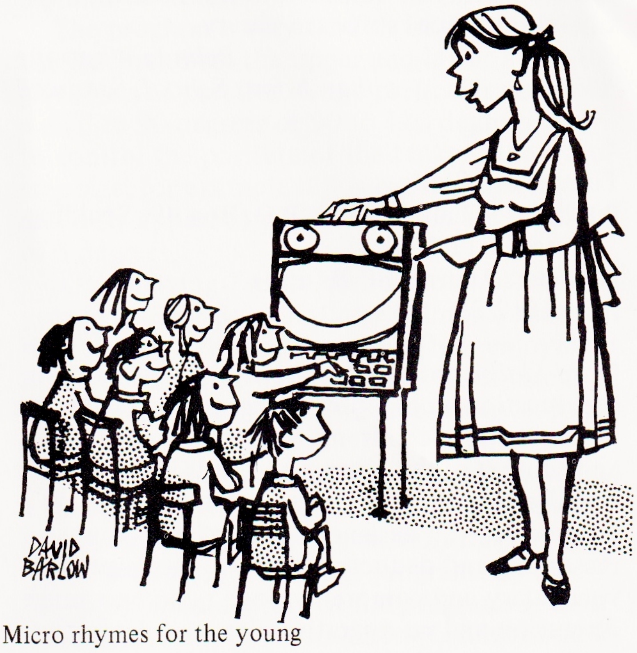
There is, on all tests, a facility for repeating dictated phrases and for deleting uncompleted answers. This very successfully reduces anxiety in users and increases their capability for careful listening.

Up to ten repetitions of the dictated phrases may be called upon. At this point unfortunately, an error message informs the user of 'Too many FOR's at LINE 470'. For the average music pupil the program has crashed, with all that this implies. This is probably the most serious of a small number of minor bugs, which one presumes will not be present in later versions.

On-screen information at the start of the program is comprehensive, leaving little need for documentation. The introductory screens, without the pupils' help routine, require a minimum of ten key presses and complete with unavoidable jingles take around a minute to execute. That is without reading any of the text and without pondering over choices. Regular users are likely to become irritated by this and will wish for some means of obtaining a required test immediately on demand. For instance it is, at first, quite a novelty to be asked which choice of graphics colours one would prefer, but after a few times one begins to wonder why the designer could not make up his own mind.

For the purposes outlined, this program certainly fulfils a need and should be of some benefit to a limited number of teachers and their pupils. It is not however a program to be recommended for the primary classroom. It does nothing to further musical education, except in a very narrow technical sense. It stands in relation to effective music teaching as a tables testing program does to promoting a love of mathematics.

Tony Beauchamp



Micro rhymes for the young

Mary, Mary, quite contrary,
In the classroom, how do *you delight 'em?*
With discs and tape, ideas from MAPE,
And computer games, ad infinitum.

Evidence from MAPE

to the Committee on Achievement in Primary Schools

MAPE – its background and role

MAPE (Micros And Primary Education) is a national organisation, formed in 1981 with the support of the government agencies of DTI, MEP and CET. It enjoys the support of BP and IBM among other industrial concerns.

Its constitutional aim is to promote and develop the awareness and effective use of microelectronics as an integral part of the philosophy and practice of primary education. This aim is to be achieved by:

a. developing a philosophy on methods of using micro-electronics in education;
b. disseminating information and ideas among members;
c. advising members;
d. liaising with commercial organisations, with a view to making them aware of the educational needs of primary schools and to receiving from them information about developments relevant to primary schools.

The curriculum implications of micro-technology

There is clear evidence that high quality software can provide teachers with a means of extending children's opportunities in a wide range of curriculum areas. Examples can be drawn from a wide range of pupils and across a wide spectrum of curriculum activity.

Major influences can be seen, for example, on:

- the content and presentation of children's written work via wordprocessing;
- the flexibility of investigation of collections of information via information retrieval packages;
- the exploration of geometrical shape in an open-ended way, and the development of problem-solving techniques, via the language LOGO;
- the manipulation of environments via simulations;
- basic skills of numeracy and literacy via a range of uni-purpose software.

Such examples – and this list provides merely a few examples for the purposes of illustration – are sufficient to indicate the benefits likely to accrue when sufficient resources exist, and when the passage of time has enabled a greater part of the teaching profession actively to contribute to the harnessing of the technology to their curriculum aims.

