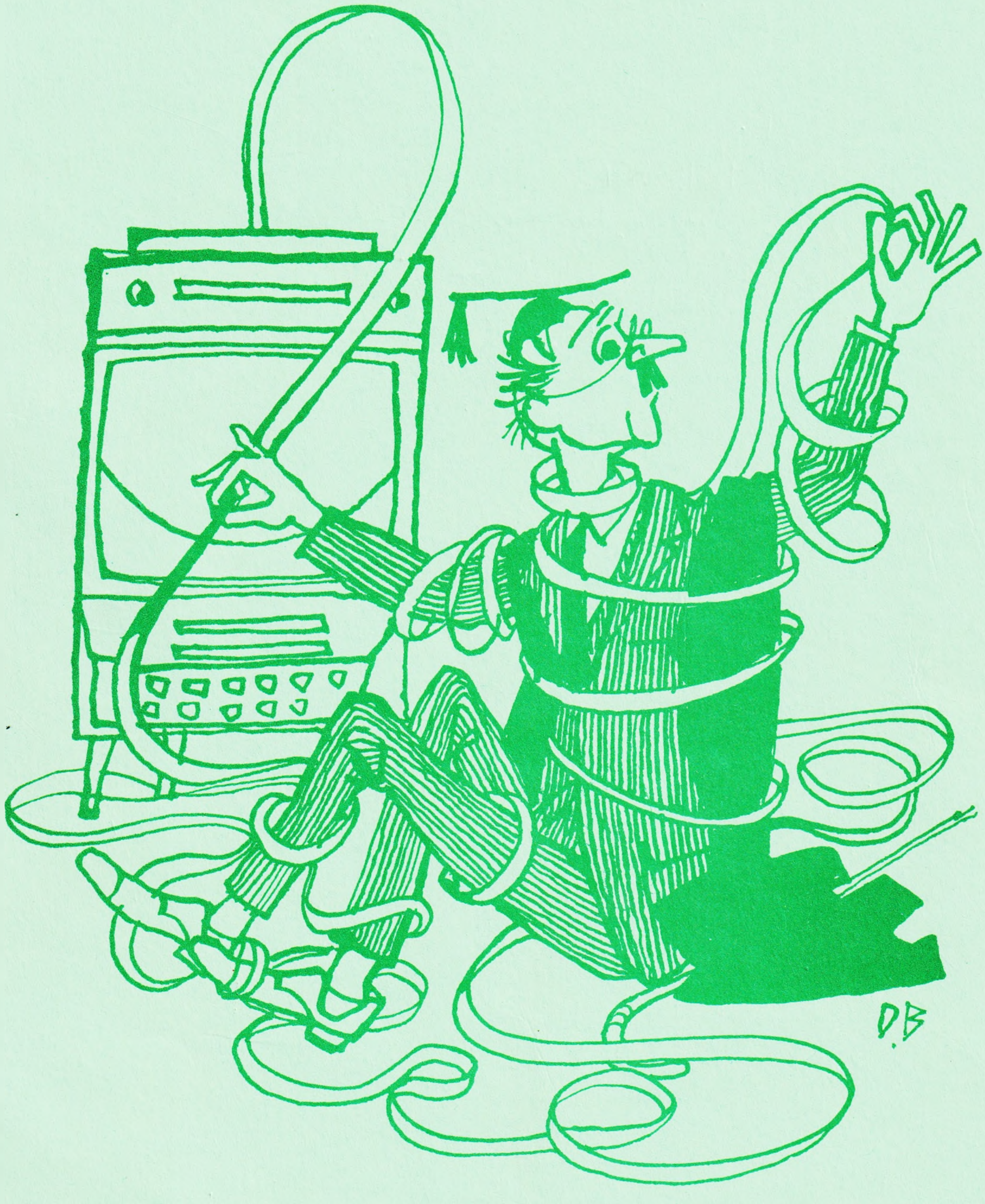
MICRO-SCOPE



Newman College JUNE 1981 3

MICRO-SCOPE - 3

(MICROcomputer Software Co-Operation for Primary Education)

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We are pleased to acknowledge with gratitude a generous grant from the Department of Industry. This will help us to maintain our policy of providing a free service to primary teachers for at least a year. All primary schools in the West Midlands should receive copies by courtesy of LEA mailing. All primary advisers in England and Wales should receive sample copies. Primary schools and teacher's centres can go on our direct mailing list by sending £1 p.a. (3 issues) to cover postage. Others in education pay £5 p.a. - we cannot supply interests outside education.

The next issue will be dated November 1981. Contributions should reach us by October 7th.

CONTENTS

EDITORIAL

Momentum has increased dramatically. In this issue we report on the Microelectronics Education Programme, on BBC plans and on the Exeter conference. A new and significant move is the creation of a national organisation of teachers using microcomputers in primary schools. We support this development, and hope that our reports (see p. 40) will help to publicise it. All of this offers a genuine prospect of a powerful professional influence on progress. Commercial pressures will be enormous: we need countervailing educational principles. This applies to software also. Should teachers sell each other programs? Let us make our views clear. Commercial software has a rôle, but we should examine it critically. It is quite legitimate for teachers to write for commercial companies, or accept consultancies. But we see the co-operation of teachers freely exchanging software as an important principle of development. There are crucial yet difficult issues here, including questions of copyright, on which we invite comment from readers. An efficient network of communications, as planned by the MEP, should help to provide solutions.

* * * * * * *

Now that the Department of Industry has plans to enable every secondary school to possess a micro, an extension to primary schools would be welcome. But note the irony, if schools making sacrifices to buy and get involved now miss out on the handouts later! If the Government is serious about support, it should urgently review the provision of in-service training. Part-time courses of many kinds are needed, and BBC initiatives will help too. But substantial full-time courses, backed by generous secondment, offer the only prospect of providing expertise in the schools on an adequate scale. Initial training courses too must soon reflect rapidly changing needs. We shall expand on this theme later.

* * * * * * *

Micro enthusiasts will do their cause a disservice if, as the band-wagon rolls, they fail to listen to more sceptical colleagues. Children do like punching buttons and summoning flashing lights! Many current programs seek to harness (or pander to) this extrinsic motivation. What is the child then learning about learning? Some programs by-pass the class teacher and the education process completely. It is too early for anyone to be dogmatic about the strengths and weaknesses of the micro in the classroom. We shall again look to the MEP for guidelines in due course.

Meanwhile Newman College has planned a programme for monitoring the use of micros in six local primary schools over a year (see p. 39). We shall report on this and other exercises, as MICRO-SCOPE in its second year moves on from raw enthusiasm to more sober efforts at evaluation.

THE EXETER CONFERENCE

"MICROCOMPUTERS IN PRIMARY EDUCATION"

at the School of Education, University of Exeter,
April 8th to 10th, 1981

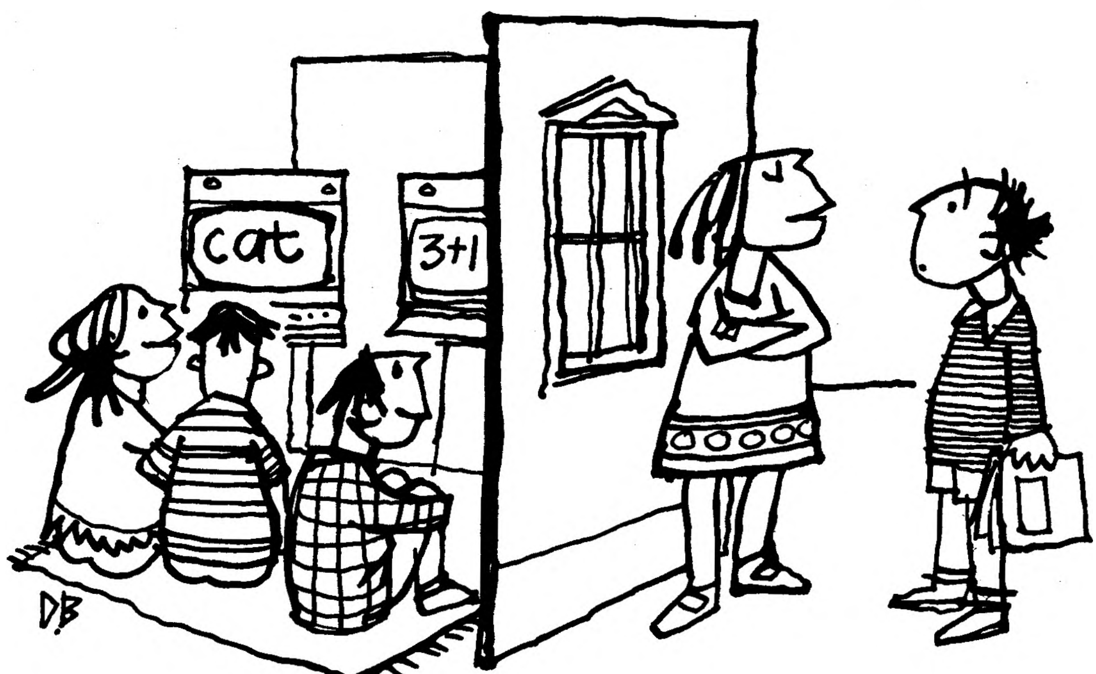
The Exeter Conference marked a significant new stage in development. Participants came from Cornwall and the Isle of Wight, from Cumbria and Scotland, from Wales and Ireland, even from Canada, Australia and Switzerland. There were class teachers and heads, advisers and lecturers, representatives of BBC and MEP, publishers and computer men. Some brought the fruits of years of experience, some the enthusiasm or scepticism of newcomers. Many represented well established local groups, others were isolated individuals drawn by curiosity or the need to make contact. The conference predictably sharpened our sense of anticipation. We could feel the change to a new and national scale of events.

Bob Coates, newly appointed to the Microelectronics Education Programme(1) set the scene in a keynote speech. When the project wound down in 1984, it would aim to leave behind a solid foundation for further development. Accordingly, the style was to encourage and coordinate initiatives, not to issue directives. MEP worked on three levels - national, regional and local - and the establishment of a strong regional network was seen as the first organisational priority. The specified age-range was 5 to 18 years, and a sharp primary/secondary split in this new field would be false. New topics would emerge, as well as applications of Computer-Assisted Learning and Teaching ("CAL" and "CAT") in the existing syllabus. "Number-crunching" was not the only, or even the most promising, facility - the machine's graphics and text-handling gave far wider scope. Computers could not replace teachers, but would provide them with powerful new resources. The implications for teacher-training were considerable, with in-service needs taking immediate priority. As examples of the current momentum, Bob selected far-reaching plans announced by the BBC(2), the productions of "MICRO-SCOPE" and "MUSE", and the Department of Industry's Government-based scheme to help provide hardware for schools. Answering questions, he confirmed that MEP would have a rôle in establishing standards for educational programs. A national MEP newsletter could use word processors and so only become paper in the regions, using LEA internal mailing from there. The project would not standardise on any particular model, but would support all the machines which are well-established in schools - work would be done on "compatible writing". MEP would undertake, in its final report, to identify some guidelines for the evaluation of programs and curriculum applications.

(1) See also page 38 for a summary of MEP.
(2) See also page 36.

In the second major speech, Mike Golby offered a gently probing inquiry into the philosophy and direction of change. He identified two contrasting traditions in English education - the elementary, control-centred drill approach and the progressive, pioneering spirit emphasising self-expression - a split also associated with masculine/feminine stereotypes. A third tradition, of technological innovation, could be more empirical and thus either subject to prevailing influences or open to conscious choices. The unanswered questions were disturbing. Would development be determined by economic investments or by visionary hopes for a new expansion of consciousness? Would the balance move towards the accumulation of facts and skills, against the transformative qualities of attentive and aesthetic learning? How would local diversity fare against the uniformity of national expertise? Would we seize the opportunity to demystify the ritual power of the printed word in education, or merely replace it with new forms? Who shall program the programmers themselves? Mike cited "Star Wars" mania as an example of the insidious attraction of the machines, to which children were particularly vulnerable. He reflected also that the majority of primary teachers were women: of conference members, men. Unless we learned to tame the beast, it could feed on us.

Michael Thorn's concluding paper, on "What makes a good program?" was positive and practical. He reminded us that children take in their stride innovations which seem futuristic to adults. The computer has the power to provide a world in which the child can lose himself in the practice of science, can investigate problems and challenges, fantasies and consequences, and gain the satisfaction of control. He can learn to tolerate, and even gain from, making mistakes. Michael contrasted this with a traditional curriculum that creates "mathophobia" - lots of rules, fierce teachers, lack of relevance, unnatural time pressure. He demonstrated some lively possibilities using "BIGTRACK", a "walking-beast" similar to the turtle which Seymour Papert has been using in America.



'We're a two-computer family.'

Of course, the heart of a conference lies in the working groups and informal contacts. Individuals and local groups offered valuable demonstrations of their programs and described the results of their use in schools. The ensuing discussions were wide-ranging and lively. My strongest impression was of the sheer diversity of current practices and objectives. There are no final answers yet, no established standards of excellence. The need to share, compare and eventually evaluate our experiences is clear.

Following this general summary we publish three individual accounts of personal impressions from the conference. We hope to follow up in future issues with reports from local areas, correspondence on the issues raised and further developments on the national scene.

