S & Thesis in Phil. 1976. Longworth

'INFORMATION'

A course for the lower Secondary School on the impact of information and information systems on the world of today.

written at the School of Education
University of Southampton
by Norman Longworth
IBM United Kingdom Limited

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MODULE 0

A teacher's introduction to the course.

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What is the course about?
How long does the course last?
What is the content of the course?
Who would teach it?
How can the course be modified?
Writing your own module.
How should the course be taught?
To whom should it be taught?
What more do we need to know?
What preparation is required?
How can I plan the course?

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Module 0 - a teacher's introduction to the course:

What is the course about? As the title implies, this course is about information, its collection. analysis, storage, processing, retrieval, communication and proliferation. Information is a huge topic which affects all of us, child and adult alike, whether or not we have the advantage (or the disadvantage) of a mechanical means of handling it. In the classroom, teachers are handing out information or encouraging children to find out information for themselves; in the home, teachers and children receive a constant bombardment of information, perhaps trivial, perhaps interesting and occasionally vital, from the media, from the people they converse with and even from just sitting in the room; in the town or village, in the country walk, in everything we do or say, information is all around us - how do we make sense of it all? how are we made aware of it? how does it affect us? what is important to us? to others? how can information in the hands of others be used for the good? for the bad? These are not academic questions to exercise the intellect; they are crucial questions to which we may be subconsciously supplying an answer, not necessarily the right one, at every moment of the day, and which affect our reaction to events, our ability to think clearly, our willingness to appreciate and our whole life-style. Nor are they questions which concern only the mathematician and the scientist - all departments of the school are concerned with the childrens' assimilation of information in many different spheres.

Commercial organisations, Research Establishments, schools, libraries, computers and human beings thrive on information - it is the fuel by which they operate, the essence of their vitality. And in a world in which information is doubling every two years, an essential prerequisite to orderly adaptation in the face of such demands is an understanding of its cause, its effect and its nature. The purposes of education, the making of decisions, the reasons why we learn or teach in one way rather than another, one set of facts rather than another set, are all influenced by the amount and nature of the information we have available and our ability to access it, and will become increasingly so influenced in the future. One of the alternatives to knowledge through information is bewilderment through information, and it is surely in the interests of children that they be allowed to appreciate the difference.

This course 'Information' attempts to put these ideas into perspective by presenting Case Studies of some diverse organisations which use information and, by relating their activities to experiences of which they themselves will be aware, hopes to develop some insight in the children of the part information plays in their everyday lives.

Thus, modules on Police Work, Road Research, School Information Systems and the Southern Gas Board are examples of the needs of organisations for methods of information collection, analysis, processing, retrieval and communication which are related to their own specific types of activity - they are presented from the standpoint of what the child knows already about these activities. Introductory modules on Information, the Library and Individual Information Assignments teach the child much more about the nature and proliferation of information and the problems he/she may encounter in dealing with it and making sense of it. Modules on the Engineering Aspect of Computers and Working with a Computer are meant to illustrate how the machine may be used (or misused) to help the human being solve information problems (and also create further problems in some cases).

A fuller list of the modules follows together with a brief description of their content, but it is important to point out that this course is not all about information - no one course could hope to achieve this. It is about those aspects which enable us to recognise the information problem and to understand how it may be solved, using perhaps our own personal resources but also the mechanical tools we can make available to help us in the solution.

The course is not intended to usurp the place of the standard content of the school curriculum, rather to act as a complementary subject to all others, perhaps as a common core in the first, second or third year of secondary school, perhaps as a complete unit to precede the traditional curriculum.

Finally, although the subject matter may be taught by one person, who need not be highly qualified in technology, or information, or any specific subject, the organisation of the course into modules permits team teaching methods to be tried out if the normal constraints of the school timetable allow. A high proportion of the course encourages practical activity on the part of the children, especially in those topics which may be unfamiliar to both teacher and children - this is an attempt to take some of the burden from the teacher who is hard-pressed in developing other courses and topics. Nevertheless, some preliminary activity is required from the teacher and this will be outlined in a later section.

How long does the course last?
What is the content of the course?
Who would teach it?

The following table shows the content of the modules and gives some course timings based upon one double lesson (approximately one hour) per week. As all teachers will know only too well, some children learn less quickly than others, and this is the reason for the wide variation in completion times for any module. Further, the time given is an approximation for the teaching of the whole module - as is explained later, it is not always necessary to do this.

Module Descriptions, Approximate Course Timings and Subject Teachers for course on 'Information'

CODE LETTER	Module	Title	Brief Description	Time (weeks)	Recommended Subject Teacher (If Team Teaching is used)
I	1	An Introduction to Information	Definitions. Types of Information. Information in the school environment-a walk in the area. The universality of info. Summary. The history of man's use of information.	4-7 weeks	English, General Studies, Maths, Geography, History.
H	2	Designing a Headmaster Info System	The problem of information in the school and the different topics involved. Case Studies of specific problems. Designing the answer to the problem. An edge punched card exercise.	4-7 weeks	English, General Studies, Maths. - any subject area.
P	3	Information in Police Work and the Law	TV police v real problem. Sherlock Holmes approach-Observation, Knowledge, Deduction, Action. Case Study of computerised police force in future. Uses of computers in police work and courts. Police National Computer - implications and apps.	8-12 weeks	English, General Studies, Maths, -any subject
M	4	The computer- an Information Machine	Functions and working of a computer. Structure of a computer system. Input-Processing-Output Cycle. Progress of Technology over the past 20 years.	5-8 weeks	Physics, Maths, General Studies.
R	5	Information in the Transport and Road Research Laboratory	Geographical exercise on homing in. The work of the Laboratory and the facilities used there to gather and process information. Road Accident figures - how produced. Computing and language.	9-13 weeks	Maths, Geography, English, General Studies, any subject.
C	6	Working with a Computer.	Terminal Work using personal information recorded by the children. Information collection and retrieval. Batch work using computer created Haiku verse forms. Learning with a computer.	5-8 weeks	Maths, English, General Studies, all subjects
G	7	Information at the Southern Gas Board	The Geographical Area of the Board. The need for information and how it is obtained. Meter Reading Application in particular and Gas Billing -other applications carried out at the SGB. Processing.	6-9 weeks	Maths, Geography, General Studies, Physics, any subject
L	8	Information from Library	The library as an information store. How to find information. Library projects on information finding coding systems and the use of indexes. How the library keeps tabs. Libraries of the future.	4-7 weeks	Librarian, English, General Studies, any subject.
A	9	Individual Info Assignments	Personal Assignments in information collection, storage, analysis, processing and retrieval. Using computer if availability allows or edge-punched cards. Surveys of Television Viewing, Football etc.	4-7 weeks	General Studies, Maths, English, any subject.