It is noticeable that content-free software – that is, software which provides a basic structure for an activity but leaves the content to teacher and pupil to define – is becoming widely accepted as the most obviously beneficial. The facility to impose a purpose on the technology, rather than be imposed on by pre-defined routines, motivates children to collaborate in formulating and refining their solutions to problems.

Such activities imply access to a computer for substantial periods of time. They are, however, of very much greater value than activities artificially tailored to fit into defined timeslots in order to allow a scarce resource to be moved from class to class.

The study of the technology itself, rather than its use as a service agency, may well be of less relevance to the primary child, notwithstanding the possible relevance of such study, at more advanced levels, to the national interest. There is a danger of primary education being seduced by the technology, swayed by its existence rather than its contribution to the accepted primary curriculum. That is not to say that the curriculum should be seen as incapable of embodying change and new content, but that potential advances should be seen in the light of commonly accepted criteria for the curriculum.

Implications of the current trends and likely development

1. Teacher expertise

Integrating the use of computer technology into their work is not simply a matter of teachers learning skills, although that is a subsidiary part of their task. The basic need is for an environment to exist which allows these new, powerful resources to be considered and evaluated alongside each teacher's other resources and activities. This implies a need for a substantial national commitment to INSET, but that the provision of such INSET be integrated with the other training opportunities available to teachers locally. The requirement is for LEAs to be properly funded to provide INSET, and not merely for the external provision of courses which may fail to relate to schools' and teachers' real needs.

At present the pre-service contribution in this field is very small. Methods of ensuring that all teachers, during their training, meet technology in a relevant way need to be found, but it has also to be appreciated that most teacher training staff have little or no experience of this field themselves, and are therefore poorly placed to provide the necessary educational context for the use of the technology.

2. Equality between schools and between pupils

Three facts are particularly pertinent here:

a. The home computing market is male dominated.
b. There are already recognisable differences between areas of the country in the extent to which home computers are bought.
c. The provision between schools is already seen to differ widely depending on LEA provision, PTA contribution and other factors.

Good primary school practice tends to militate against sex bias, in that integration of the use of computers with other aspects of the curriculum tends to avoid the focus on the technology evident with much home use. There is nevertheless an urgent need to ensure that girls continue to be fully involved in computer use. This also relates to the INSET comment above, in that female teachers must continue to be seen as regular users of technology.

Access to the intellectual power which computer technology can provide for children should be ensured for all pupils. Although it may well not be possible to eradicate all differences in provision, urgent consideration should be given to funding schemes aimed at meeting this objective.

3. Provision of computer equipment

The Department of Trade and Industry scheme has enabled all primary schools to purchase a subsidised microcomputer. Valuable though this has been, it has in some ways created demands which cannot be met without further national funding. A priority is to provide disc and printer facilities to accompany the original equipment – which would make certain uses such as word-processing and information retrieval more feasible – and to assist in the purchase of more computers.

The evidence is clear that powerful computing facilities need to be readily available to young children to enable them to undertake the sort of work described above. Indeed, it could be argued that the younger the child the more sophistication is needed in the computer's response, and therefore the greater the need for computer power. Any future funding should extend the facilities in schools in terms of power as well as numerically.

Taking a longer term view, it is probably unrealistic to expect schools to carry the burden of managing a number of computers operating independently. Management considerations, as well as financial advantages from sharing of resources such as printers, imply that networks of computers should be available in primary schools, making all software readily available with the minimum of restriction or of technical expertise on the part of the children and teachers.

4. Software and related materials

Educational computer software is in its infancy, with today's usage being seen as indicating a clear potential for expansion. This implies substantial investment in computer software; such investment should be directed towards assisting education to collaborate in the design and testing of materials, and not towards a commercial software market largely unresponsive to, and/or uninformed of, schools' needs. Primary schools are, and will increasingly be, unable to purchase software priced at current rates. An educational software market, producing quality material at minimum cost, and where possible using LEA and other curriculum groups' resources in the creation, testing and dissemination phases, is the only system likely to be sustainable in the medium and long term. Such provision requires substantial national funding.

Summary

A. Computer software can provide powerful assistance to many children and in many curriculum areas.

B. Current usage indicates the likelihood of continuing, and increasing, relevance of computer technology to primary education.