In the final plenary session the conference gave form to the sense of progress and promise it had generated. A proposal was made to create a National Organisation for users of microcomputers in primary schools. Ron Jones, a Cambridgeshire headteacher, introduced a draft proposal outlining a possible structure. There was overwhelming support. It was agreed that a Steering Committee be established. Several views were expressed on its constitution. One was that members be nominated from the floor of the conference. Another was that various sectional interests (Infant Teachers, Advisers, Lecturers etc) be separately represented. Eventually Ron Jones and the other working group leaders were invited to form the basis of a steering committee and co-opt others as necessary. This is an important development and we hope that MICRO-SCOPE will help to support and publicise the growth of the new organisation. Roger Keeling has been invited to join the committee and his report of the first meeting is on p. 40.

John Lane.

IMPRESSIONS FROM EXETER

ONE I enjoyed the conference at Exeter very much. Why?

1) I have had an 8K PET in the classroom since September 1980. Apart from telephone contact and an occasional meeting with another colleague who also has an 8K PET, I've worked in isolation. The conference really broke that isolation. It was possible to meet other teachers in the same position. The overall impression I gained from them was that we were all doing much the same sort of thing and had similar problems. In particular it seems common for children to work individually or in pairs using Maths and English programs. However, of the 130 participants only a minority appeared to be classroom teachers with any substantial experience of using a micro with children in their class.

2) It came as a great surprise that my own impecunious L.E.A. (Knowsley) was fairly far ahead in its approach to computers in primary schools. A decision was made some time ago to standardise on the PET in primary schools. Further evidence of this enlightened policy is given by the fact that I was loaned an 8K PET as far back as May 1979 for two months' use.

3) The conference gave me the opportunity to clarify my own thoughts as to what to do next. This will be to press for the establishment of some sort of software library in the area. The conference enabled me to hear and discuss how others were approaching this task.

On the minus side:-

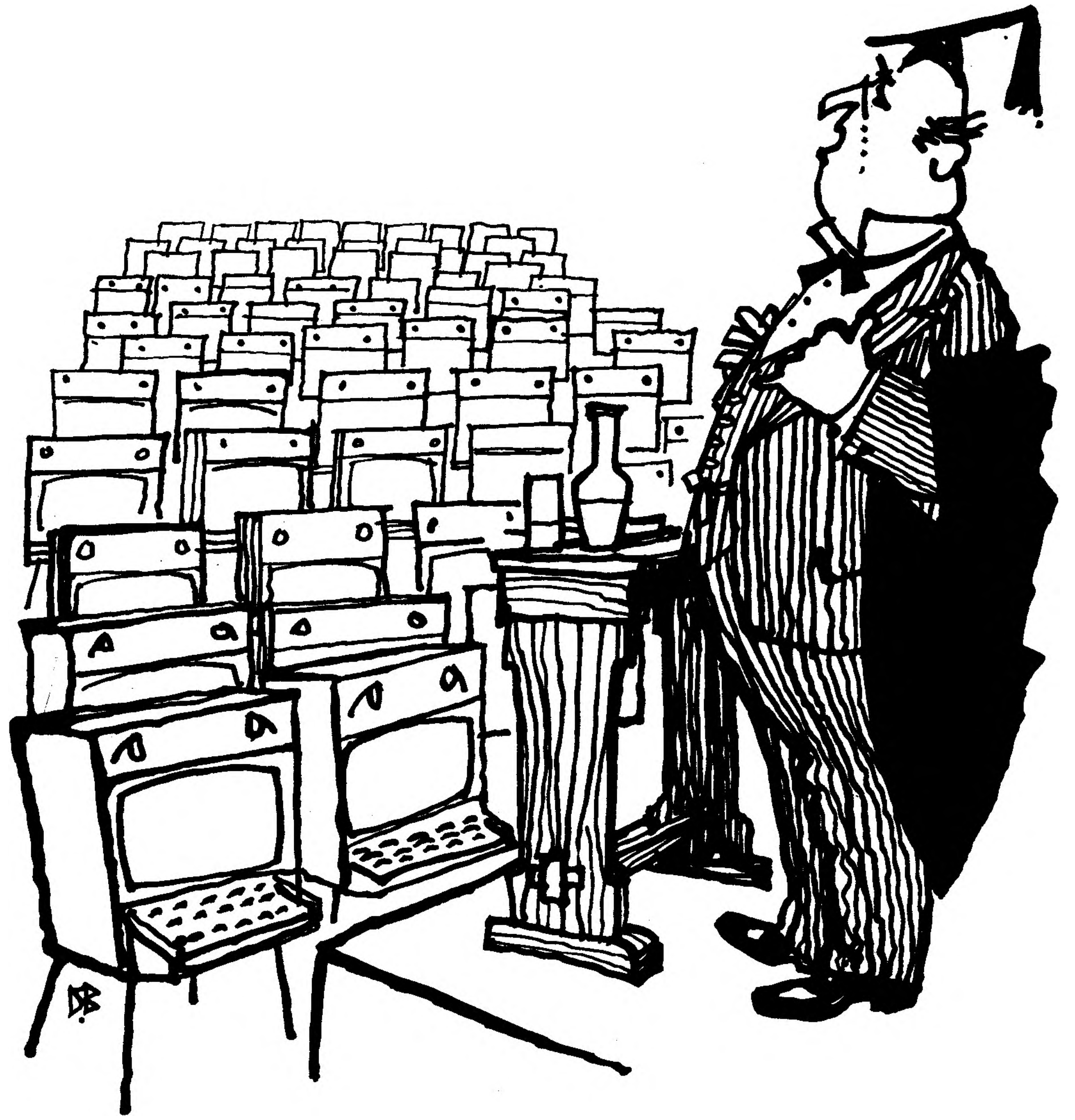
1) I was disappointed that no positive use appeared to have been made of the initial information we had put on our forms. I would have liked to have known exactly who all the different people were, so that I could have sorted out fellow class-teachers, rather than come upon them accidentally.
2) There was not nearly enough time spent on what is actually being done with children. The only new aspect I came upon was the group decision - making programs of Ray Haydon and Barry Holmes. I would have liked more opportunity to discuss with class teachers how these work. At the end of the day we are all left with 30 children. How do other people actually organise an eight-person group discussing strategy? What are the rest of the class doing? This aspect is always neatly glossed over, but back in the schools it is what our colleagues ask us about.
3) It was encouraging to meet so many enthusiasts for micros but disappointing and a little disquieting that so little attention was given to the systematic evaluation of their use.

Pat Hughes,
Huyton, Merseyside.

TWO My impressions of the current use of microtechnology in primary schools gained from the national conference at Exeter were mixed. Microcomputers seem to have great potential for educational use, but almost equally great potential for abuse. I was dismayed to see so many programs based on a behaviourist model of learning: a model which seems to me wholly inadequate. If this type of program were to predominate then CAL could suffer the same fate as programmed learning. My objection to this kind of program is that it provides an extrinsic reward for a task whose reward should be intrinsic. I found when trying them out myself that after the initial novelty, the jingle or animation became an irritating interruption which delayed the presentation of the next question.

I am also dubious about the use of the microcomputer as an electronic textbook cum general assistant. Teachers obviously need resources on which to draw: it is impossible to invent appropriate tasks ourselves for each child in classes of increasing size, and duplication of effort is foolish. But we have to ensure that the programs are truly valuable: that they are at the right level for the child and set in the context of the curriculum. Otherwise the microcomputer could become a convenient means of unthinkingly administering the 'Stride Ahead' / 'Five a Day' type of exercise that props up lazy or incompetent teachers.

The programs which seemed to me to hold more potential were those based on a cognitive model of learning, involving reasoning and strategies for problem solving. (One example was 'The Spanish Main' from St Helen's, Bluntisham.)



'... And computers can certainly take over some of the dull, repetitive chores in our school life...'

Programming itself requires similar qualities of thought, and I would be interested to see whether children who have learnt to program are better able subsequently to deal with problems. I would expect that the need for precision and for the development of an algorithm to solve a problem or complete a task would be a useful discipline, and lead to an improvement in the quality of thinking. There might also be useful links between elementary computing knowledge and some mathematics (especially logic) already on the primary school curriculum. I saw a program from the Grimsby project on sets and complements that could easily lead on to a consideration of simple logic gates.

My conclusion from the conference, then, is that I would use these principles when evaluating hardware or software:

1) start from the curriculum and use microtechnology, just as any other resource, in a way which fits in with the policies and characteristics of the school;

2) use programs which develop powers of thinking and which allow learning to be its own reward.

One final point - I was sorry that (even post-Warnock) we hardly discussed the possibilities for the use of microtechnology by children with learning difficulties of all kinds. I don't know whether special schools and units with children of primary school age attending were invited to the conference. If not, I would suggest that they are invited next year, and that they are included within the structure of the proposed national association.

Celia Miettinen
Cherry Hinton Community Junior School, Cambridge.

THREE The organisers must be applauded for taking the initiative in bringing together primary teachers from all over the country. The lectures and group sessions provided an excellent stimulus, and despite a difficult final session the initial moves were established in creating a national organisation. The potential is enormous, and it was good to see evidence of much greater activity in the primary sector than most people had anticipated. Clearly the momentum will increase phenomenally. I hope that next year's conference will invite papers in order to draw up a balanced programme and to keep track of progress. It is as important to hear about the failures as about the successes. Has anyone got a micro collecting dust on a stock cupboard shelf? We must also look for educational case studies. It is not necessary to be able to write long and complex programs to become actively involved in this aspect of curriculum development (in fact often the short, simple programs can be the most effective). I would like to see teachers demonstrating what the children have learned from particular programs, and how the latter have contributed to educational progress. What teaching and educational skills do we need if we are to integrate the microcomputer into the existing curriculum so that it makes a distinctive contribution?

However, two disturbing trends arose from the conference. One is the number of people selling software. In my view, this is a 'restrictive practice' and we are too early in the development stage for this tendency to creep in. We should be taking every opportunity to distribute and exchange software freely, to try out each other's ideas, and in return to provide constructive feedback. This happens far too infrequently. I must applaud Mike Williams of Luton College of H.E., who took TRAINS, criticised certain aspects, rewrote it and sent me back an amended version.

The second disturbing fact is that there is a vast number of uninformed primary schools. The 130 members present were no more than a drop in the ocean. Many of these enthusiasts had not heard of MICRO-SCOPE. Yet several copies of each issue had been sent to the primary adviser in every LEA in England and Wales. Perhaps this illustrates the difficulty involved in communication. I ask the reader to take every opportunity of spreading the word, encouraging advisers to do likewise. Information must be dispersed. Why not take the initiative yourself? Put on a short lecture or demonstration for staff from surrounding primary schools and invite the primary advisers along. We must work to ensure that MICRO-SCOPE and the newly formed national organisation get national coverage.

Roger Keeling.

Computers and Primary Science

It may seem to many teachers rather premature to suggest a use for computers in primary science when in many schools no science is taught. Nationwide there is a concerted effort to encourage the incorporation of science into the primary curriculum.

The phrase "computers and primary science" may suggest that primary science has need of sophisticated technology. The exact opposite is, in fact, the truth. Primary science, whether observational or experimental, requires only the most readily available equipment, much of which would normally find its way into the wastebin. Of course, specifically scientific equipment is not excluded from science: it is merely not essential.

The microprocessor in the primary school has found its immediate and most obvious use in the fields of mathematics and language, the emphasis in each case being on computer-aided learning, interaction between pupil and microprocessor. So far as science is concerned the micro should be used to assist, complement and extend practical investigations without in any way trying to supplant them. We will, however, at the end of this article suggest a possible future development in primary science which will mean that the computer can play a role as equipment in first-hand, practical investigations. As well as enriching scientific investigation the micro can help with science by simulating events and situations which are impossible in school.

Because science is essentially the observation and manipulation of materials, direct contact with the physical and biological world, wherever possible, is a necessary pre-requisite for the use of a relevant computer program.

By way of illustration and example six areas of program development are described below, some of which are currently being developed by the author.

DATA HANDLING

The computer is probably most "at home" when employed as a tool for the rapid analysis of data. Data collection and sorting are important components of graph construction in the junior school (e.g. foot length, eye colour, height etc.) Programs to extend this area of education need to be sufficiently flexible to enable almost any kind and quantity of data to be input.

Such programs make it possible for the results of analysis, rather than the method of analysis, to be given the focus of attention. Large numbers of measurements can be stored, sorted and output in tabular or graphical form. Thus, for example, the analysis of sizes of children in virtually a whole school, rather than just a class, becomes a real possibility. Such sorted data would be invaluable in the context of a topic such as Growth. There are obvious applications of such programs in other areas such as environmental studies.

SIMULATIONS

The science of sound is a commonly chosen area for investigation in both infant and junior classes. Observations result in the description and classification of sounds with regard to their pitch, loudness and quality; investigations include trying to change pitch, discover resonance and achieve amplification. The speed of sound through air is measured by the echo method - measuring the time taken for a sound (two bricks banged together) to travel across a playground and echo back to the observer off a high wall. Such measurements are essentially practical exercises but may be extended and made more accurate by computer simulations of travelling sound waves. The program ECHO, by the author, written with graphics for the 380Z, enables the pupil to find the time taken for sound to travel through chosen distances in air, water and metal and so eventually enables the pupil to calculate for himself the speed of sound in these different materials.