How can the course be modified to suit particular needs and constraints?

While all of the modules at present included in the course are generalised enough to be taught in all areas of the country, it may be that the teacher concerned wishes to develop a module covering a local industry or organisation so that visits may be made there, and so that the course is made so much more real to the children studying information. Modules contain many topics and there is ample scope for the inclusion of original work in them as the teacher desires - for example, access to a computer in the vicinity offers the possibility for extra topics to be included in Module 6 (Computer Contact), perhaps based on the teaching packages written for school work in many different parts of the country. This section, however, explains two aspects of the course which most teachers will wish to enlarge on. Firstly it recommends ways of developing Module 1 so that the area covered in the childrens' initial search for information is local to the school; secondly, it projects some ideas based on the general approach of the course as a whole on how to develop your own separate module(s) to take account of the organisations in your own area.

a) Modifying Module 1

Examples are given in the Teachers'Notes for Module 1 of local areas in Yateley and Winchester where the pilot studies for the course were carried out.(See pages I/T/9 to I/T/16). Most street corners or crossroads will provide a similar wealth of information, and the problem is often merely one of selecting a spot which is easily and quickly accessible to your school and which, if possible, does not entail crossing roads. At Yateley, we studied two contrasting points, at Winchester just the one, and it is our experience that both approaches are viable and a product only of the time constraints encountered in those areas. It is advised that you visit the spot(s) yourself before teaching the module - it will help to clear up any points about your objectives in teaching this module, and assist in teaching the preparation work before the children visit the place. To help you to prepare the necessary written work the following sequence is recommended.

i) Read Module 1 to find out what it is about.

ii) Go to the spot of your choice with blank paper and pencil and an open mind.

iii) Note down the information you see there, looking for detail all the time - ask yourself questions (which you may or may not be able to answer) about each point of information. Look particularly for evidences of the public utilities - gas, electricity, sewage disposal, GPO, water, lighting etc - make a point of noting how these are expressed on the ground eg what is actually written on the manhole cover? Then look for other information, houses, shops,pubs, trees, notice boards, kerbstones etc. Remember that observation is not only what you see but what you experience

through your other senses,; smell, hearing etc. Note down the information which may change when you take the children, eg weather, traffic. The list of questions on the example sheets in the module will help if you are not sure what to look for.

iv) Study one specific object on the corner. In the module you will see that in Yateley we took the example of a telegraph pole in Yateley and an Inn Sign in Winchester. Make a list of all the questions you can think of on the spot - others will come to you later when you sit down to make a fuller list - again remember that you are not required to answer the questions.

v) If you have a camera, take two shots from different angles of the location you are studying and one of the specific object you have chosen. Slides are best since these will help in the classroom follow-up work.

vi) Prepare a map question sheet (as in the examples pages I/P/8 and I/P/12). This is to be completed on the childrens' second visit to the location since, on the first, they will be much in your position when preparing the lesson.

vii) Prepare a sheet with some explanation at the top and blank spaces below as on page I/P/9.

viii) Prepare the sheet of all the questions you can think of relating to your specific object.(cf page I/P/10 and I/P/13.

This may seem to be a long process entailing much work on your behalf. In effect there is not as much time taken as seems likely. At Winchester, it took one hour for the personal visit and one and a half hours to prepare the necessary sheets.

b) Writing your own module

Module 5 (The Transport and Road Research Laboratory) is as good an example as any of the way in which information in its total environment can be treated. In this, the major objective of illustrating how the Laboratory exists to produce, process and communicate information is set into the real, everyday context of a place where human beings work and which actually exists in a particular location on the map. In the same way, in looking at the organisation you wish to study, observe how information is communicated, both internally between departments, and externally with its suppliers and customers. In particular, if the organisation has a computer, show how this plays a central role in the information flow. At the same time look also at the geographical and physical layout, the people in terms of the work they do, their position in the hierarchy, their distribution and composition, and the wider aims, activities and objectives of the organisation. In doing so you will discover three things. Firstly, the scope of your intended

investigation becomes such that you cannot possibly cover all aspects; secondly, there are a variety of ways in which the subject may be treated; thirdly, that there is a complex interaction of functions and activities, between people and between departments, which is more often than not sorted out by a 'system' involving the use of a computer somewhere in the organisation (not necessarily on site).

As important as the content of your module is the way in which it is presented to the children - some of the ideas you wish to put over may be complex and great care should be taken not to baffle or confuse. Children must be made to feel involved in the study, to feel part of the organisation they are looking at; the more actual, original documentation you include, the more physical contact they have with people and artifacts from the organisation, the more activity they take part in which simulates parts of the organisational activity, the greater their sense of involvement. In some of the modules, there are ideas for overcoming a sense of isolation from the subject of study - Module 7 for example contains a game in which children play the role of customer, fitter, salesman and computer using the actual documents from the Gas Board; Case Studies occur in many of the modules as do worksheets which ask the children to think through a problem before solving it. You will have ideas of your own for involving children, perhaps a visit, or a film or a visitor from the place, and it is not intended to deal further with this aspect of lesson construction at this time. The following ideas may help you both in choosing your organisation and in developing the module which brings out the importance of information to its proper functioning.

i) Does the organisation have its own external information service, with handouts, films etc which explain to the public at large what it is trying to do, what it manufactures, what its aims and activities are etc? If so, you will have saved yourself some work in trying to write your own descriptions, and also be able to use these as source material for worksheets, games etc. Even if there is no such service offered, there is often a wealth of information available in the form of sales brochures, instructions to workers, internal forms, packing documents etc which may be used for the same purpose.

ii) What contact do you have with people in the organisation? Often this can be arranged through a parent or friend, and often organisations are happy to have their activities publicised and are willing to allow you to liaise with the people you need to contact. If you have no formal contact, try starting at the top of the organisation by writing to the chief executive - the implicit approval from him permeates through the structure and you are likely to obtain all the cooperation you need. In particular, for a project of this type, you are advised to consult the Management Services Department or its equivalent since

members of this department have an overall picture of the way in which the information flow affects the different departments of the company. When making your first contact, state as clearly as possible that your interest is in the way in which information is crucial to its effective functioning - ask for advice on who would be the best person to see.

iii) Apart from the Management Services Dir-ctor, interview as many people as you are allowed to and as is reasonable, asking them in particular how they receive and passon information - if there are documents involved ask if it is possible for you to have a copy. When developing your teaching material use original documents and brochures as much as possible. Take a camera with you and obtain your own set of slides. In some circumstances, with maturer children, it is possible to enlist their help in developing material and to provide for them some valuable original work, but they will need help in the form of question sheets.