C. Content-free software, able to be tailored to children's needs, appears the most beneficial.

D. Potential developments should be measured against accepted criteria for the curriculum, not be merely the result of technological advances.

E. LEA-based teacher training in the use of computer software, integrated with teachers' other curriculum and INSET activities, needs a major national initiative.

F. Equality of provision between schools, and between individual pupils, should be an objective, and requires national funding.

G. Assistance to purchase discs and printers to accompany DTI-funded computers, and to purchase further computers, is necessary.

H. Primary school children need powerful computing facilities.

I. Networking of computers will be the most manageable and economically realistic way of extending schools' computing resources.

J. An educational software market, based on the educational system, is the only viable way to ensure access to software by schools. The commercial software market is not appropriate.

MAPE Executive

This letter, which represents the views of MAPE, has been sent to the Education, Science and Arts Committee, which is investigating 'Achievement in Primary Schools'.

'If you aint a delegate, then 'op it!'

MAPE Tapes

MAPE Tape 1

The Council has decided to grant to LEAs the authority to copy and distribute this tape to each school in the LEA. There will be no charge for this. This now means that all schools requiring a copy of MAPE Tape 1 should contact their LEA Computing Centre.

MAPE Tape 2

All members of MAPE (as of December 1 1984) should have received this tape before Christmas. It is not public domain, although at the beginning of the Summer Term LEA's will be offered the opportunity to purchase a licence. We have had very few faulty tapes returned, and of those we can only confirm faults in the case of about 1 in 4. However, a couple of bugs have come to light, for which we apologise.

BBC Amendments

1 The program NINES has a faulty line which means that vertical numbers are not scored correctly.
   Line 770 reads IF VAL(T$)MOD9
   It should read
   770 IF VAL(T$)MOD9=0 THEN S=S+T
2 On the BBC side NINES is in two parts. You should type CHAIN "NINES" and leave the tape recorder running until the second part (NIN) has been loaded.
3 On a BBC machine with a DNFS chip (i.e. combined disk and network chip) the program CTOD will generate an error message "Bad name at line 17". In this case remove line 17 from CTOD and try again.

480Z Amendments

1 Please note when using CRECLZ.BAS on a cassette based machine, the following modifications should be made:
   Replace line 510 with
   510 TD=PEEK(65390):PUT31
   then add this line
   555 IF TD=255 THEN 600
2 Please note that the programs when transferred to disk are designed to run under BASICSG2 (i.e. version 5). Some of them will not run under BASIC6.
3 If you have problems with some programs it may be due to the fact that you have loaded them into the micro after you have run SURVEY and SITING. This program redefines some characters and can affect subsequent programs. After using SURVEY and SITING press reset before loading subsequent programs.

BBC Jumbo

Some members may have noted that the function keys are also programmed in Jumbo, with the exception of f9.

f0 Elephant	f5 Forwards
f1 Crane	f6 Backwards
f2 Lorry	f7 Tie
f3 Up	f8 Release
f4 Down	

BBC Castle

Some children have found a means of increasing their score ad infinitum; namely when a particular item is found there is nothing to stop you typing FIND several times and winning 30 points each time. In order to stop this low cunning, retype line 5510 as follows:

```
5510  IF find (J) = room AND found (J) <> 1
      THEN found (J) = 1: found$(J) = find$(J)
      : F = F + 1
```

FRONT PAGE and the Walters Printer

The program as it stands allows a printout to be made on an Epson printer. Because of the difference in the way the Walters and Epson print out high resolution graphics, it is not easy to simply change FRONT PAGE so that it works with a Walters 2000. However, we have written a machine code routine to produce screen dumps on the Walters, and FRONT PAGE can be changed so that instead of sending codes to the Epson, it calls this routine.

There are two versions of the routine, one called WTDUMP and the other called WNDUMP. The former will give a true representation of what is on the screen, (i.e. white will appear as white on the paper), and the latter will give a 'negative' image (i.e. with intensities reversed). As FRONT PAGE uses a white background on the screen, it will be best to use WTDUMP to give a printout.

The routines can, of course, be used for dumping any pictures to a Walters printer, except those in Modes 3, 6 and 7.