INTERACTION

Certain areas of primary science lend themselves naturally to very interactive programs. One example is astronomy, with obvious use of graphics. Another is the topic of magnetism and electricity. Concepts and information derived from experiments with magnets and circuits can be thoroughly tested, verified and assessed by suitable question/answer programs. Circuit diagrams in particular, because of their simple 'rectangular' nature, readily lend themselves to a modular graphics display. Jones (1980) mentions such a program, called "CIRCUITS 8-12" for Apple II.

KEYS

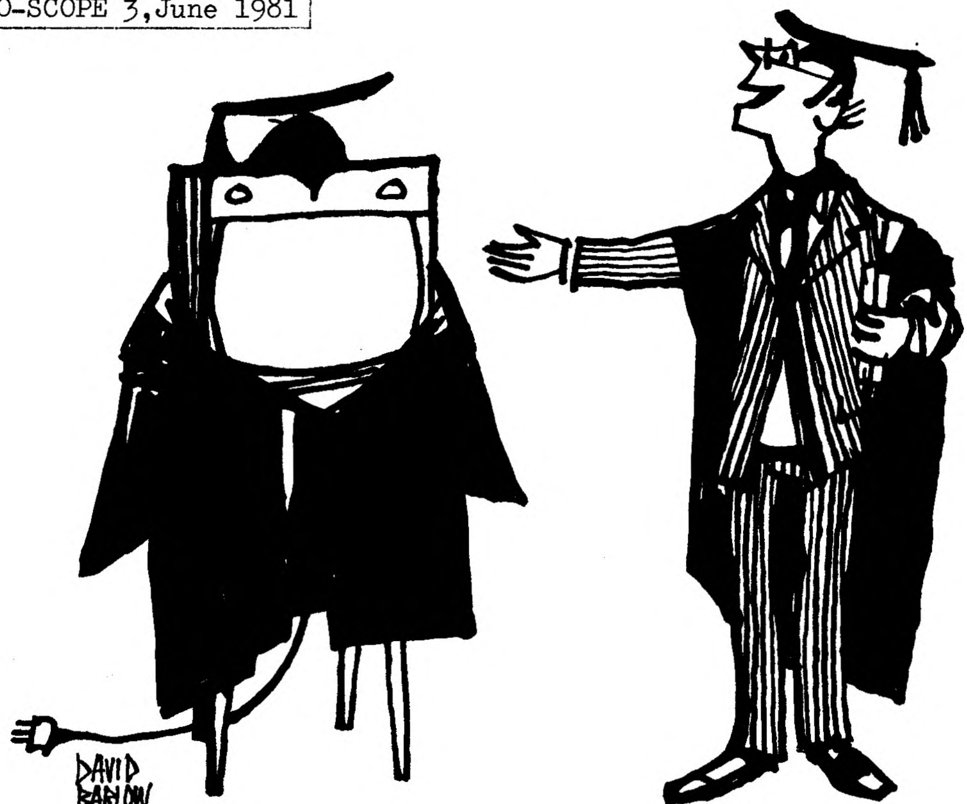
Classification is an important aspect of primary mathematics. It is also of cardinal importance in the interpretation of scientific information as well as in the construction and use of keys for the identification of unknown plants and animals. ITMA (The College of St Mark and St John, Plymouth) has recently produced an ingenious package of programs developed from the well-known ANIMAL key program. Two master programs THINK and SEEK make it possible to use the files SLUGS, TWIG, POWDER and ANIMALS. These offer interactive binary tree systems for the identification of slugs, twigs, powders and animals. The files grow with use; mistakes, which inevitably will be added to the files by children, can be replaced by the teacher. New files can be created by a program called INTREE. Programs of this kind do have a few problems. The teacher must regularly monitor the files for mistakes; also, the micro needs a 48 K RAM.

CONCEPT DEVELOPMENT

The author has a particular interest in the correct development of such concepts as mass, force, weight and pressure in primary science together with an understanding of the standard units involved. The computer can offer considerable help in the development of such concepts by means of programs which combine graphical illustrations with interactive question/answer components. One such program, called MASS (for 380Z) is currently being developed by the author. Another program, to be called CHAIN, will assist the development of concepts associated with ecological food chains.

COMPUTER GAMES

Some computer games can be useful from a scientific point of view. Programs like LUNAR LANDER or ROCKET (Digital Computer Games, 1975) can easily be adapted for 380Z with graphics. These programs together with others that involve missiles, bombs and so on require the pupil to estimate speeds, distances, forces etc. The programs have obvious educational uses: missile programs



teach 'intuitively' the resultant of vectors; ROCKET, the landing of an Apollo capsule on the moon, teaches the relationships between fuel consumption, thrust and the controlled rate of descent against lunar gravity.

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The use of computers in primary schools is in its infancy. The use of computers in the context of primary science has hardly begun. Undoubtedly many mistakes will be made, but mistakes are part of an ongoing learning process. Primary science programs will become increasingly available as computers become the normal possession of primary schools.

To conclude, mention should perhaps be made of a relatively new development in primary science. This is primary technology or applied primary science, the design and construction of equipment to perform a specific task or make a desired measurement. Those interested should read Evans (1977, 1980). At the same time we can expect that microelectronics will gradually be incorporated into the electricity sector of primary and middle school science. The 'black box' aspect of integrated circuits probably makes them more suitable for this age range than microelectronics. It is quite possible to suppose that once primary schools have computers cheap interfaces will become more available (one is already being sold by Oundle School). Then the computer could be used to analyse inputs from peripheral equipment (made in the primary school) or even to act as a simple control system.

Michael Negus, Newman College

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MICROCOMPUTERS IN ENGLISH TEACHING

The development of the Microcomputer has reached the stage where English teachers can no longer regard its use as the sole monopoly of the Science departments. Language teachers must now respond to the implications of this new technology.

For many years teachers have been using a number of technological aids to enrich the pupils' learning process and they have had to adapt their styles of teaching in order to use these aids successfully. For example, television is now established in most schools; teachers regard it as a powerful means of conveying information to their pupils and particularly for its capability to put life into a subject which is remote from the personal experiences of the pupils.

That whole schools have adapted themselves in this way is striking evidence of the commitment of teachers to a technology which they believe is of great value to their pupils' learning. The really important influence underlying this commitment is that the broadcasters have developed educational programmes (i.e. the software) of a high professional standard and supported by follow-up material of excellent quality.

The skills which the teacher of English tries to develop can be broadly divided into four categories:

<u>Reading</u> <u>Writing</u> <u>Talking</u> <u>Listening</u>

Underlying all of these is the need to learn conventions and rules of grammar, vocabulary and spelling; and to broaden experience in comprehension, expression and communication.

The microcomputer can complement existing teaching aids in a number of ways provided that the software clearly meets the teacher's requirements. One of the major criticisms of the text-book is that it allows the teacher little freedom in the structuring of lessons. The computer's big advantage over other teaching aids is that it can permit the teacher to control the software. In the writing of any program, therefore, one of the most important criteria to bear in mind is that the teacher using it will require as much flexibility as possible. This point can be illustrated by reference to the methods and practice employed in one approach to the teaching of spelling.

A requirement of any spelling program is visual repetition of the word and its components. The teacher wants the class to see a word as frequently as possible, both in its entirety and broken down into syllables, because this greatly assists the pupil to understand and mentally retain the construction of the word.

A simple spelling program could be structured as follows:

A word is displayed on the screen, e.g.

TRANSPARENT

Using simple key commands, the teacher then shows the class how the word breaks down into syllables:

TRANS - PAR - ENT

The word is then illustrated in the context of a sentence:

The glass was transparent.
I could see through it.

The teacher will now wish to supply the class with further uses of the word and perhaps to input a sentence or alternative words, similar in meaning, suggested by the class. This repeated emphasis on the visual use of words, and particularly on those suggested by the children themselves, is important because it motivates pupils to comprehend the meaning and hence encourages them to use new words.

Having gone through this series of displays for the word TRANSPARENT the teacher will proceed to the next word in the program and repeat the exercise. At the end of the program the teacher should have a number of options available such as:

- Display the words as a list.
- Display the words complete and broken down into syllables.
- Display the syllables only.
- Display a selection of sentences including some of those which the teacher or pupils have added during the running of the program.
- Have the class copy the words into their own exercise books.
- Simply memorise the words direct from the display in preparation for a test.
- After a test (not necessarily held on the same day) recall the words for display so that pupils can mark and correct their own work.

The more flexible microcomputers are in terms of teacher-machine interaction, the more the teacher will use them and gain the substantial benefits which they can provide. Ideally, the teacher would like to be able to stop the program at any point for questions or discussion, recall at will and bypass sections of program. In the type of spelling program illustrated here, the teacher will not want a string of sentences coming up on the screen if he is only dealing with syllables. Most important is the capability of breaking into a program to insert information or descriptions which arise during the lesson and which need to be repeated - as in spelling tests - on later occasions.

Teachers do not have time to write programs any more than they have the time to write their own text-books. What they need, therefore, is program modules which they can readily assemble into lesson texts prior to the lesson, and a simple way of interacting with the program during the teaching session. Even this will require the acquisition of new skills and this raises the crucial question of - who will teach the teachers? For some years to come it may be the teachers themselves; but they will need the backing of their educational authorities to build up the necessary pool of experience and software and to provide in-service courses for teachers of all subjects.

David Hawthorne,Butler's Court Middle School,Beaconsfield.

The above extracts are taken from an article in "COMPUTER AGE", August 1980.

MAP READING-

Description and listing of a geography program

GRIDREF is a program that has been used with top junior and lower secondary pupils. It aims to give practice in a basic map reading skill, the use of four and six figure grid references.

On typing RUN the program will give a choice of four alternatives. The first two give practice in four figure grid references, the third in six figure references. Once an alternative is selected, a grid is displayed on the screen, numbered along the bottom and left margins as with a map.

For alternative one, the simplest, a complete grid square is shaded and the pupil asked to give the four figure grid reference, while the second alternative requires the answer when only a point is indicated within the grid square. This point is flashed on and off the screen to draw attention to the location. Alternative three is similar, but calls for a response in the form of a six figure grid reference.

In each case ten locations are given before the alternative is completed. The pupil responds by typing in his attempt at the answer. This response is checked for the right number of digits and tested to see if it is correct. The "easting" is tested first and if incorrect a message is given for the pupil to "try again". If the easting element of the answer is right, the northing is then tested in the same way. A correct answer in both elements brings the response, "you are correct", and the next location is displayed on the screen.

This part of the program has provided a useful revision exercise for pupils in the practice of grid references. It can be undertaken by a small group, without the teacher present. Certainly after a pupil has achieved the correct answer to the requisite ten points or squares, he has grasped the order of "easting first, followed by northing". It uses these terms, which will require prior introduction by the teacher, because this reinforces the relationship of the grid on the screen to the national grid in the United Kingdom and is part of the reality of the exercise.

One of the advantages of this program which classroom use has shown is the accuracy that it requires of the pupils, especially in the alternative using six figure points. In conventional pen and paper exercises responses are often inexact, but the computer demands accuracy in the answers and this seems to motivate pupils. Both third and fourth year juniors find it well within their capabilities and respond to such a level of accuracy.