iv) Information is not confined to your own course - in many cases you will find colleagues at school who are interested in what is being done. The geography department would be interested in the physical location, access to raw materials, markets etc, the technical departments may be interested in some of the processes involved in manufacture, the english department may be interested in techniques of interviewing - the careers department, the history department all have their own involvements with projects of this nature - bear in mind that the possibilities for an integrated approach are endless, since information is the commodity common to all departments of the school, just as it is to the several departments of the organisation you are studying.

v) The point has already been made about the necessity of involving the children with the organisation. Apart from visits, and the possibility of inviting someone to come along to the school, when you are developing the actual material think in terms of the childrens' opinions, their need to think through and come to their own conclusions. Work sheets serve three purposes; they help to clarify your own thoughts, they can be used by the children to summarise what has been learned and at the same time they can stimulate discussion in the classroom, and they give to the organisation you are dealing with a sense of involvement which encourages gretaer participation on the part of the people you are dealing with. In constructing worksheets, make them as informal as possible, use them as a link

between the different parts of your treatment of the subject by putting in some commentary at the top explaining what its purpose is, and include questions which require the children to draw from their own experiences as much as possible. Look at some of the worksheets in the rest of the - there is a wide variety of question, some asking for factual material, some for opinions and some for descriptions of things they themselves have done. Leave spaces on the sheets for answers - this is the child's personal record which he/she keeps. Leave blocks for maps, pictures, drawings and encourage neatness at all times. In your material plan discussion work either between yourself and the class (cf the Case Study page in Module 2) or in informal groups of children - in this latter give them a problem to solve, preferably open-ended, so that they can report back to the whole group. Consider the use of games and simulations, of roleplaying exercises and of taped conversations. The possibilities in developing material for a project of this sort are enormous, but the essential emphasis is on involvement.

vi) Finally, keep in mind at all times that your organisation, like yourself, is concerned with information and aim to bring this home towards the end of your module, when you may consider dealing with the computer as the central theme, introducing the hardware as a processor of all the information which has been included in the rest of the module. Perhaps trace one aspect of this throughout the organisation. Refer to the chief executive - how does he keep in touch? On what information does he base his decisions? Who does he consult and on what do they base their opinions. You may even be able to recommend a better way of approaching the problem in the future - and, if you can, encourage the children to talk about the future of the organisation - they enjoy speculation of this kind and it is a good opportunity to teach some truths about the computer as an influence on the way in which they will live their lives, and perform their work activities.

How should the information course be taught?
To whom should it be taught?

As has been mentioned in an earlier section, the information course has been designed to last one hour per week for approximately one year (although there is sufficient material for longer than this. This is only a guideline - there is no reason why the course should not be taught all in one piece at the beginning of a term or school year, and by a team of teachers from various departments or by one teacher alone. One of the main objectives of the course is to enable children to make sense of the school curriculum in terms of the interaction of subjects, and this latter approach may go some way toward realising this. In terms of the approach to individual approach to topics within

the course, there are no constraints of background knowledge - whatever new material there may be is contained in the teachers' notes or picked up by the children from referenced work sheets, and the former are very copious - or teaching style, although it should be perhaps borne in mind that there is a fair amount of discursive work, alleviated again by the work sheet approach. Apart from this, there is an inherent flexibility about the course which allows additions to be made and modifications to be incorporated. Indeed the teacher is able to choose from the wide number of topics in the modules what he or she wishes to teach and in which order.

The course has been developed with second year (12-13 year old) pupils in mind but again the material is easily modifiable to suit other age groups. Insofar as ability level is concerned, most of the teaching material can be taught to pupils of reasonably measurable intelligence - as would happen in any course, more help would need to be given to lower ability level children, although it is interesting to find in the pilot studies that such children are just as likely to come up with bright ideas in discursive work as their more developed counterparts.

What more do we need to know?

What preparation is required?

The following preparations need to be made by the teacher in charge of the course.

a) Films - at intervals, recemmended films will need to be ordered - this cannot be done until you have worked out in which order you will be teaching the modules and therefore when the films will be needed. The sheet which follows enables you to plan the course ahead and acts as a reference for preparing the visual aids in advance.

b) Visits - the more visits you can make to organisations which you are studying the better. You will need to make the arrangements necessary to provide you with cover on the day, teacher-child ratio, guide or speaker at the other end etc. Again the next sheet helps.

c) Lessons - Teachers Notes should be read before the lesson - these contain details of the visual aids, worksheets reference sheets etc needed for each lesson - they are also indented so that you can make your own notes on the left. A complete schedule of the visual aids etc is given at the end of this introduction. (Teacher's Intro /12 to 22)

d) Computer Contact - written into module 6 are suggestions for a terminal session to be brought to the school, and for the processing of programs prepared during the course. You will need to schedule these in when you have confirmed that you can carry out the requirements with the people concerned.

The following sheets contain resumes of the modules of the Information Course, divided into lessons lasting approximately one hour. However, since all classes will not learn at the same speed they are to be taken as guidelines only. They can also be used to help the teacher plan ahead what he or she wishes to teach from each module. The form at the end will help in the planning of the course over a complete year. The detailed work in each module and suggestions for teaching it are contained in the teachers notes presented with the module. Also given in the sheets are the visual aids required. Many of them are provided with the course, but it is necessary in some cases to order films about four or more weeks in advance of the lesson. Inability to obtain films does not of course invalidate the module or the lesson, but it may entail some thought on how to present the topics in a different way. In most cases there are synopses of what is contained in the film and these can act as an alternative to the film itself.

MODULE 1 - Introduction to Information

Time taken: 4 - 7 hours

Broad Objective: To introduce children to the concept of information as a commodity which is ubiquitous, which is common to all subjects and topics and which is capable of organisation and development.

Outline of Module

Lesson No.	Resume of work	Pupil worksheets needed	Visual Aids needed	Other Info.
1	Discussion on the meaning of information, where it is found, how we define it. Film to illustrate its place in the world. A simple info collection problem.	A blank sheet for making lists and designing forms. Folders *	Film 'The Question Tree' Blackboard for general work. (Alternative film - as in lesson 4)	Order film from Random Film Library at least one month before lesson Film projector needed.
2	A visit out of the school to one or more spots to find information.	Blank sheets preferably on hard back Simple map of spot visited.		Take camera if possible Arrange cover/insurance if necessary.
3	Follow-up to previous week's visit. Discussion of things found. Revisit spot. General and detailed information.	Question sheet about location visited. How many questions?- lined sheet for completion. How many questions? - list of questions about one item.	Photographs of location visited and single item studied.	Slide Projector needed. Arrange revisit. (This lesson will probably ta longer than one hour an will need to be continu next week.
4	Resume of activities to date. General lessons re information learned. Film to illustrate uses made of information through history and elements of organisation.	Summary sheet on information.	Film 'The Information Machine' (Alternative film as in lesson 1 above)	Film Projector needed - order film at least 1 month before show date.