If you would like a copy of WTDUMP and WNDUMP we can distribute copies provided there is sufficient demand. There would be a charge of £2 for which you would receive a BBC cassette containing both programs. If you are interested in this utility, please write in to Newman College Computer Centre. Do not send any money at this stage. We will contact you again once we have determined the demand.

If you do have a tape that it is necessary to return, please indicate which side is faulty and give a brief description of the problem.

More importantly *MICRO-SCOPE* would be delighted to receive articles giving classroom accounts of any interesting work carried out with the programs.

MAPE Insurance

The firm providing the insurance has been forced to review the policy in view of the fact that claims exceed revenue by over £8,000. All existing policies will be honoured, but it will not be possible to renew on existing terms. The National Council will no doubt review this matter at the next meeting and report back to members at the A.G.M. at Easter.

Roger Keeling

MAPE news

Chiltern Region

Our travelling roadshow was again the main event of last term. Entitled *Kids, Computers and Classrooms* it took place in Bedwell Teacher's Centre in Stevenage and was principally organised by Gail Porterfield, our current secretary. The event was particularly well attended. Two rooms were in use and a variety of applications on show. These included data base work, control applications, LOGO, Developing Tray and some commercial material from educational publishers. Back issues of *MICRO-SCOPE* were also on sale. Compared with other occasions, it seemed particularly crowded, with parents getting as involved as the children. One individual got particularly hooked on Developing Tray, and didn't leave it for over an hour. We hope to stage our next roadshow in Cambridgeshire this term.

Bill Bailey

West and North Yorkshire

The inaugural meeting of MAPE (West and North Yorkshire) was held on November 22nd 1984.

Sixty members had been notified of the meeting and 15 questionnaires covering the possible activities of the group were returned.

Eight members and four visitors were present, and they discussed the objectives of the group and future activities.

The steering committee consists of:
Convenor/Secretary, Regional Representative – Marjorie Briggs
Treasurer – George Blanchard
Editor of Newsletter – Mr Gregory
Minutes Secretary – Janet Saxton
Convenor for York area – R.A. Laycock

We intend to hold the next meeting on January 31st.

Marjorie Briggs

Greater Manchester and Lancashire

We are holding a meeting on Saturday 27th April at Bury Teacher's Centre from 10.00 a.m. until 1 p.m. There will be a main lecture by Mike Matson (author of *Granny's Garden* and *Flowers of Crystal*) plus interest groups covering Quinkeys, turtle graphics, number patterns, MAPE Tape II, *Edfax*, Bigtrak, and 480Z maths programs. The fee for members will be £1, and for non-members, £1.50.

Stephen Booth

MAPE National Commitee Members 1984/85

Chairman: Bryan Weaver, I.L.E.C.C., John Ruskin Street, SE5 0PQ. Tel. 01 7359123.

Vice Chairman: Roger Keeling, Newman College, Genners Lane, Bartley Green, Birmingham, B37 3MT. Tel. 021 476 1181

Treasurer: Keith Whiting, 149 Sherbourne Ave, Nuneaton, Warks CV10 9JN. Tel. 0203 396132

Secretary: Anne Liddle, Pentland Primary School, Pentland Avenue, Billingham, Cleveland, TS23 2RG. Tel. 0642 552848.

Microscope Editor: Senga Whiteman, Newman College.

Conference Organiser: Reg Eyre, Dept. of Maths, Science and Computing, College of St Paul & St Mary, The Park, Cheltenham, Gloucestershire, Tel. 0242 513836

MAPE Admin: Mrs G. Jones (MAPE), 76 Sudbrooke Holme Drive, Sudbrooke, Lincs, LN2 2SF.

Regional Representatives

CAPITAL REGION
Heather Govier, IT Unit, Davidson Centre, Davidson Road, Croydon CR0 6DD
Tel. Office: 01 654 3769, Home 01 657 0423

LEAs
Bexley, Bromley, Croydon, Ealing, Hounslow, ILEA, Kingston, Merton, Richmond, Sutton.

Code 01

CHILTERN REGION
Bill Bailey, 'Kingsley' Scatterdells Lane, Chipperfield, Herts, WD4 9EX.
Tel. Kings Langley 63532

LEAs
Barnet, Bedfordshire, Brent, Buckinghamshire, Cambridgeshire, Enfield, Haringey, Harrow, Hertfordshire, Hillingdon, Oxfordshire.