In alternative four the user is asked to search for the hidden point (or treasure!) on the "map". This seems very difficult to adults, yet pupils need very little encouragement to make a start! After an initial six figure grid reference is entered a clue is given in terms of the eight compass points to show the direction in which you have to move to find the hidden location. The aim of this alternative was to give further practice in the use of six figure grid references, while making pupils think of the reference required to move in a particular direction. It reinforces the points of the compass and encourages children to set about a logical search strategy.

```
10 REM GRIDREF ***** BASICS5 VERSION *****  MAY 1981
20 CLEAR200
30 ?CHR$(12):GRAPH 1:GRAPH 0
40 ?"NEWMAN COLLEGE GEOGRAPHY DEPT. "
50 ?"BARTLEY GREEN, BIRMINGHAM B32":?:?:?
60 ?"GRID REFERENCES PROGRAM":?:?:?:?
70 RANDOMIZE
80 GOTO 100
90 TEXT:?CHR$(12);
100 ?"CHOOSE YOUR ALTERNATIVE PROGRAM":?
110 PRINT "1 FOUR FIGURE SQUARES"
120 PRINT "2 FOUR FIGURE POINTS"
130 PRINT "3 SIX FIGURE POINTS"
140 PRINT "4 SIX FIGURE 'FIND THE SQUARE'"
150 ?"5 END PROGRAM"
160 ON BREAK GOTO 90
170 ?:INPUT LINE "WHICH ALTERNATIVE";K$
180 ?CHR$(12)
190 IF LEN(K$)<>1 THEN 220
200 C=VAL(K$)
210 IF C>0 AND C<6 THEN 230
220 ?"NUMBER 1-5, PLEASE !":?:GOTO 100
230 IF C=5 THEN ?"END OF PROGRAM": END
240 IF C<=2  THEN C$="FOUR":G=4 ELSE C$="SIX":G=6
250 REM***** DRAW GRID*****
260 GRAPH1
270 FOR Y=10 TO 50 STEP 10
280 PLOT 10,Y,2: LINE 70,Y
290 NEXT Y
300 FOR X=10 TO 70 STEP10
310 PLOT X,10:LINE X,50
320 NEXT X
330 REM***** NUMBER GRID*****
340 Z=91
350 FOR X=6 TO 66 STEP10
360 PLOT X,8,STR$(Z)
370 Z=Z+1
380 NEXT X
390 Z=61
400 FOR Y=10 TO 50STEP 10
410 PLOT 4,Y,STR$(Z)
420 Z=Z+1
430 NEXT Y
440 ON C GOSUB 470,620,730,810
450 GOTO 90
460 REM***** ALTERNATIVE ONE*****
470 FOR S=1 TO 10
480 A=(INT(RND(1)*6)+1)*10
490 B=(INT(RND(1)*4)+1)*10
500 REM***** SHADE SQUARES*****
510 FOR Y=B+1 TO B+9
520 PLOT A+1,Y,2:LINE A+9,Y
530 NEXT Y
540 GOSUB1350
550 REM***** CLEAR SHADING*****
560 FOR Y=B+1 TO B+9
570 PLOT A+1,Y,0:LINE A+9,Y
580 NEXT Y
590 NEXT S
600 RETURN
610 REM***** ALTERNATIVE TWO*****
620 FOR S=1 TO 10
630 GOSUB 1600
640 GOSUB 1630
650 J=A:K=B
660 A=INT(A/10)*10
670 B=INT(B/10)*10
680 GOSUB1350
690 PLOT J,K,2-D
700 NEXT S
710 RETURN
720 REM***** ALTERNATIVE THREE*****
730 FOR S=1 TO 10
740 GOSUB 1600
750 GOSUB 1630
760 GOSUB1350
770 PLOT A,B,2-D
780 NEXT S
790 RETURN
800 REM *****ALTERNATIVE FOUR ****
810 GOSUB 1600
820 PRINT "GUESS THE SIX FIGURE GRID REFERENCE OF  THE HIDDEN POINT"
830 FOR S=1 TO 10
840 INPUT G$
850 IF LEN(G$)<>6 THEN ?"SIX FIGURE REFERENCE, PLEASE":GOTO 840
860 A$=MID$(G$,1,3)
870 B$=MID$(G$,4,3)
880 AH=VAL(A$)-900
890 BV=VAL(B$)-600
900 IF AH<10 OR BV<10 OR AH>70 OR BV>50 THEN ?"ON THE GRID PLEASE !":GOTO 840
910 PLOT AH,BV,2
920 IF AH/10=INT(AH/10) THEN PLOT AH,BV,0
930 IF BV/10=INT(BV/10) THEN PLOT AH,BV,0
940 UU=0
950 IF AH=A THEN 1150
960 IF BV=B THEN 1180
970 IF AH>A THEN UU=1
980 TA=(AH-A)/(BV-B)
990 IF ABS(TA)=1 THEN 1210
1000 AL=ATN(TA)/3.1415927*180
1010 IF AL<0 THEN AL=AL+180
1020 IF UU=0 THEN AL=AL+180
1030 FOR XI=0.5 TO 8.5
1040 IF AL-XI*45<0 THEN XX=XI:XI=8.50
1050 NEXT XI
1060 ON XX+0.5 GOTO 1110,1120,1130,1140,1070,1080,1090,1100,1110
1070 ?"MOVE NORTH":GOTO 1250
1080 ?"MOVE NORTH EAST":GOTO 1250
1090 ?"MOVE EAST":GOTO 1250
1100 ?"MOVE SOUTH EAST":GOTO 1250
1110 ?"MOVE SOUTH":GOTO 1250
1120 ?"MOVE SOUTH WEST":GOTO 1250
1130 ?"MOVE WEST":GOTO 1250
1140 ?"MOVE NORTH WEST":GOTO 1250
1150 IF BV>B THEN ?"YOUR EASTING IS CORRECT, ";:GOTO 1110
1160 IF BV<B THEN ?"YOUR EASTING IS CORRECT, ";:GOTO 1070
1170 GOTO 1310
1180 IF AH<A THEN ?"YOUR NORTHING IS CORRECT, ";:GOTO 1090
1190 ?"YOUR NORTHING IS CORRECT, ";
1200 GOTO 1130
1210 IF TA=1 AND UU=1 THEN 1120
1220 IF TA=1 AND UU=0 THEN 1080
1230 IF TA=-1 AND UU=1 THEN 1140
1240 GOTO 1100
1250 ?"TRY AGAIN"
1260 NEXT S
1270 PRINT "DO YOU WANT TO SEE THE CORRECT LOCATION (YES) OR TRY AGAIN (NO)";
1280 INPUT X$
1290 IF X$="YES" THEN GOSUB 1630:GOTO 1330
1300 ?CHR$(12);"SIX FIGURE REFERENCE";:GOTO 830
1310 PRINT "YOU ARE CORRECT - WELL DONE"
1320 FOR L=1 TO 3000:NEXT L
1330 RETURN
1340 REM***** TESTING GRID REFERENCE INPUTI*****
1350 PRINT "GIVE THE "C$" FIGURE GRID REFERENCE"
1360 INPUT G$
1370 IF LEN(G$)<>G THEN ? C$;" FIGURE REFERENCE, PLEASE":GOTO 1360
1380 IF C>2 THEN 1440
1390 A$=MID$(G$,1,2)
1400 B$=MID$(G$,3,2)
1410 AH=(VAL(A$)-90)*10
1420 BV=(VAL(B$)-60)*10
1430 GOTO 1480
1440 A$=MID$(G$,1,3)
1450 B$=MID$(G$,4,3)
1460 AH=VAL(A$)-900
1470 BV=VAL(B$)-600
1480 IF AH=A THEN 1510
1490 PRINT "YOUR EASTING IS INCORRECT - TRY AGAIN"
1500 GOTO 1350
1510 IF BV=B THEN 1540
1520 PRINT "YOUR NORTHING IS INCORRECT - TRY AGAIN"
1530 GOTO 1350
1540 PRINT "YOU ARE CORRECT"
1550 REM DELAY
1560 FOR H=1 TO 200: NEXT H
1570 ?:?
1580 RETURN
1590 REM *****RANDOM NUMBERS FOR GRID REFERENCES*****
1600 A=INT(RND(1)*60)+10
1610 B=INT(RND(1)*40)+10
1620 RETURN
1630 REM***** TO SHOW SITE (FLASHING)*****
1640 D=2
1650 FOR I=1 TO 10
1660 PLOTA,B,2
1670 FOR J=1 TO 200:NEXT J
1680 PLOT A,B,0
1690 FOR J=1 TO 200:NEXT J
1700 NEXT I
1710 IF A/10=INT(A/10) THEN D=0
1720 IF B/10=INT(B/10) THEN D=0
1730 PLOT A,B,D
1740 RETURN
```

The program gives ten chances of finding the correct location. Most pupils find the hidden point within this limit (although not all teachers do!). If they have failed they are given an opportunity to see the right answer, or they can continue to search for it.

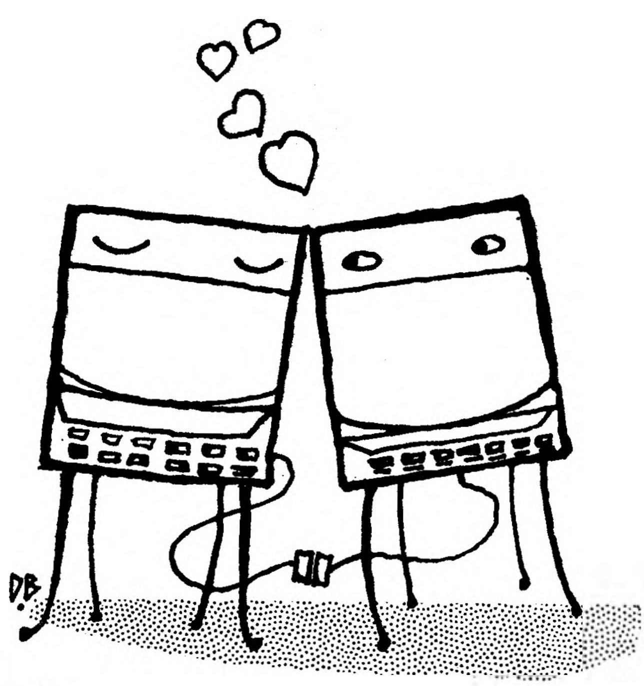
Point locations are generated randomly - unless the teacher wishes to know the sequence of hidden points and show his/her powers of second sight, by removing the"RANDOMIZE"statement on line 70. The program can be interrupted by Control Z - the "menu" of alternatives will be redisplayed. Alternative 5 ends the program and clears the screen.

The program is written to run under BASICS on a RML 380 Z and makes use of low resolution graphics. This makes it difficult to adapt, although a Coventry teacher has adapted the program to run on a Tandy TRS80. We are most interested to hear from anyone who has a version of GRIDREF for a different microcomputer.

Though written mainly with junior pupils in mind, this program has been readily accepted and used in geography lessons in some local secondary schools. One teacher has commented:-

> "Slow learners benefited from repetition of the task in what was regarded as a one-to-one challenge situation. Faster learners enjoyed the challenge of a fast (and accurate!) response. I don't think it has replaced Space Invaders in their (first formers')affections, but its benefits are undoubted - and the long term recall is sound, it is not merely flash -in-the-pan attainment ".

Andrea Tapsfield ,Newman College



'I can't wait to hear the patter of tinny feet'

CALCULATORS IN THE PRIMARY SCHOOL

Many teachers are reluctant to have calculators in their classrooms, fearing that, through their use, the children will lose all powers of mental calculation. We doubt if this is the case in general: and certainly teachers should be able to guard against its happening whilst utilising to the full the benefits which this branch of microelectronics has to offer.

Even a simple calculator with the 'Four Rules' and a memory has considerable potential as a classroom aid. This article will open up some possibilities going far beyond mere computation. In a later issue, these ideas will be extended through the greater power of a programmable machine. We shall assume, in all cases, that the instruments chosen handle arithmetic operations as they are normally written, from left to right ("algebraic logic").

The calculator is useful in two broad areas: firstly, as a direct help in 'basic' number work; and secondly, when providing a useful tool for those investigations which involve difficult computation, beyond the numerical capability of many children otherwise quite able to understand the mathematical principles involved.

An aid for 'basic' number work

In the early stages of number work a calculator can be used, along with more conventional aids such as Cuisenaire rods and counters, to illustrate the underlying concepts of arithmetic. Instead of using buttons to produce an answer swiftly and magically we can deliberately slow down the process and produce intermediate steps for greater understanding. Areas of application could include:

(a) Discovering by trial the 'story' of a given number

e.g. $8 = 0 + 8 = 1 + 7 = 2 + 6 = \ldots\ldots$

A measure of the child's memory could be the time taken to reconstruct a given 'story' at intervals of a few days.

(b) Verifying the associative and commutative laws for addition and multiplication

(and demonstrating that they do not hold for the other two rules). Later on the distributive law of multiplication (or division) over addition (or subtraction) will prove easy to illustrate :-

$$27 \times 16 = 27 \times (9+7) = \underline{27 \times 9} + \underline{27 \times 7},$$
$$= 27 \times (10+6) = \underline{27 \times 10} + \underline{27 \times 6}, \ldots\ldots$$

The first product in the RHS of each example would be saved in the memory and then added to the other product. The LHS would be computed in the usual way to demonstrate the equality.
Note: To store in a memory requires pressing a single button of the type $\boxed{\overset{\uparrow}{M}}$ for most single memory machines. For calculators with up to ten memory locations, pressing two buttons (such as $\boxed{\text{STO}}$ then $\boxed{3}$) will cause the

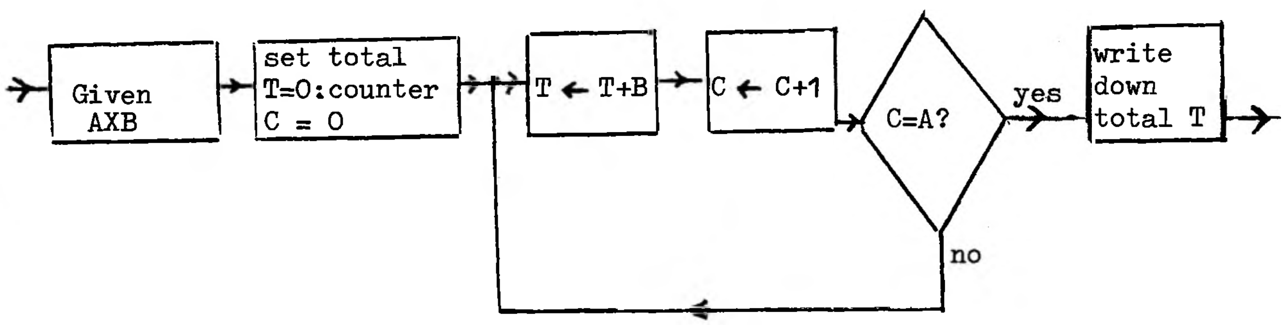
number visible in the display to be stored in memory number 3.

(c) An understanding of partial sums in long multiplication.

In finding the partial sums, children would be reminded that, when multiplying by 17, the multipliers are really 10 and 7. This is readily extended to three digit multipliers so that 216 x 123 is emphasised as (216 x 100) + (216 x 20) + (216 x 3). Repeatedly pressing the zero button acts as a considerable reinforcement.