* Folders are useful for each child taking the course since they keep many of the sheets they are issued with and create new sheets of their own.

MODULE 2 - A Headmaster Information System

Time taken: 4 - 7 hours Broad Objective: To take the school as an organisation familiar to children and its needs in terms of information. To propose some solutions to those problems.

Outline of Module:

Lesson No.	Resume of Work	Pupil Worksheets needed	Visual Aids needed	Other info.
1	A Case Study - discussion of an information problem which crops up fairly frequently for a headmaster and which he could use an information retrieval system for. Other information problems peculiar to a school.	Case Study 1. How about these for information problems?.		
2	Setting up an information system - part 1 - looking at the variables involved - personal information in the headmaster's information system.	Some questions about your school. Information about you in the Headmaster Information System.	Slides of the school and its buildings? (If you have them).	
3	Stages in the setting up of an information from collection to communication.	Eight stages in setting up an information system.		
4	An edge-punched card exercise to illustrate a possible answer to the headmaster's problem. Guided and free exercises.	A sheet to help you plan the info on the edge-punched card. Two edge punched cards.		You may need to obtain the cards well in advance. It is suggested that you experiment in advance of the lesson to familiari yourself.

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MODULE 3 - Information in Police Work and the Law

Time taken: 8 - 13 hours

Broad Objective: To illustrate, by means of well-known examples, how information is an essential part of police work, in the catching of offenders, in the administrative functions and in the training of the policeman. To show how the computer can assist in providing the information that is reqired quickly and efficiently.

Outline of Module

Lesson No.	Resume of work	Pupil Worksheets needed	Visual Aids needed	Other info.
1	Police information problems - the job of the policeman vis-a-vis information. Information and knowledge.	How much do you know about your friend?	Blackboard.	Perhaps you may have a friendly local policeman available for this.
2	The policeman on television - a look at the real job of the police and the television image.	200 Tartan Teddy-bears - a Z-cars script. The Police on Television - question sheet		If it can be made available a tele-recording of a typical episode is useful.
3	Deduction from information. A Sherlock Holmes story to highlight information in the detection of crime.	Text of Sherlock Holmes film-strip (4 sheets)	Filmstrip and tape of Sherlock Holmes story.	Can lead to follow-up in many different ways
4	Information on the beat. A walk round the school to illustrate the difference between info with direction and without.	A sheet of questions relating to the information seen in the walk round the school. (Composed by the teacher). Map of the beat.		Entails some preparatory work in the setting up of the beat and in question sheet design.
5	Case Studies in police work - a general discussion and work session illustrating some of the problems of police work and some of the answers.	A sheet of Case Studies in Police Work.		
6	The accuracy of information. A series of exercises which show problems of identification, time estimation, recall etc. The danger of jumping to conclusions.		A watch. A series of slides taken by yourself (optional)	You may wish to set up a sophisticated set of questions to back up this lesson.
7	The computer in police work 1. A story about the use of the computer in the not-too-distant future.	Is this the way it could happen? A crime story (two sheets)		
8	The computer in police work 2. The Police National Computer and its uses. Structure of the Law. Machines which could be used.	Areas of police work in which the computer might be useful. A question sheet on the display screen and the teleprinter	Pamphlets on the display screen and teleprinter.	Look for newspaper cuttings about this. This could be a general theme for the module.

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MODULE 3 (contd) - Information in Police Work and the Law

9	The misuse of Computers in Police Work. Computers Don't Argue - a cautionary tale.	Script of 'Computers Don't Argue' (8 sheets). Computers Don't Argue - questions.	Tape/slide demonstration 'Computers Don't Argue'.	Look for newspaper cuttings on Databanks and Privacy.
10	Computer Fraud and Embezzlement - a new type of crime?	Computer Fraud and embezzlement - some Case Histories.		Again, newspapers are a source of information.

MODULE 4 - The Computer - an information machine

Time taken: 4 - 6 hours Broad Objective: To show, by reference to bits and pieces from scrap computers, how the computer works both logically and in practice, and to illustrate how the rapid growth of computer technology over the past few years has resulted in the increasing use of the machine in every walk of life.

Outline of Module

esson No.	Resume of work	Pupil worksheets needed	Visual Aids needed	Other info.
1	The Central Processor. Its function and modus operandum. Storage, Control and Arithmetic/logical functions.	Input-Processing-Output sheet (uncompleted). How does a computer store information? A computer code for you to solve.	A core store plane (or slide of same. A TROS module.	A box of parts may be available (details in the teachers' notes.
2	Computer peripherals. Cards and codes, paper tape, magnetic tapes and disks etc. The media of backing store and the machines which make it available to the computer.	Input-Processing-Output sheets (as in previous week) . The Information Machine and its Peripherals.	The relevant bits and pieces for the peripherals. (or slides of same)	Preferable to show actual parts, but slides will help to identify them, and also act as alternative.
3	Computer Peripherals - 2. Speeds and capacities etc. Some detail illustrating the speeds of information processing in the modern computer.	Computer peripherals reference sheets (5 sheets)	Pamphlets and leaflets illustrating aspects of computers.	Uses technical literature which may be beyond some children.
4	The technology of computers. Developments from Eniac to the present day computer and their relation to the amount of work they can do.	ENIAC	Valves, SMS cards and SLT cards (or slides of same).	You may wish to go back further into the history of computing. Since there is some electronics, your physics may like to help out.
5	The applications of computers today. How they affect the world we live in and the life we lead. Some problems which may arise.	What did you do today? Some uses for computers in today's world.	Slides of computer applications and uses. Film - Man and Computer - a perspective. *	You may wish to take this subject much further into the implications of computer usage. The film acts as a round-up of the whole module and you may need to devote a whole lesson to it.

* From Random Film Library

Teachers' Notes /16

ODULE 5 - Information at The Transport and Road Research Laboratory

ime taken: 9 - 15 hours Broad Objective: To show a research organisation in its total context but putting articular emphasis on its function as a collector, processor and communicator of information.