Code 12

EASTERN REGION
Newton Coen, Ridgeway, The Row, Hartest, Bury St Edmunds
Tel. 028 483 535

LEAs
Barking, Essex, Havering, Newham, Norfolk, Redbridge, Suffolk, Waltham Forest.

Code 03

EAST MIDLANDS
Stan Norman, 70 Mount Pleasant, Keyworth, Notts. Tel. 06077 5540

LEAs
Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, North Derbyshire, Nottinghamshire.

Code 10

GREATER MANCHESTER LEA
Dave Whitehead, 550 Whitworth Road, Rochdale, Lancs. Tel. 0706 33759

LEAs
Bolton, Bury, Lancashire, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, Wigan.

Code 05

MERSEYSIDE WITH CHESHIRE
Jim Fawcett, St Malachy's R C School, Beaufort Street, Liverpool 8
Tel. (School) 051 709 3682 (Home) 051 734 0786

LEAs
Cheshire, Knowsley, Liverpool, Sefton, St Helens, Wirral

Code 09

NORTHERN REGION
Tony Renkin, Beaconside Junior School, Penrith, Cumbria. Tel: 0768 66547

LEAs
Cleveland, Cumbria, Durham, Newcastle on Tyne, North Tyneside, Northumberland, South Tyneside, Sunderland, Gateshead.

Code 07

SCOTLAND REGION
Glenys Marra, 7 Ralston Place, West Ferry, Dundee, DD5 1NP
Tel. 0382 78815

Code 20

SOUTHERN COUNTIES
David Marshall, Rocks Park Jnr School, Uckfield, East Sussex

LEAs
Berkshire, East Sussex, Hampshire, Isle of Wight, Kent, Surrey, West Sussex.

Code 11

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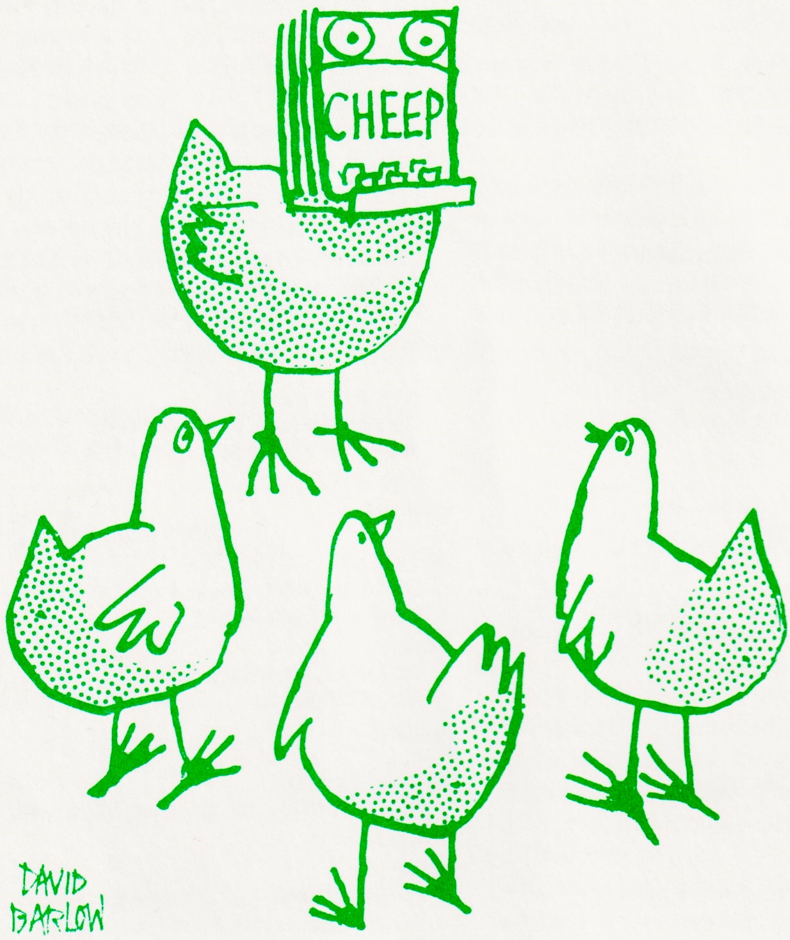

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