(d) Multiplication as repeated addition, which is demonstrated with the aid of a counter to record the number of additions.

e.g. $11 \times 7 = \underbrace{11 + 11 + \ldots + 11}_{\leftarrow 7 \text{ times} \rightarrow}$. The counter is necessary to determine when no more elevens are to be added. The general process is shown in the following flowchart

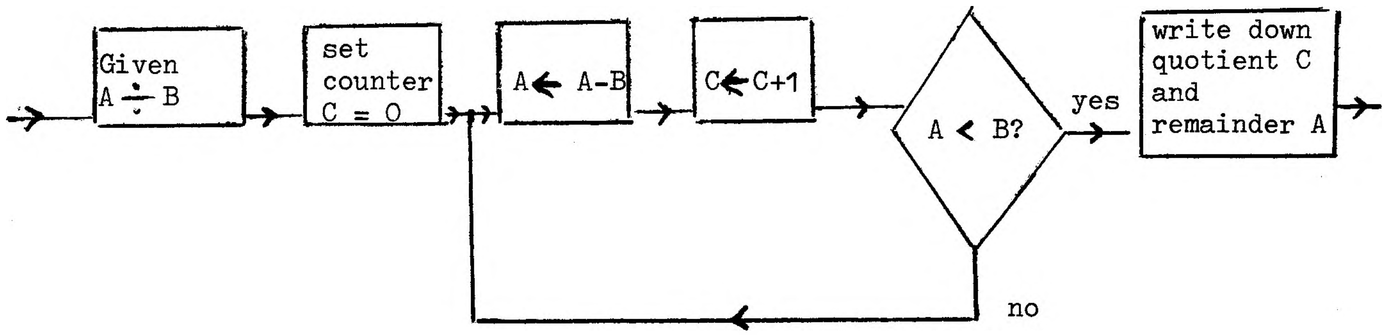


With a two-memory machine there is no need to write down any intermediate results but children may find it easier to use a pencil and paper along with the calculator. A neat alternative is to combine the counter and the accumulating total as a single artificial number in display, with zeros to separate the parts. For instance, to multiply 4 x 732 we could enter the number $\boxed{1}\boxed{0}\boxed{0}\boxed{7}\boxed{3}\boxed{2}$ into the memory and repeatedly add to it to the display, yielding 201464, 302196, 402928 successively. The last number shows that 4 x 732 = 2928.

(e) Division as repeated subtraction.

This is a similar process to multiplication except that (i) the dividend is successively reduced by subtracting the divisor until it is less than the divisor and (ii) the counter, recording the number of subtractions, becomes the required quotient.

e.g. $29 \div 7 \longrightarrow 29-7 = 22$
$22-7 = 15$
$15-7 = 8$
$8-7 = 1 \longrightarrow$ stop subtracting. The quotient is 4 and the remainder is 1. The general process is shown in the flowchart below.



The tracing of such flowcharts can be fun, will certainly deepen the child's understanding of the arithmetic process and will prove a valuable asset later on for the planning of computer programs.

(f) Decimal fractions

An understanding of these is enhanced by the calculator's reliance upon decimal notation:-

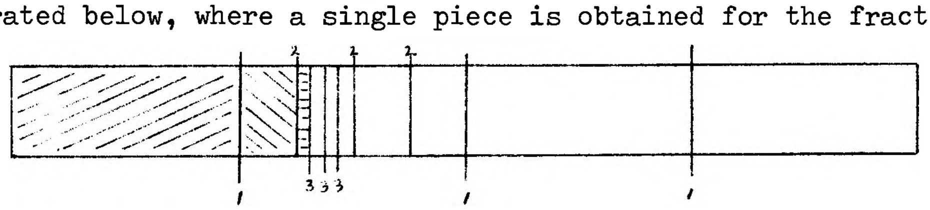
e.g. $\frac{3}{10} + \frac{4}{100} = 0.34$ (key this in as $3 \div 10 + 4 \div 100 = \ldots\ldots$).

Calculators as a tool in numerical investigations

The calculator is a great boon where the main purpose is not to practise numerical competence but to use the results of computations for interpretation. Examples of its use include:

(g) Fractions

Divide a rectangular strip of paper into thirds as accurately as possible (or perhaps a cake fairly amongst three children!) It is easy to divide the rectangle into quarters by folding. Three of these quarters can be allocated, one to each 'third', whilst the fourth quarter is then used for further division into quarters (now sixteenths of the original strip). The process is now repeated until the strip of paper left is too small for further division. At this point most children will agree that the strip is almost in thirds and that continuing the process indefinitely would give an exact division into thirds. An alternative way of carrying out the folding is illustrated below, where a single piece is obtained for the fractional part.



The sum of the shaded regions rapidly approaches a third of the strip. These examples give rise to the representation of 1/3 as a never-ending series thus:-

$$1/3 = 1/4 + (1/4 \times 1/4) + (1/4 \times 1/4 \times 1/4) + \ldots$$

Summing this series to a given number of terms is easy with a calculator! The first few partial sum are given in the table below to show how rapidly they approach 1/3.

No. of terms	Value of last term	Partial sum
1	0.25	0.25
2	0.0625	0.3125
3	0.015625	0.3281
4	0.003906	0.3320
5	0.000977	0.3330

Children will enjoy proving, for themselves, that

$$1/7 = 1/8 + (1/8 \times 1/8) + (1/8 \times 1/8 \times 1/8) + \ldots$$

and

$$1/9 = 1/10 + (1/10 \times 1/10) + (1/10 \times 1/10 \times 1/10) + \ldots$$

Many children will be capable of generalising the work to obtain

$$1/(n + 1) = 1/n + (1/n \times 1/n) + (1/n \times 1/n \times 1/n) + \ldots$$

(Though probably not in an algebraic form!!)

(h) Finding square roots (without, of course, using the $\sqrt{\ }$ button!!)

Two basic strategies can be practised,both of which illustrate very useful mathematical principles. Each method makes use of basic definitions for squares and square roots. However, one is clearly superior and this provides children with a useful discussion point.

First Method If A is the square root of N then A multiplied by itself will equal N,i.e.

If $A = \sqrt{N}$ then $A^2 = N$.

The relationship is used to find $\sqrt{19}$ in the following example. It is clear that $\sqrt{19} \times \sqrt{19} = 19$; therefore the child is looking for a number which gives 19 when it is multiplied by itself. The child starts with a first guess, 5 say. If 5 is the sought-after root then 5 x 5 should give 19, but 5 x 5 = 25 which is greater than 19 and it is concluded that 5 is too big. Now a second guess is tried which is less than 5, say 4. The test leads to 4 x 4 = 16 which is less than 19, and it is concluded that 4 is too small. These two results imply that $\sqrt{19}$ lies between 4 and 5. Most children will choose, as their next guess, the average of 4 and 5 i.e. 4.5. This is tested as before and a fourth guess is made by averaging the two guesses which give squares just above and below 19. This procedure is repeated until sufficient accuracy has been obtained. The first few steps are shown in the table below:

Guess number	Guess	Square	decision
1	5	25	Too large
2	4	16	Too small
3	4.5	20.25	Too large
4	4.25	18.06	Too small
5	4.375	19.14	Too large
6	4.3125	18.60	Too small
7	4.3438	18.87	Too small
8	4.3594	19.004	Too large (but nearly there)

This method is very slow and only after eight guesses are the squares near 19.

Second Method. Here we use the principle that $\frac{N}{A} = A$ if A is the square root of N. This leads to the following procedure which will be illustrated for finding $\sqrt{19}$. Let the first guess be 5, as before. Now $\frac{19}{5} = 3.8$ and since $3.8 \neq 5$ the square root has not been found. It is not difficult to accept the reasoning that $\sqrt{19}$ lies between 5 and 3.8, so a good choice for a second guess would be $\frac{5+3.8}{2}$ i.e. 4.4. Now $\frac{19}{4.4} = 4.318$ and, by similar reasoning to previously, a third guess is taken to be $\frac{4.4+4.318}{2}$ i.e. 4.359. This process is repeated until the divisor and quotient are equal when working to a specified accuracy. The first steps are traced in the table below:

Guess number	Guess	Quotient	Decision
1	5	3.8	Not equal - take average
2	4.4	4.318	Not equal - take average
3	4.359	4.359	Correct answer to 3 dec.pl.

It will be readily noted that the first method requires two arbitrary guesses whereas only one arbitrary guess is required for the faster second method.

(i) Calculation of maximum and minimum values.

As an example we shall find the maximum area of a rectangle which must have a perimeter of 27 metres. Firstly it is established that length + breadth = 13.5m. Now it is possible to tabulate the area obtained for chosen breadths (or lengths)

breadth (m)	length (m)	area (m^2)
1	12.5	12.5
2	11.5	23.0
3	10.5	31.5
4	9.5	38.0
5	8.5	42.5
6	7.5	45.0
7	6.5	45.5
8	5.5	44.0
9	4.5	40.5

The last two calculations show that the maximum value for the area has been passed. After discussion the children will probably suggest looking for higher area values for breadths between 6m and 7m, thus obtaining

breadth (m)	length (m)	area (m^2)
6.5	7	45.5
6.75	6.75	45.5625
6.875	6.625	45.5469

Other values close to 6.75m may be tried but the children should soon reach the conclusion that a length and breadth of 6.75m gives the maximum area for the rectangle. The rectangle is now a square and children may wonder if this will always be the case.

It is hoped that readers will be stimulated to try the examples given and to devise others. Please let us know your reactions to the opportunities opened up by the use of calculators in primary schools. In particular we would like to hear of other applications, including games.

A. James
Newman College

USERS' GROUPS AND PROJECTS

These are preliminary notes towards a fuller directory of useful contacts.

Dave Futcher — Beaconsfield First and Middle School, Southall, Middx. (01 574 3506) has a TRS-80 Educational Users' Group and is compiling directories of users and of software. He is also involved in conversion of programs from other machines - he has adopted PHRASES from MICRO-SCOPE 2! Send a cassette for a copy.

Derrick Daines — (Carsic Primary School, Sutton in Ashfield, Notts) has also adapted PHRASES for his SWTP 6800.

Brian Richardson — (18 The Lawns, Benfleet, Essex) sends a varied list of PET Software and comments that he has a program for arithmetic practice very similar to our TRAINS.

P.J. Wayth — has written a thoughtful report on the Computer Project (PET) at St Andrew's Junior School, Willesden, concluding: "The key... is software.... Perhaps there is some way that teachers and experienced programmers can meet to produce programs to the teachers' specifications. Teachers are the only people who can describe their exact requirements."

Harry Dolphin — Writes from 23 Bruche Drive, Padgate, Warrington, WA1 3JX, about introducing pupils to programming. He uses 'families' of programs based on LET, FOR, INPUT and READ, DATA.

Eric Deeson — Highgate School, Birmingham B12 9DS, will send the Educational ZX80/1 Users' Group Newsletter on receipt of a s.a.e. He believes the Sinclair range is often undervalued just because it is cheap and insists it is not a toy.

Don Walton — is director of the Houghton School C.A.L.Project, at Huntingdon, Cambs. 0480 63398.

Barry Holmes — St Helen's Co. Primary School, Bluntisham, Huntingdon has programs "The Spanish Main" and "Hunt the Thimble" for 16K Apple or PET.

Newman College Primary Software documentation booklets are still available from R. Keeling at Newman College for 50p + 25p p&p.

BEHAVIOURAL OBJECTIVES

- A Report from Coventry

The article on the M.A.C.E. project and the extract from M.E. Fowler's letter (p.2.5) stimulated me to write this article with a view to informing your readers of a few aspects of educational computing in the primary field in Coventry.
I gave a short demonstration and talk at the local Teacher's Centre and hope to make a video-tape illustrating the applications of the computer in our school. I will be showing this to parents and interested colleagues in the hope that it will encourage the Local Authority to provide our school computing efforts with some financial support.
I teach in the Junior department of an all-age E.S.N.(M) school, so my aims may differ slightly from those of your other readers, but still I find your magazine the most useful for my needs.

Yours sincerely,

Mrs Myra Duffy

I teach in a primary department of an E.S.N. (M) school in Coventry and I only recently became acquainted with computers in education. My interest was initially aroused by a need to reduce the amount of paperwork associated with teaching and recording behavioural objectives. My colleagues and I have been busy for some time writing behavioural objectives. Each basic subject is task-analysed and written as sequential target objectives. It is intended that each child should have a copy as part of his individual programme of work. As you can imagine, the amount of paper-work and recording is enormous.

It seemed that a computer might be the answer to this side of our problem and I set out to discover if this was so. One of the experts I approached was Dr John Karron at the Lanchester Polytechnic, Coventry. He assured me that a computer certainly could help and personally assisted by arranging the loan of an 8K Commodore computer.

The Polytechnic has supplied, on loan, three 8K Commodore computers to primary schools - two in Coventry, one in Rugby. The other two teachers and myself who are responsible for the computers attend a 'workshop' every week to share ideas, programs and learn programming techniques.

My own interest lies in the investigation of using computers to teach maths to slow-learners. I anticipate that I will also have to explore the application of peripheral devices as an interface to the computer - especially for the younger slow-learner. To this end I have begun to write a series of programs. This is a typical example:

Program 1 Recognise and match sets with a cardinality of two, four, three, one and five.

Demonstration:
1 block appears. 1 star appears to match it.
2 blocks appear. 2 stars appear to match them.
3 blocks appear. 3 stars appear to match them.