utline of Module:

n No.	Resume of work	Pupil Worksheets needed	Visual Aids needed	Other info
1	Introduction to topic of Transport. Road signs and improvements made. Involvement of people.		Slides of Road Improvements	You may wish to take your own slides of local roads.
2	Geographical introduction to TRRL - a homing in problem to teach the location of the Laboratory.	Let's find TRRL - a homing in problem(2 sheets). Outline map of Britain. Map of Crowthorne area.		The Geography Dept can help with the map.
3	The function of TRRL and its relationship to traffic problems in the British Isles. Film.	Safely on the Move - Some questions on the film.(3 sheets)	Film 'Safely on the Move' from the TRRL Film Library	Order film at least one month in advance.
4	Facilities at TRRL as an example of a research organisation. People, layout and the Research Track.The position of these in the information story.	Leaflet LF 340 'Aims,activities..' Organisation of TRRL. Plan of the Laboratory Leaflet LF 362 'Small Rd Layout' Leaflet LF 350'Small Rd System' Map of Small Road System Finding your way about TRRL's Research Track(3 sheets).	Booklet 'The Road Research Laboratory Research Track' Slides of the site and its facilities.	This lesson will probably take longer than a week, but can be modified.
5	Focus on Accident Stistics - some of the information in the form of tables already published by the Laboratory. Generalised into the presentation of information in tabular form.	Accident and Other Statistics (4 sheets). Questions on the tables.		
6 and 7	A traffic accident and the people and services involved. The collection of information about traffic accidents - its disemination and coding. The problem of form and card design and the ways by which information can be recorded.	The Crash - the story of an accident...and after.(2 sheets) Accidents and Car Safety.(4 sheets) Stats 19 form (blank) Stats 19 form (completed)	Film 'Accidents and Car Safety' from TRRL Film Library. 80 column punched cards (1 blank, the other with all letters symbols and digits punched into it)	Order film at least one month in advance. If film unobtainable the story acts as a good alternative. This lesson could take longer but is important to the module since it holds most of the informational meat.

Teacher's Info 1/7

MODULE 5 (contd) - Information at The Transport and Road Research Laboratory

Lesson No.	Resume of work	Pupil Worksheets needed	Visual Aids needed	Other Info
8	Data processing at TRRL - the computer hardware used and how it is used. Some aspects of the software - the RATTLE tabulation language.	How a computer deals with information at TRRL. Road Accident Tabulation Language. Some tables produced by RATTLE.	Slides of the TRRL computer System	Slide projector needed. Some technical detail in the RATTLE part.
9	Communication of Results. How the Laboratory makes its findings known. Summary of our treatment of TRRL in this module.	What we have learned about TRRL and Information.	Slides as in Lesson 1	

Schools within reach of the Laboratory may wish to set up a visit. This would obviously add one or two weeks to the time taken.

Teacher's Notes /18

Time taken: 8 - 9 hours (as outlined in this module, but, dependent on the computer facilities available, it could take much longer if teachers develop their own computer contacts).

Broad Objective: To enable children to make contact with a computer a) through a terminal link b) through a batch processed program and c) through a visit to a Computer Centre.

Outline of Module:

on No	Resume of Work	Pupil worksheets needed	Visual Aids needed	Other info
1	Terminal session. Preparation of personal data -n mark sense cards for processing during the following week. Some general introduction to the preparation of data.	Preparing information for the computer (2 sheets)	Appropriate mark sense cards. Port-a-punch cards Master card containing all letters and digits. Punched paper Tape containing program 'Norma2'.	Terminal session set up for Honeywell Time-sharing system. It can be easily modified for other use but you will have to spend some time with your machine source. Further details in Teachers Notes.
2	Terminal Session - bringing a terminal into the school. Preparation for session, session and follow-up work.	A Terminal Session - some questions to help you understand what is happening.(3 sheets) Output from reading of cards filled in in previous week.	Output from terminal.	You will need to arrange a room which has access to a telephone line. This may mean some re-arrangement of classes.
3 1	Follow-up to the terminal session - How it was done, a look at the program and how it worked.	A look at '[redacted] INFO' (4 sheets). Listing of [redacted] INFO program.		Info [redacted] is written in the BASIC Language.. No specialised knowledge of this language is necessary on the teacher's part.
d	Haiku - a 17 syllable Japanese verse form. The use of words to determine moods and to describe scenes. Preparation of lists of words, computer processing into Haiku and follow-up.	Haiku data forms(2). Haiku examples (2)		Descriptions of nature and purpose of Haiku contained in the Teachers Notes.
7 and 8	Setting up a visit to a computer intallation - how to go about it and what to do.	Your visit to a computer installation - questions to ask.		You will need to set up the visit - order coaches etc give the question sheet to your host beforehand.

*** a list of other computer packages is given in the Teachers Notes ***

*** This module is not taught as a separate sequential entity - aspects of it are interspersed into the rest of the course as required ***

Teacher's Notes/19

MODULE 7 - Information on (Gas) Tap

Time taken: 8-13 hours Broad Objective: To examine the information problems of a large Public Utility Organisation (the Gas Corporation) and the information flow in one of its regional boards.

Outline of Module:

n No	Resume of Work	Pupil Worksheets needed	Visual Aids needed	Other Info.
1	A Gas Account - the impact of numbers. Exercises on the computer influence on the production of accounts. Automatic checking.	Specimen Gas Account for Mr Bloggins. A Gas Account - the impact of numbers. Write your own Gas Account. Notes on the Gas Account. Blank Gas Account form. Answer to problem(Cackett a/c)		
2	The broader aspect of the Gas Corporation's work. Drilling, exploration, recovery and distribution of Natural Gas.	Synopsis of film.	Film - Natural Gas for Britain obtainable from Gas Council Film Library.	Order film at least one month in advance. Synopsis need only be used by teacher and would act as alternative to film. Also Geography Department will hold some info on this aspect of Gas.
3	Follow up work on the work of the Gas Corporation using pamphlets produced for the purpose.	Gas in Britain - looking a little deeper. (3 sheets) Pamphlets as specified on the above sheets.		A list of the pamphlets etc available from the Gas Boards is given in the teachers notes. You will need to give some time to obtaining those needed.
4	People in the Gas Industry and organisation of boards so that information flows in the correct direction. Some problems. Film.	Flame of the Future - what did we learn from the film? (2 sheets).	Film - Flame of the Future from Gas Council Film Library. Some discussion Notes on the film.	Order film at least one month in advance.
5	Information in a Gas Environment - how all the threads concerning the activities of the Gas Corporation are pulled together by use of the computer.	Information in Gas - what's it all about? (blank) Information and reference Material (4 sheets).		Large display boards are obtainable on loan from the Gas Board.

Lesson No	Resume of Work	Pupil Worksheets needed	Visual Aids Needed	Other
6	Introduction to flowcharting - constructing a simple flowchart (preparation for the systems flowcharts which will be studied later).	A few flowcharting problems for you to solve. Director's letter - flow of info. Going to work - a flowchart.		Flowcharting templates may be available from the Maths Dept. Your friendly can probably help out with with this lesson.
7	A Gas Game. Manual simulation of the work of the salesman, fitter, meter-reader and computer. Game for small groups using forms and simulating information flow through computer.	Instructions and forms for playing the Gas Game (should be in a packet) Via Barry Blakey.		You may need to check that the game is complete before the lesson. Arrange groups of mixed ability.
8	Credit and Prepayment Gas - how the computer copes. Intro to Systems flowcharts and revision of lesson 1.	Systems Flowchart - Credit Gas Systems Flowchart - Prepayment Gas.		
9	Summary of the Gas Module. What we have learned about information and the computer in the Gas Story.	What have we learned about information on (gas) tap?...		

Teachers Notes /21

How can I plan the course?

The form below helps you to plan the lessons you will be teaching throughout the school year. It makes provision for listing the lessons and for obtaining the visual aids you will need. Also the 'Action' column enables you to make the advance preparations needed in good time eg ordering films etc.

To be done before the course starts.	Action/Vis Aid needed.	Tick when done.

Week Comm.	Module	Lesson	Topic		

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I/T/1

MODULE 1

AN INTRODUCTION TO INFORMATION

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Module 1 - An Introduction to Information

Introduction to the Module: The purpose of this opening module is to introduce children to the concept of how information of one sort or another is all around us and to widen their perceptions of the environment in which they live. It starts by getting them to discuss what they understand by the word 'information', where in their experience it has a place, and helps to arrive at a satisfactory definition of the term. It continues in a practical way to enlarge their appreciation of the ubiquitousness of information, and encourages them to 'see' it in its many facets, all of which can be studied to a limited depth depending on the type and nature of its discovery. The module requires the children to search and find; and, having found, to examine and hopefully understand. There is a large amount of practical work which involves making expeditions, not very far, outside the school, and these are followed up by exercises which test what the children have observed and then lead them to an appreciation of the further implications of this activity.

What we see and consciously remember in our environment is only a tiny fraction of what we see. This must necessarily be so since the information received by our brain is wide and varied at every moment of the waking day - and yet how do we discriminate between what we need to take note of and what we don't? Also, in our environment, the evidences of man's occupation of the natural landscape are all around us, in the buildings we inhabit, the sewers we build, the electricity and gas feeders we construct to provide us with what we consider to be the necessities of life. The children are encouraged to look with a fresh eye at those pieces of information which are normally taken for granted. These are just two of the insights which this module attempts to develop in children in the course of fostering a greater awareness of information.

The object is not to attempt to answer questions of how it is possible to store retrieve and communicate the isolated items of information found in the environment - this aspect of the information process is dealt with in other modules and in the context in which the questions arise - but it is an attempt to enable the children to see what the problems might be, since satisfaction in finding answers depends largely on appreciating what the problem is in the first place.

The module treats its subject in four well-defined stages which broadly correspond to one-hour long lessons - there may be a requirement to extend one or another of the lessons into a further follow-up the following week, but this is something which the teacher must judge from experience of how quickly the children accept the principles taught in the module.

The stages are as follows:

a) Introduction to the course and the concept of information as a subject to be studied. Discussion of what the children understand by the word 'information' leading to a temporary definition. (Where there is a question to be asked there is one or more pieces of information to be given in reply). Exercises on asking questions. This part

may be augmented by a film ('The Question Tree') for added impact, but this is not absolutely necessary.

b) A visit to a location near the school to enable the children to practise recording information which they find. There may be more than one location involved and the Teachers Notes outline two examples of how this activity has been carried out in two Hampshire schools. Also, the introduction to the course makes recommendations on how to set up this lesson.

c) A follow-up to the visit testing the childrens' observation of what they have seen and then a revisit with specific tasks to perform. A discussion on the things the children have seen and the further implications of these.

d) A consolidation of what has been learned and preparation for a more detailed and disciplined study of information within specific areas. This again is taught in conjunction with a film ('The Information Machine'), which attempts to add some historical perspective to the way by which man has progressed through his ability to handle information effectively.

These are brief notes on the approach adopted in this introductory module. The teachers notes in later pages give much more detail and suggestions on how the lessons may be taught.

Material required:

a) Lesson 1:	Film 'The Question Tree' Questions on the film (The Question Tree ??? ???????? ????) Blank Paper (sheets I/P/1 to I/P/6)
b) Lesson 2:	Map of the route to the location (optional) Blank Paper for each child plus, preferably, a hard backing sheet and clip.
c) Lesson 3:	Question Map of the location(eg Sheet I/P/8) How many questions - on one item (eg Sheet I/P/9) A few questions to test your observation (eg sheet I/P/11) How many questions sheet 2 (eg sheet I/P/10)
d) Lesson 4:	Film 'The Information Machine' Questions on the film(The Information Machine - what did you find out?) (sheets I/P/14 to I/P/17)

And, of course, Teachers Notes for all the lessons.....

Module 1 - Introduction to Information

Teachers Notes

Part 1 - What id Information?

These notes are written for the guidance of the teacher. The space on the left-hand side of the sheet is for any individual notes or summaries which the teacher may wish to add and which may help in teaching the material recommended. The notes are quite copious and are written assuming no knowledge of the subject - naturally modifications of either approach or content are left to individual teachers to decide for themselves.

Should you decide to use the film 'The Question Tree' at this stage, the six sheets of questions (I/P/1 to I/P/6) will help you remember its content in your follow-up. It is recommended that these questions are not given to the children as an exercise to complete, but that they form the basis for a discussion between teacher and class on the content of the film and the questions it throws up. You will notice that the questions are by no means all concerned with memory of what happened in the film - there are also questions on the childrens' opinions of its subject matter and suggestions on how it can be followed up by projects. The object of the film at this point is to encourage the asking of questions rather than the answering of them. The sheets can be presented to the children one by one or collectively as a batch. Some of the less able children may find parts of the film difficult to understand and it is recommended that you show it twice, devoting a whole lesson to it. It lasts approximately twenty minutes. Before the first showing give an outline of what the information course is about in order to whet the appetite and reduce the confusion among the children as to why they are studying the subject.

The sheets have been constructed in such a way that they follow the spirit of the film. At the bottom of each sheet is the question 'Are there any more questions' - it is up to the children to find out the answer to this.

Whether or not you have decided to show the film, an important part of the introduction phase is the encouragement of the children to verbalise what they actually mean when they think of information. The objective of this is to get them to crystallise their ideas and to enable them to arrive at a satisfactory definition of what is being talked about. It will also perhaps help them to focus in on what to them is a strange subject and broaden their ~~their~~ awareness of its importance. The following three steps will help you initiate the discussion, expand it and arrive at a conclusion. The whole process should take about an hour, but this can be regulated by judicious use of the time you allow them to complete the written exercises recommended.

i) Step 1. What do the children understand by information? Get them to verbalise what they think it is; write their ideas on the blackboard. At this point you are not trying to get them to define the word, but merely to express the circumstances in which information is used or useful. You may need to prompt occasionally and the words may not be well expressed, but the following list on the blackboard might result from this session:

INFORMATION

. It tells you things
. It is what the police use to catch a criminal
. It is everywhere about us
. It is what you(the teacher) give to us
. It is what we come to school for
. The Secret Service get it through spies
. We hear it on television news
. Computers store it
. It is on the Library shelves
. It is something I know or can find out
. It helps with project work
. You get it from books and newspapers
. There are information offices in Seaside towns
. It answers problems set by teachers
. You get it in adverts on the telly
. etc etc