Practice: A set of blocks (1-5) appears in random order. The child has to press a '*' for each block and then press RETURN.

If correct: ✓ 'Well done'
If incorrect: 'Sorry, try again'

When 10 consecutively correct answers are given, test appears. (a different criterion can be substituted)

Test: A set of blocks (1-5) in random formation and random order. The child has to press a '*' for each block and then press RETURN.

If correct: When all 5 attempts are correct, 'Well done' 'Goodbye'.
If incorrect: Child is taken back to practice section.

Next I hope to write a series of diagnostic tests for each behavioural objective. The child's name, the date and his results will be stored on a 'results' file. If the tests are written with sufficiently fine objectives, the area of a child's lack of understanding will be specifically identified. Thus future teaching strategies can be inferred from these results - and the amount of paper-work cut to a minimum. Already my experience with a computer in the classroom and the evaluation of my programs has shown me where I can considerably improve them and has altered many of my original ideas.

The Adviser in Coventry who has responsibility for Computers in Education has called together a group of teachers interested in computers. One of these is the City's representative to M.A.C.E. (Micro-electronics And Computers in Education - West Midlands). This group is to investigate ways in which program ideas can be distributed to members of the group, and others, who will act as program writers. It is intended that the software will then be brought back into the special schools for evaluation. One idea is to concentrate on the writing of programs based on behavioural objectives which will be suitable for all children - but with remedial loops for slow-learners. There are problems, of course. One is that there are, at the moment, three principal makes of computers in schools in Coventry and so the software will not be compatible. The group is also seeking ways to make the software more easily adaptable from one machine to the other.

It is still very early days and a great deal of work in writing and evaluating programs has to be done - as well as attempting to make them more consistent. However, there is much interest, enthusiasm and co-operation in the field so I am confident that computers will be used more extensively in Coventry as more and better educational software becomes available.

Myra Duffy,
Deedmore E.S.N.(M) School,Bell Green,Coventry

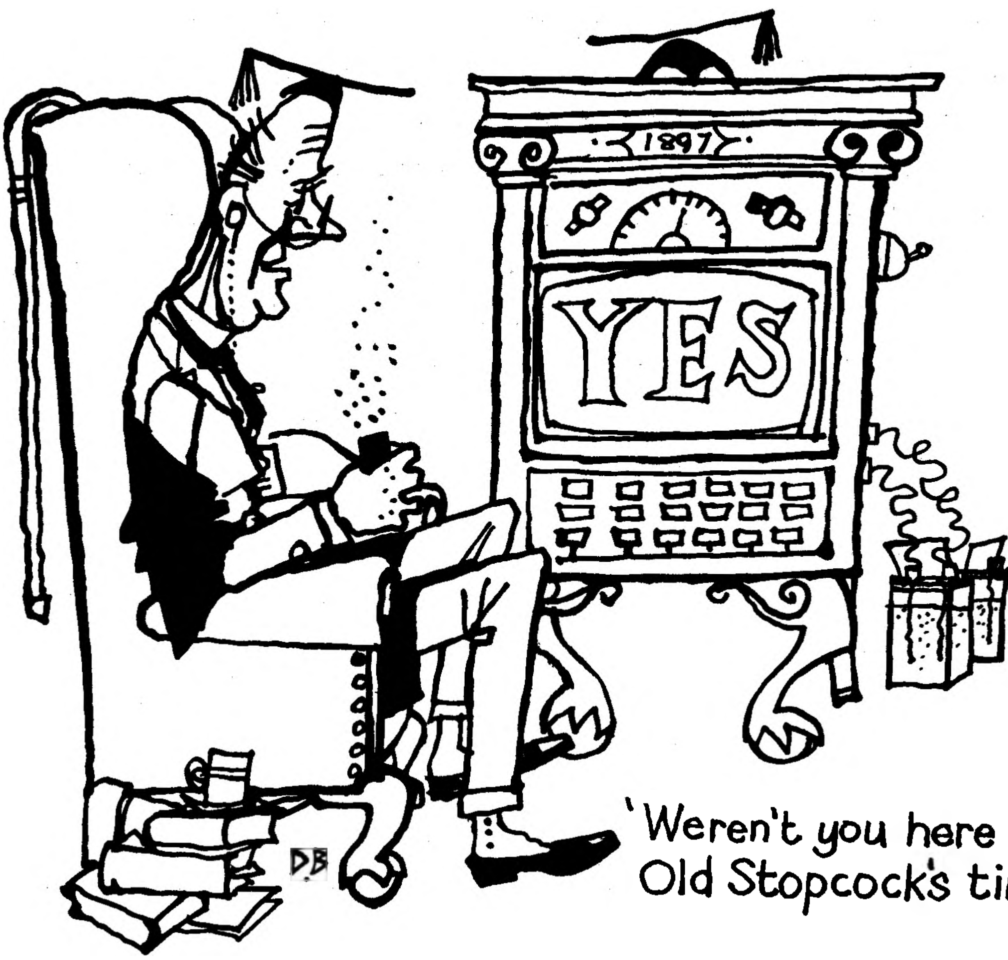
380-Z in darkest Warwickshire

Without doubt no single piece of equipment introduced into the school has equalled the microcomputer for immediate impact and interest. The microcomputer in question, a RML 380 Z, plus a selection of programs was offered for a week by Roger Keeling, after the day course "Microcomputers - a teaching resource in Primary Education". I practically had it in the car before he'd finished his sentence, and I returned to darkest Warwickshire with a year's worth of capitation on the back seat, and an unexpected opportunity in front of me.

Shipston on Stour Junior and Infant School has 330 5-11 year olds on roll. We are on a split site, with about 100 juniors in 19th Century buildings and the others in a modern "annexe", 150 metres away. We have a continuously hard working PTA which amongst many other things has provided a VCR, a Music Centre and recently a Cine Projector, and so the purchase of a microcomputer is a genuine possibility, if the need can be justified. For some time now I have been gleaning as much information as I can about microcomputers, taking "Educational Computing", and "Personal Computer World", visiting other schools,exhibitions and a local engineering firm, and the Head and I have been talking over possibilities. The chance to use one for a week was very welcome, and allowed a widening of the discussion.

The attractions of the microcomputer were first apparent at home over the weekend as my 6 year old and 8 year old daughters played interminably with the "TRAINS V5"program amongst others. The 6 year old eschewed "Jim'll Fix it" in favour of addition and subtraction! My machine didn't have high resolution graphics and so the "SPELL" program which would have suited her wasn't available. By the end of the weekend they were asking for other programs and using them. Even my 3 year old son insisted on using it, and the "JANE C" function program allowed him to use the machine himself even if the programmer's original aims weren't quite fulfilled! I can believe more easily now the articles I have read about pre-school children using microcomputers.

My class of 10-11 year olds were delighted and very interested as soon as the machine was brought into the classroom, I gave a brief explanation of what it was, what it could and couldn't do and how to load a program and then let them at it. "TIMES 3" is an arithmetic practice program with a speed factor. Because of the speed factor it wasn't the best of programs to start them with, since they were unused to the keyboard. However it did allow all 34 children to get their hands



'Weren't you here in Old Stopcock's time?'

on the micro in the space of about an hour which was my aim. The speed with which they learned how to use it was surprising. During the first break, while I was on duty out of the classroom one child made a few keyboard errors in the middle of the program. Since I obviously couldn't attend to it another pressed the RESET button and re-loaded the program, which needed a sequence of correct groups of symbols.

"TRAINS V5" is a program which provides practice in addition, subtraction, or multiplication, and trains appear on the screen as correct answers are keyed in. Although I think younger children would benefit more from the trains appearing on the screen my class of 10-11 year olds found this an enjoyable program. It gave useful arithmetic practice and gave the time taken for the whole program after each attempt.

"DIAGRAM", a drawing program according to compass directions, fitted in well with the finish of the Magnetism topic in science. The previous week the children had been "navigating" with miniature boats containing compasses on large maps of different countries. For this program it took the children a while to take in the details about instructing the cursor's movements. Really, the short time available wasn't long enough to use the program fully but every child spent a limited time on it.

At the end of the week the children were very sorry to see it go. They'd happily stayed in at breaks and dinner hours to use whatever program was available. Every program was examined with new interest and even ordinary mathematics practice was tackled with pleasure. I could have done with 34 of them.

The staff reaction was much more guarded. As soon as I took it into the "annexe"staffroom one member of staff said "I can't see what use that'll be". (So much for immediate impact!) It was left in that staffroom for two days, along with instructions for setting it up and a description of programs. The first day, apart from pulling the plug out to boil the kettle, no one touched it! The second day I was able to spend a short time in that staffroom and a few showed interest and had a brief look at some of the programs. The fact that I was teaching on the other site and was unable to do any real demonstrating will have been the main factor in the staff's lack of reaction.

I was able to demonstrate it at the PTA meeting on the Tuesday night after it had been in the staffroom. A few parents had heard nothing else from their children all week. Two of the parents had seen it working in my classroom while they were in the school helping. All of them were very keen to examine it, a few tried it and I was plied with questions, some of them quite searching. The response was very favourable. I regretted that I couldn't have had the same sort of session with the staff.

Are we going to buy one? Well, the feeling of the meeting was one of approval, and fund raising is a continuous process any way. I gave a brief rundown of the possible machines and the cost of a disc drive as against a cassette recorder. I also mentioned the software gap and the incompatibility of programs between different machines. There is the likelihood that some authorities are on the point of recommending a microcomputer for their primary schools, and there is the advent of the BBC's new series of programmes for which they will market their "own" computer which is likely to be the Acorn Atom. These factors prompted us to hold fire on the final decision. In the meantime two or three parents and staff will be hoping to visit schools which already have a microcomputer to see it in action and gain an assessment from the chalk face.

Tony Arthur
(Deputy Head, Shipston Junior/Infant School,Shipston on Stour)

CHILDREN AND THE NEW TECHNOLOGY

Short Heath J.I. School, Erdington, had a microcomputer on loan from Newman College for a period of 4 school days. I went to fetch the microcomputer with my headmaster on a Thursday morning. The College Technician gave ten minutes of instruction on how to set up the machinery (I had never touched one before) and how to prepare it for use, and then we were off back to school. The equipment we were given consisted of a keyboard - similar to a typewriter; a V.D.U., - just like a television; a black box - the microcomputer, a Research Machine 380Z with in-built disc drive; two floppy discs - the programs, and a folder of documentation - instructions on how to use the microcomputer.

I was amazed that within the duration of one school day all the children in my class were completely at home in their using of the microcomputer. Many soon became as good as myself in setting up the machinery.

During the four days that we had the microcomputer in school I managed to demonstrate to all staff its various uses. I also had some teachers from another school come in for a demo. The majority of them were very interested and would appreciate another opportunity to see one working.

I found that the standard of documentation varied a great deal from program to program. I think that it is important that all the input commands should be listed together in a block instead of being dispersed throughout the instructions. In some of the programs the abort input, required when something has gone wrong or one wants to escape from a program, was not obvious.

In conclusion, I would like to make the following observations:

1. The children accepted the microcomputer into the classroom very quickly. It did not distract those children who were doing other work.
2. They all found it very easy to operate.
3. The children had no difficulty in learning the input commands for each program.
4. Those children who were apprehensive to start with overcame this within minutes.
5. It was a great confidence builder. The children were able to "wipe out" their mistakes. No other child need see their mistakes - a great bonus .
6. The children who had used typewriters were at an advantage with keyboard manipulation.
7. All the children thought that the learning situation using the microcomputer was fun and very enjoyable.

8. It was very noticeable that those children who normally experienced some learning difficulties with new concepts, coped extremely well with the microcomputer.

9. The computer was completely fair; it treated everyone, children and teachers, the same.

10. It was very difficult to send the children home after school: they couldn't get enough of it.

I conclude that the children can cope extremely well with the Technology of the Eighties. But are the teachers ready and willing?

Michael E.Fowler, Short Heath Primary School,
Erdington, Birmingham

M.A.P. Microtrain

Did you go aboard the MAP Microtrain this year? If not, there is another chance later on (see the schedule below). M.A.P. is the Microprocessor Application Project set up by the Department of Industry to provide information, advice and support.

In addition to the local sessions specifically for teachers, pupils and education generally, there are seminars for various types of industry and commerce and, of wide appeal, the exhibition itself makes a visit well worthwhile. However, group visits can be arranged by prior booking and Friday is an OPEN DAY!

The message is clear - the new technology is here- automatic micrometers and thermometers, special aids for the handicapped and for designers, robot control, word processors, PRESTEL.... and if your idea is marketable large grants are available!

Comments. As far as teaching and learning are concerned we must find the positive aspects before we get taken over! It's a powerful technology - let it remain our servant and not our master.

Here is the MAP train's timetable:

July	Plymouth (June 29-3), Gloucester (6-10), Cardiff (13-17), Wrexham (20-24)
September	Glasgow (Aug 31-4), Aberdeen (7-11), Dundee (14-18), Newcastle Upon Tyne (21-25), Middlesborough (28-02).
October	Birmingham (NEC 5-9), Liverpool (12-16), Manchester (19-23), Hull (26-30).
November	Sheffield (2-6).

Further information from MAP Information Centre, Department of Industry, Room 524, Dean Bradley House, 52 Horseferry Road, London SW1P 2AG.