While you are getting answers from the children you will perhaps need to maintain some momentum of thought by asking from time to time 'But what exactly is information','where do you find it','how do you get it'? Perhaps you may throw in some quotation like 'Knowledge is power' to get them thinking along different lines. In a sense, this is a brainstorming session in which one idea feeds on another, so try not to confine it too much within predefined limits.

ii) Step 2. - is an attempt to focus in more concretely to the immediate situation and environment and to find within the classroom what, in practical terms,the children mean.
At the point when you consider that the list on the blackboard has outlived its usefulness, and you have enough comments and suggestions, introduce the children to the situation in the classroom. Ask what there is in the classroom to do with information by looking around them - obtain one or two of the obvious answers like books and

maps, and then broaden out the whole thing by asking 'but what about the window?'(or table, or floor). Try to broaden out the whole discussion by asking for information about the floor (it's brown, it has cracks, it needs polishing) and isn't this information? The children should soon realise that we are not now talking about information in its narrow, well-accepted context but in a new, but equally valid, dimension. Ask them to make a list on a piece of paper of the things in the classroom which concern information in any of its aspects. Give them five minutes or so for this and then obtain some answers from one or two children, broadening this out to the whole class. Cut this off when you feel that the point has been made that everything in the classroom has some kind of informational element. Ask the children what they now know about information which they hadn't considered before.

Reinforce this point by specifying a hypothetical question such as ' If you take a photograph of this classroom home to your mother, what questions could she ask about it?' .

You are now attempting to lead the children to a preliminary definition of information which, in terms that they can understand, means 'if there is a question to be asked, there is a piece of information to be given in reply'- or perhaps even more than one. You are also making clear that, in fact, one can ask a question about anything. Illustrate this by asking a child to ask a question about the blackboard - can it be answered? If so, give the information required. Ask for a question which no-one knows the answer to in the class. Point out that, nevertheless, the information exists which can answer that question.

This is the central point to be learned at this stage and it emphasises the ubiquitous nature of information no matter how small the environment or how obscure the subject of enquiry.

One other facet of information which can now be introduced into this phase is the possibility of classifying information so that children can see that some sort of organisation is preferable in the midst of all the information that is all around them. Ask them to suggest a simple classification which would suit the classroom environment. Lead them to:

Module 1 - An Introduction to Information

. Information about people - the teacher, the children, visitors, the caretaker etc.

. Information about objects - the desk, the window, the blackboard, the chairs etc.

. Information in the Abstract - new information learned (both facts and idea) during the course of the lesson. Communication of information.

These lead naturally to.....

iii) Step 3. which focusses on one particular aspect information within the classroom ie the individual child. Take your original classification and focus in on the one aspect of the people, namely the individual children themselves. Indicate that we have been discussing information in very general terms so far, and now we want to find out how much detail we can go into. Take a child to the front of the class (your choice), and ask the rest of the class to say what information one could ask about him or her - what is it that makes this child different from everything other child in the class for example. You may have to curb some overenthusiasm to take part in this exercise, but such items as date of birth, address, colour of eyes, height and weight should be forthcoming, and when you have extracted this sort of detail ask the children to write down on a piece of paper twenty items of personal information about themselves in the form of questions. They may record such items as:

Christian name	Surname	Address
Age	height	Weight
Sex	Date of Birth	No of Brothers
No of Sisters	Place of Birth	Nationality
Religion	Colour of eyes	Colour of Hair
Telephone Number	Father's Job	IQ
Doctor's Name	Position in Class	Mother's Name

etc etc etc

There are too a whole host of questions about opinions such as favourite football team, pocket money, amount of TV watched etc.

You may, if you wish to at this stage, point out that these are the sorts of questions which will be asked of the children time and time again both as children and as adults, and you may wish to follow up on this by asking who would ask them and for what?

iv) Step 4. - involves collecting some information and is a round-up of the lesson so far in that it sets a practical problem dealing with the topics you have been discussing.

In your discussions the point will have been made, among others, that information is all around us, and that there is a good deal of personal information about every individual which makes him or her unique. In this part, which will last until the end of the lesson, and perhaps beyond, the children are given a practical introduction to the problems of collecting information. At this point you are not concerned with making the task an easy one for three reasons:

. You have already defined, in step 3, many of the questions which can be asked, and this is usually the most difficult part of an information collection exercise.

. This lesson continues in a later lesson in Module 2 when the information is collected for a specific purpose.

. It is better to allow the children to wrestle with the problem before being given the wherewithal to answer it - this is particularly so when the question is an open-ended one, as is the case here.

Basically you are asking each pupil to find some information about the others in the class, and you are supplying them with a piece of paper which they may use both to ask and have the questions answered. If you wish to be more specific, set it in the context of an information collection exercise in which the headmaster needs the information for his records, whereby the children are roleplaying the position of headmaster. The questions to be asked, the method of obtaining the information and its classification are left to the children. They will need tp do some preliminary thinking, and perhaps form designing before they collect.

You may wish, in the interests of noise and chaos-abatement, to structure this session in a more formal way. Alternatively, the problem is more genuinely wrestled with in an atmosphere of combined freedom and confusion.

Module 1 - An Introduction to Information

Part 2 - Finding Information

During the second or third week of this module the children are taken out of the environment of the school to a location nearby so that they may recognise the potential of the neighbourhood, often a familiar one, in providing insights into the richness and diversity of types of information. This is not just a strategy for distraction, but a genuine effort to emphasise those key points in the information story which are elaborated upon in later classroom work - these are enumerated in the lesson notes to part 3 (pages).

Why walk? Why is it necessary to go out into the wider world outside of the classroom? The answer is, of course, that it isn't absolutely necessary to do so, but the following notes may help to explain why it is perhaps more than preferable.

It was a famous geographer, James Fairgrieve, who pointed out that Geography is not limited to the space between classroom walls, but that it would more likely be found by wearing out the soles of ones boots. So it is with information, although of necessity many of the ideas and concepts in all inherently peripatetic subjects have to be put over in the classroom. In a sense, although the storage and retrieval of information is concerned with the machinery which carries out that task, its collection and distribution is not. In the classroom you will find a lot of information, in the library probably more, in both places more than any human being can cope with even within a period of years. Nevertheless, the diversity of source, the impact of the realisation that the earth, even the familiar earth, contains so much more than what is taken for granted by everyone, and opens up far more questions than can be answered, must best be approached in a different sort of environment than that encompassed by four walls.