A PRIMARY B.A.S.I.C. - Part 3

In this article we shall develop two important programming techniques which greatly extend our range in handling passages of text. One is the incorporation of personalised information, fed in by the user, into a prepared text. The other is the random selection of one item from a whole set of stored data. The classroom application chosen shows how both techniques combine to provide a starting point for creative writing.

This PRINTOUT shows the first program in operation:-

```
RUN
PLEASE TYPE IN YOUR NAME?MIC
ARE YOU A BOY OR A GIRL(BOY/GIRL)?BOY
GIVE THE NAME OF YOUR FRIEND?JOE

MIC AND HIS FRIEND, JOE, WERE ON HOLIDAY WALKING ALONG A DESERTED SEASIDE LANE.
SUDDENLY, MIC WAS STARTLED BY A NOISE BEHIND HIM.
HE AND JOE BOTH TURNED ROUND QUICKLY TO SEE A FLASHING ROBOT.
                                         .......WHAT HAPPENED NEXT, MIC?
```

After RUN is typed, the child is asked to supply names and data for the story (shown in boxes above). Then the computer gives the opening lines of a story. The words underlined are provided in these three different ways:-

1. Pupil input is returned as appropriate (Mic, Joe)
2. Pronouns and possessives dependent on pupil input (boy) are selected (his, him, he)
3. Basic elements for the story are chosen randomly from a set previously stored by the teacher (deserted, seaside, flashing robot).

Now for the programming details. Look at the listing of Program 1 (obtained by typing LIST). The pupil provides the INPUT information at lines 110-130. Line 110 is a contraction into a single line of the formulation we have used in previous articles, namely

```
110 PRINT "Please type in your name";
111 INPUT NAME$
```

A number of contractions are given in this article. The objective is space saving. Often a computer runs out of storage space which could have been saved by efficient programming.

Note that NAME$ is the so called 'address' of a computer store. In previous issues we have used 'one letter addresses' like M$ and W$. The computer only reads the first two letters of an address (NA$ in this case) but the whole word is used to help the human reader!

```
100 REM ************************************ PROG 1 ******************
110 INPUT"PLEASE TYPE IN YOUR NAME";NAME$
120 INPUT"ARE YOU A BOY OR A GIRL(BOY/GIRL)";SEX$
130 INPUT"GIVE THE NAME OF YOUR FRIEND";FR$
140 REM ************************* DETERMINE PERSONAL PRONOUNS ********
150 IF SEX$ = "GIRL" THEN 180
160 P1$ = "HIS": P2$ = "HIM"
170 P3$ = "HE": GOTO190
180 P1$ = "HER": P2$ = "HER": P3$ = "SHE"
190 READ A$,B$
200 READ C$,D$,E$,F$,G$,H$,J$,K$
210 RANDOMIZE
220 REM************************************** CHOOSE DESCRIPTION *******
230 Y = RND(1)
240 IF Y < 0.5 THEN TYPE$ = A$ ELSE TYPE$ = B$
250 REM *********************************** CHOOSE PLACE *************
260 Y = RND(1)
270 IF Y < 0.333 THEN PLACE$ = C$ :GOTO 290
280 IF Y < 0.666 THEN PLACE$=D$ ELSE PLACE$=E$
290 REM *********************************** CHOOSE THING *************
300 Y = RND(1)
310 IF Y < 0.2 THEN THING$ = F$ :GOTO 350
320 IF Y < 0.4 THEN THING$ = G$ :GOTO 350
330 IF Y < 0.6 THEN THING$ = H$ :GOTO 350
340 IF Y < 0.8 THEN THING$ = J$ ELSE THING$ = K$
350 PRINT
360 PRINT NAME$;" AND ";P1$;" FRIEND, ";FR$;", WERE ON HOLIDAY WALKING ALONG A ";
365 PRINT TYPE$;" ";PLACE$;" LANE."
370 PRINT "SUDDENLY, ";NAME$;" WAS STARTLED BY A NOISE BEHIND ";P2$;"."
380 PRINT P3$;" AND ";FR$;" BOTH TURNED ROUND QUICKLY TO SEE A ";THING$;"."
390 PRINT TAB(40);".......WHAT HAPPENED NEXT, ";NAME$;"?"
400 PRINT
410 DATA STORMY, DESERTED, MOUNTAIN, SEASIDE, COUNTRY
420 DATA ZULU WARRIOR,HUNGRY LION,WOUNDED THRUSH,WHITISH SKELETON,FLASHING ROBOT
```

The personal pronouns in the output text are determined by the use of the matching idea developed in the previous article. We use the contents of SEX$ provided at line 120. If SEX$ = "Boy" at line 150 then his/him/he are located at addresses P1$, P2$, P3$ by lines 160 - 170 (again P1$ is a two "letter" address), but if SEX$ = "GIRL" then her/her/she are located by line 180 at the same three addresses. (Notice that we have contracted two lines at line 160 by using a semicolon.)

Now the story has been "personalised". In the next step it is given variety by the random selection of some basic elements. The program DATA at lines 410 - 420 are READ at lines 190 - 200.(Line 190 is a contraction). Thus all ten items of data are read in order into appropriate stores.

We now make use of the computer's RANDOM number generator which produces a sequence of arbitrary decimals between 0 (zero) and 1 (one). Each six digit decimal (d) could be zero but not one - more precisely $0 \leqslant d \leqslant 0.999999$. The statement RANDOMIZE (line 210) is necessary to start the sequence at a different place each time. The assignment statement (LET) Y = RND(1) (lines 230,260,300) assigns the next decimal in the random sequence to the location Y. Y is a 'dummy' variable used to sort out the stored data. We use this temporary location three times in this program. In line 240, one of the descriptions 'stormy ' or 'deserted' (located respectively at A$, B$) is copied to the new location TYPE$. If, for example, Y = 0.21 (i.e. $Y < 0.5$) then 'stormy' is selected and copied to the address TYPE$, but if Y = 0.73 (i.e. Y ⩾ 0.5) then 'deserted' would be selected. The two choices are equally likely.

IF - THEN - ELSE - in line 240 is a contraction for the lines

```
240 IF Y < 0.5 THEN TYPE$ = A$
241 IF Y < 0.5 THEN 250
242  TYPE$ = B$
```

There are two conditionals here. The first is new: line 240 is a conditional assignment statement. The second is the conditional jump we have met previously (line 241 above). This conditional jump is implied in the original line 240 where the word 'ELSE' allows for an unfulfilled condition.

Lines 260 - 280 choose one "place" out of three located at C$, D$ and E$. In one third of the cases (Y < 0.333) the word 'mountain' is chosen and copied to PLACE$; in another third, 'seaside' (0.333 ⩽ Y < 0.666); and in the rest, 'country' (0.666 ⩽ Y). Similarly the "thing" is chosen by lines 300 - 340.

The output text - the introduction to the pupils' story - is printed by lines 360 - 390. The only new statement is the PRINT TAB(40); "..." in line 390 which as can be seen from the printout acts as a (40 space) tabulator.

Apart from the child's input there are 30 variations now possible in the output (2 types, 3 places, 5 things - 2 x 3 x 5 = 30). In this way this program can be used many times to provide different stories. The story introduction provided is, of course, quite arbitrary and limited only by the imagination of the teacher. Anyone who carefully compares the printout with the BASIC listing (lines 360 -390) can create a different one. Here are the steps:-

1. Write out your own 'introduction' containing as many names, dependent pronouns and parts of speech as you wish to vary - underlining each.
2. Place the whole text in quotation marks.
3. Replace each chosen variable, in 1 above, by a variable address (e.g. NAME$, N$, NZ$ for words or NA, N, NZ for numbers). This 'address' must be separated from the rest of the text by semicolons and further quotation marks. It may be necessary, if two addresses occur consecutively, to specify a space within "text quotation marks" as in line 360 between TYPE$ and PLACE$. Otherwise "desertedseaside" would be printed out.
4. Carefully examine the spaces and punctuation on either side of a 'variable address' and compare with the printout.
5. Write down as many alternatives as required for each variable and put these on DATA lines (e.g. 410 - 420).
6. For each 'variable address' in the text output, prepare a random selection routine.
7. Check carefully, for each variable, that you have the same number of items of DATA as of READ statements and of random choices. You have been warned!

Program 2 illustrates an appointment between two classmates at an arbitrary time:-

```
RUN
JOHN MET JO AT  9  O'CLOCK.
JO MET MARY AT  6  O'CLOCK.
JOHN MET JO AT  6  O'CLOCK.
```

Multibranching techniques are introduced to demonstrate an alternative method of programming random choices of numbers or of words.

```
490 CLEAR 100
500 REM ********* PROG 2 **************
510 READ N1$,N2$,N3$,N4$
520 FOR N=1 TO 3
530 RANDOMIZE
540 REM ********* CHOOSE TIME *********
550 T = RND(1)
560 TIME = INT(12*T) + 1
570 REM ******* CHOOSE 2 CHILDREN *****
580 C = RND(1)
590 C = INT(4*C) + 1
600 ON C GOTO 610,620,630,640
610 N$=N1$:GOTO650
620 N$=N2$:GOTO650
630 N$=N3$:GOTO650
640 N$=N4$
650 REM ***** A DIFFERENT FRIEND ******
660 F = RND(1)
670 F = INT(4*F) + 1
680 IF F = C THEN 660
690 ON F GOTO 700,710,720,730
700 FR$=N1$ : GOTO 740
710 FR$=N2$ : GOTO 740
720 FR$=N3$ : GOTO 740
730 FR$=N4$
740 PRINT N$;" MET ";FR$;" AT ";TIME;" O'CLOCK."
750 NEXT N
760 DATA MARY, JOHN, PAT, JO
```

Notice that we have used different dummy variables in lines 550,580,660. This is only important in line 680 which ensures, as we shall see, that two different (!) classmates are chosen. The statement in line 560 TIME = INT(12 * T) + 1 needs some explanation. Now by line 550 T lies between 0 and 1 so 12 * T (12 times T) is a decimal between 0 and 12. The INT ( ) function gives the 'integer value' of 12 * T - that is, the whole number which is less than 12 * T (e.g. INT 2.71 = 2). Thus INT(12 * T) is a whole number in the range 0 to 11 (but not 12 since RND(1) is never 1) and this number is then stored in location TIME.

Similarly line 590 makes C = 1,2,3 or 4. Line 600 is a multibranching conditional jump which is used here as an alternative to the method in program 1. It is a contraction of four lines like "600 IF C=1 THEN 610".

Only one of the lines 610 - 640 is read, only one of the names in line 760 (stored by line 510) is chosen at lines 610 to 640 and the friend is chosen similarly at lines 700 to 730. The friend's name is different because the conditional jump in line 680 rejects and replaces any random choice giving F = C.

Clearly this multibranching technique has many applications. Some of these were explored in older programmed learning techniques. I am sure that we should use the best of these 'old' methods, for example, in consolidations and revision but let us at all costs not be bound by them. It would be a pity if,through lack of imagination in this new field, the majority of programs turned out to be of the 'conditioned response' type.

One side effect of this article may be useful. The next time you receive a mail order circular with your name (and address) apparently specially typed within the text of a letter promising you personally numbered prizes etc etc - perhaps you will pause, consider how it was constructed and file it in the dustbin.

Let us summarise the new ideas covered in this issue:

1. BASIC <u>commands</u> RUN, LIST
2. Several statements may be <u>contracted</u> onto one line - separated by a colon (:). Address names may have two (significant) letters or one letter plus one digit (both for strings (NA$) and for numbers (NA))
3. <u>Input/Output Statements</u> (I/O) - mainly contractions.
   - i) INPUT "printed message"; NAME$
   - ii) READ A$, B$,C$
   - iii) PRINT TAB(5); "Indent this paragraph"
4. <u>Conditionals</u> can use <u>statements</u> as well as <u>line numbers</u> after THEN
   - i) IF (statement) THEN (statement or line number)
   - ii) IF (statement) THEN (-) ELSE (-)

     ELSE allows for unfulfilled conditions.
   - iii) ON (whole number 1,2,3) GO TO(line 1, line 2, line 3 respectively.)
5. <u>Functions</u>
   - i) RANDOMIZE - variable start

     A = RND (1) - locates a random number less than 1 at A
   - ii) I = INT (X) - locates the integer part of X at I.

J. Fair

Microcomputers and the BBC

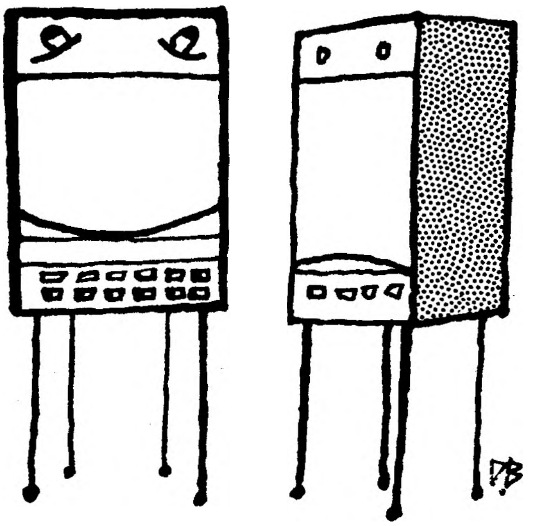
Microcomputer technology is never out of the news for long these days, particularly when the BBC decide to lend their weight to developments.

Certainly the BBC Computer Literacy Project has caused a stir in the computing world, but it may be the forerunner of exciting developments within primary education. Firstly let me outline the scheme, to be launched in January 1982. In the words of the BBC, "The aim of the project is to introduce interested adults to the world of computers and computing, and to provide the opportunity for viewers to learn through direct experience how to program and use a microcomputer". The components of the project are:

1. a ten-part television series (Sunday mornings on BBC-1 from January 10th 1982, repeated on Mondays at 1500 on BBC-2).
2. a BBC handbook explaining how the microcomputer works, and giving a range of applications and basic principles of programming (available in January 1982).
3. A BBC microcomputer. With this option, viewers who follow the series can gain direct "hands-on" experience. The particular micro used will be produced by Acorn Computers at Cambridge to BBC specifications and will be available by cash post from the fourth quarter of 1981 at a cost of approximately £230 for the standard model, including a user guide. This model is based on the 6502 microprocessor with 16K of RAM and 32K ROM, comprising a 16K BASIC and a 16K Operating System. The eight possible display models include teletext and a 320 x 256 high resolution graphics (in up to 8 colours). There is also a range of expansion options or, as an alternative, an enhanced model at approximately £330. Perhaps the most interesting enhancement is the Teletext receiver (at about £100). It will be capable of receiving teletext transmissions from the BBC and IBA and of downloading computer programs, transmitted in the form of telesoftware, directly into the memory of the microcomputer. The BBC propose to make available a range of software, which hopefully will include programs suitable for primary education, and written in a version of BASIC closely resembling MICROSOFT.
4. a 30 hr introductory course in BASIC programming provided by the National Extension College in association with the BBC. The course can operate independently or as a correspondence course with the N.E.C., as a core text for part-time class teaching or as a core text for home-based students studying by Flexistudy through their local college.
5. a telephone referral service, to put viewers in touch with local sources of advice and help.

Further details of the BBC scheme and associated microcomputer can be obtained from Robert Salkeld, Continuing Education Officer, BBC, Broadcasting Centre, Woodhouse Lane, Leeds LS2 9PX. Details of the National Extension College course are available from Richard Freeman, N.E.C., 18 Brooklands Avenue, Cambridge CB2 2HN.

This project represents a new venture for the BBC, particularly in the provision of hardware support and local courses, in addition to their usual printed backing. As far as primary education is concerned the project offers a unique opportunity for primary school teachers to gain a working facility with micro-computers and it may well be that the Acorn/BBC micro becomes one of the standards of primary education. The recent Department of Industry announcement concerning the provision of microcomputers (either Research Machines or Acorn) to all secondary schools by the end of 1982, is a move towards standardisation. If Acorn can produce primary software to support their machines then they must be serious contenders for the primary market. All micro manufacturers are aware of the enormous potential of the education sector, but their attempts to fill the software gap are very crude. However, the idea of accessing a library of software via a teletext adaptor to an ordinary TV set and then downloading the particular program into your computer memory is one of the most exciting solutions to the software problem.



"Of course. I could make far more in industry, but I love working with people."

However, I have some reservations. Research Machines, and Acorn even more so, are small but expanding British businesses with imaginative plans for future growth. I only hope thay they will be able to meet the tremendous demand that will be generated by the BBC and Department of Industry initiatives. Hopefully, then, for primary teachers the project represents an ideal opportunity to find out about computers before the children we are teaching show more awareness than their teachers.

* * * * * * *

Since writing this article we have visited the BBC at Leeds to discuss the Computer Literacy Project. We must emphasise again that the project is not designed specifically for primary school teachers, nor is it mainly devoted to BASIC programming. The programmes themselves are about computer awareness and are aimed at the general public. Those teachers wishing to concentrate on programming will need either the associated N.E.C. or a part-time local course linked to the series.

However, the BBC are very aware of the needs of primary school teachers and appreciate the extent of in-service training necessary before the micro becomes a generally accepted aid to teaching. We hope that their future plans will include a short series aimed specifically at primary school teachers, with an emphasis on case studies, and a pack of back-up material. The facility of the BBC to reach a huge audience could make a significant contribution to the necessary in-service programme and certainly help to spread the word and show "good practice".

A final note: Order forms for the BBC/Acorn mico will be sent out in June to all those who have written to Leeds for details.

R. Keeling.

The Microelectronics Education Programme

Do you remember the £9 million the Government made available to promote the use of microelectronics in schools? Well, things are now moving, The Director of the Microelectronics Education Programme (the organisation created to spend it) has now produced a document entitled "The Strategy", outlining "future priorities and methods of operation". Copies can be obtained free from: The Publications Despatch Centre, DES, Honeypot Lane, Canons Park, Stanmore HA7 1AZ.

The emphasis is on curriculum development, teacher training and regional resource organisation and support. The latter will be achieved by establishing 14 regional centres to cover the whole of England, Wales and Northern Ireland (Scotland have their own programme). By September some of these centres will be operational, so do use the expertise that will be available there. Find out where your regional centre is and make yourself known to the director and his staff. For West Midlands teachers the centre will be based at Albrighton School in Sandwell with Ian Glen (Brays School, Sheldon) taking up the role of director.

Finally let me repeat the invitation that appears in the Foreword to "The Strategy":

"Anyone who wishes to submit a new proposal, amend a previous submission after reading this document, or believes he may be able to contribute to the Programme in some way, is invited to write to me at the following address: Richard Fothergill, Cheviot House, Coach Lane Campus, Newcastle upon Tyne NE7 7XA."

R. Keeling

NEWMAN COLLEGE - The Schools Project

We are pleased to be able to announce a preliminary outline of an exciting project for the forthcoming academic year. The College has arranged to equip six local primary schools each with its own cassette - based microcomputer: namely, RML's new "Minim". The cost will be shared by the LEA's (Sandwell and Birmingham), the Department of Industry and Research Machines Ltd., all of whom we thank for their generous support.

We plan to observe how much they are used, how they are timetabled and integrated into the curriculum, which facilities of the micro the schools find most useful for particular age and ability levels, and which types of program are most beneficial. The College will provide much of the software support and co-ordinate the activities of the six schools, with tutorial support across the curriculum. The emphasis is on the word "support" - I am sure that teachers and College staff will learn side by side. We hope we will all learn to recognise those areas where the micro can really make a significant contribution to the education of younger children. Equally, if any of the micros are sitting on a shelf next July, collecting dust, no doubt there will be many lessons for us there! Naturally we will report on developments in future issues. If any other areas are proposing similar schemes we would be delighted to hear of progress.

R.K.

COURSES AT NEWMAN

Microcomputers Workshop (Assessment and Development of Software)

A series of monthly meetings related to the design and evaluation of programs appropriate to the primary sector. All interested primary teachers are welcome to attend. First Thursday of each month, commencing October 1, 4.15 p.m.

BASIC Programming for Primary Teachers - 10 Meetings

A series of ten introductory lectures on BASIC programming. 'Hands on' experience will be provided on the College's microcomputer systems (eight 380Z systems and an Acorn Econet of 9 stations). 10 Wednesday meetings commencing September 23.

Advanced BASIC Programming for Primary Teachers - 10 Meetings

This is similar to the above course, but is designed for those teachers who have some knowledge of programming, or who attended the introductory programming course in the Spring Term. Topics will include file handling, high resolution graphics, data structures and the design of educational software. 10 Monday meetings commencing September 28.

380Z Workshop

This one-day course, similar to the one held in the Spring Term, will examine certain extensions to the 380Z system. Possible topics will include PASCAL, simple control applications, mini assembler, and applications to geography, science and art. (Date to be announced)

For further details please write to Mr R. Keeling, Newman College, Bartley Green, Birmingham B32 3NT.

MAPE

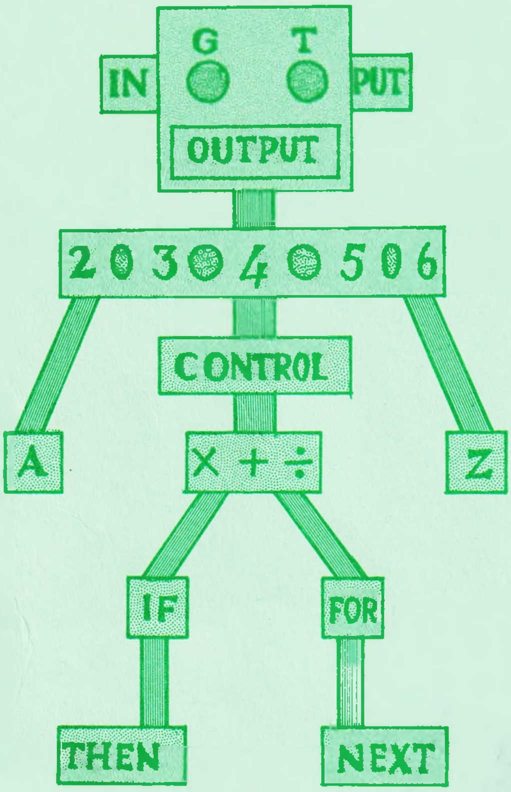
Micro ..... and Primary Education is the name given to the newly formed national association representing microcomputer users in primary schools. The dots indicate an inconclusive debate as to whether -computers, -electronics or -technology best fits the gap ! This in turn reflects the committee's awareness of the rapidly changing technological world and the need to formulate a name which will still be representative of current developments in five or ten years time. The aim of the association is:"To promote and develop the awareness and effective use of microelectronics as an integral part of the philosophy and practice of primary education."

The first meeting of the steering committee met at the C.E.T. on 6 June and, as with all organisations in their infancy, progress was slow! The potential membership is vast (with 22000 primary schools it could soon outgrow MUSE), the climate is right and interest is growing at an amazing rate. However the committee is also aware of the need to get things right and to have something to offer. Undoubtedly there will be a great deal to offer (information, journal, courses, software, advice etc); the problem is to determine a structure that ensures both quality and readily available access to everyone. For these reasons the committee chose a cautious start leaving the question of subscription details and membership to the next meeting (September 26 at Newman.) In the meantime it has been agreed to investigate the question of sponsorship, the possibility of setting up regional networks based on the MEP regions, and to develop close links with MUSE while retaining the principle of autonomy. Next year's Easter Conference will be held at St Luke's,Exeter, on April 2/3/4. The provision of information packs for schools is under active consideration. MAPE and MICRO-SCOPE have considerable identity of interests, and this journal will help to serve the needs of the new organisation. The committee members are listed below for your information. They would be pleased to receive your name and school address if you are interested in receiving further information when available, and would welcome your ideas on what you would expect from a national association. However they are not yet in a position to act as advice centres: this function must await the establishment of a regional network. Watch this space!

Ron Jones, Chairman, Upwood C.P. School, Huntingdon.
Bryan Weaver, Deputy Chairman, ILEA Inspector, Room 231C, County Hall, London SE1 7PB.
Barry Holmes, Secretary, St Helen's, Bluntisham, Cambs.
Ron Gatfield, Treasurer, Hart Plain Middle School, Hart Plain Avenue, Cowplain, Hants.
Derek Daines, Carsic Primary School, Sutton in Ashfield, Notts.
Dave Ellingham, Marcliffe CP, Marcliffe Road, Sheffield.
Jim Fawcett, 15 Berbice Road, Liverpool.
Pam Fiddy, The Wing, Rosehill, Lostwithiel, Cornwall.
Roy Garland, School of Education, St Luke's, Exeter.
Ray Haydon, 43 Heneage Road, Grimsby, South Humberside.
Roger Keeling, Newman College, Birmingham.
Tony Mullan, Plympton St Maurice CP, Plympton, Devon.
Don Walton, Houghton CP, Houghton, Huntingdon, Cambs.
David Wharry, Department of Education, University College, P.O.Box 78, Cardiff.

R.Keeling

MICRO-


G
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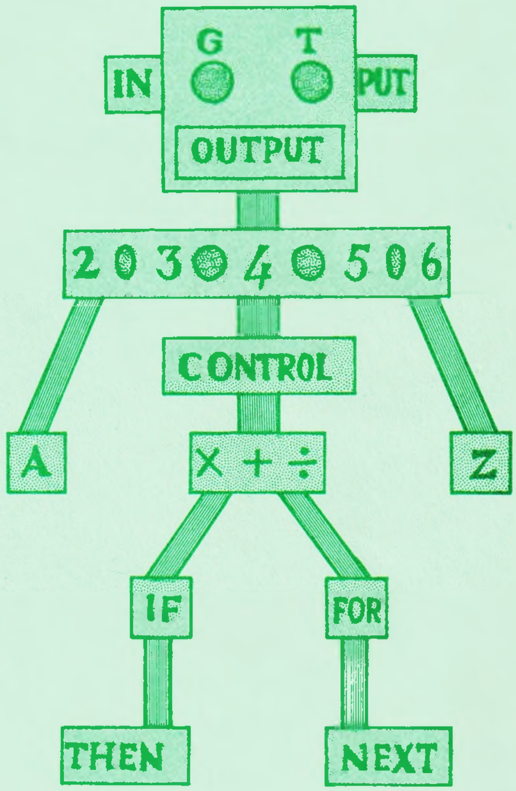
IN
PUT
OUTPUT
CONTROL
A
X + ÷
Z
IF
FOR
THEN
NEXT


G
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IF
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THEN
NEXT

SCOPE