In the library it is possible to find page upon page of descriptive material about, for instance, birds, or even about one particular species of bird. In reality, of course, the birds fly in the air outside; they nest in the fields, or the trees, or in the eaves of your house; they sing, they warble or they croak to entertain some passer-by, or to attract a mate, or just because they feel like singing. They are, and they are not, in the library. This point may sound obvious to us, but is it so to children? How are they taught to recognise the difference between the written word and the reality, the connection between the copious sources of information in the school, the home, the computer and the world in which they live and are sentient?

There is a world of difference between seeing and experiencing. In this visit we want them to experience information, to grapple with the problems of observation, perception and classification, to ask the questions and to want an answer. If children are to make any sense of the information explosion, of the impact of the information machine on our society, of the power of the computer to store, process and retrieve great quantities of the stuff from which information is made, they must, first of all, be made aware of why it is important to do so, and what a lot

of it there is about, and how it affects them in a very real sense. Having seen this, and one does not expect them to do so without guidance and discussion, the rest is follow-up. Indeed, the immediate follow-up to the visit (Part 3) will be a s important as the visit itself, if not more so.

It is recognised that the planning of a walk outside the school such as has been described involves extra work and preparation. To help in this there is a full description of how the teacher might approach this task in the Introduction to the course (pages), and the following notes contain details with examples of what happened at two schools in Hampshire which have followed the ideas through.

Planning the walk

a) Pre-lesson work - some notes and suggestions.

i) You will need to observe the local educational rules and regulations about staff-pupil ratios, insurance requirements, information to other staff etc

ii) Preparation of the route - the location(s) you visit need not be far away from the school, but you will need to visit it yourself first and to prepare some sheets as outlined in the course introduction ( ).

iii) Preparation for the follow-up - it is a good idea to take one or two slides of the location(s) you visit for the follow-up lesson

Example 1 - Yateley in North-East Hampshire

At Yateley, four contrasting stopping points were chosen along a predetermined route to and from the school. These have been found useful when a full afternoon or morning was available but too long for the normal double period.

i) Point 1 - a not very busy crossroads 100 yards from the school, containing much information on the ground and in the air and including a distance view in at least one direction. Also, it had the obvious advantage of being near the school for a follow-up visit. (Example map on page I/T/18)

ii) A position by the village green with much historical information - ie church, pub etc and contemporary contrasts such as banks, bus shelters and shops etc. (Example map on page I/T/19)

iii) A busy part of the main road through the village with views of a housing estate and community amenities.

iv) A very secluded spot almost totally enclosed by trees, but which enables children to see that, even in a place where one would expect information to be restricted, there is in fact an enormous quantity of information around.

The children were given blank sheets and a clip-board and taken to each of the four spots. They were also given a bare outline map of the route taken on which they were expected to complete the road names as they went. At each stopping point they were given ten minutes to record on their papers all the information they could find and encouraged to look at details. Not a great deal of assistance was given by the teacher since the children were expected to solve the information collection problem by their own efforts, although a short three minute talk was given before the expedition set out. (The follow-up lesson is used to sort out the answers to the childrens' problems.) The question asked of the children at each stopping point was 'What do you observe?' rather than'what do you see?', since information does not only occur through the eyes, but also through the other senses, such as small, touch, feel etc. When the children returned (at the end of the time allowed for the lesson, they were given the task as homework of tidying up their notes.
The follow-up lesson is described in Part 3.

Example 2 - Henry Beaufort School, Winchester.

Here only one place was chosen as a suitable place for gathering information, in view of the time available but this did not detract from the purpose of the exercise. As at Yateley, the children were given a three minute chat and taken out to the location - a map of this is shown on page I/P/8 . With one class, which had only two single periods,the children were taken twice, the second time being given more information on what they were expected to achieve. (NB the sheet of questions is not given out until the follow-up lesson in the following week.)

Part 3 - Making Sense of Information

This follow-up lesson to the walk is very important in the consolidation of the childrens' ideas of what they have learned and experienced. Many of them will probably be in a state of some confusion about what they have done and whether they have done it properly, and this is perhaps to be expected. The purposes of this lesson then are mainly to do with clearing up this confusion and to establish the general principles about information which the children may know intuitively but not appreciate in any ordered sense. The follow-up takes four distinct phases and may involve more than one week of teaching.
the phases are:

a) A revisit to the nearest spot to the school armed with specific questions to answer - this is preceded by an exercise establishing the need for this.

b) A classroom session taking one aspect of information to a much greater depth as an illustration of the breakdown of information into specific questions.

c) A discussion session rounding up all the things which have been learned by completing this exercise.

d) A film which tries to put the acquisition of information (which is what the children have been doing) into a historical perspective and attempts to relate this to the development of knowledge.

Lesson Notes

In your preparation for the walk and its follow-up you will have prepared some sheets of questions similar to those examples shown at the end of these notes. (eg for Yateley pages I/P/11 to I/P/13 and for Winchester pages I/P/7 to I/P/10).
Your first objective is to get the children to remember what they did last week and to produce their notes. Ask them what the problems were and discuss with them how they overcame them, if indeed they did. If you took the slides reinforce their memory by showing these. If necessary put their reasons for confusion on the blackboard - perhaps the following points may be made

- We weren't told enough
- We didn't have enough time
- We didn't know how to write it down
- We couldn't possibly write all that down
- There's too much to see
- We didn't know how much detail to go into
- Not enough paper to write it all down
- we have never been trained to observe
- Hands too cold.

Having established that there were difficulties, involve them in an exercise which tests how they did observe by giving out the first of the two 'How much did you observe' sheets (Yateley example sheet I/P/11 , Winchester example sheet I/P/7). Tell them that they can use their notes to answer as many questions as they can on the sheet and set a time limit. When this is complete, find out how many questions the children have been able to answer - ask them what this means in terms of i) their powers of observation ii) their powers of memory and iii) their ability to record information.

Ask what might have been an easier way to approach a walk such as last week's, and lead them to the concept of having specific things to look for and specific questions to answer - easier, but not necessarily better.

Give out the second of the 'How much did you observe' sheets (Yateley example sheet I/P/12 , Winchester example I/P/8) make sure that the children recognise the map and tell them that you are now going to test this point by taking them back to the spot to answer the questions. Do so - what has not been answered in the lesson time may, if you wish, be completed for homework - experience tells us that even the reluctant learners have asked to do this. You can offer all the help needed for this particular visit.

The next time you are in the classroom phase two should be started. Remind them of the difficulties experienced at first and how they were partially solved by the revisit because the information had been sorted into a specific order and specific questions had been asked. Were these all the questions which could be asked? Point out that there were indeed a lot of questions on the sheet, but ask them to ask one more each which was not there. Focus in on one item (Example at Yateley, the telegraph pole, at Winchester, the Inn sign) - if you took a slide of it show it. Ask orally at first what questions can be asked about the item - remind them of the earlier definition reached in the first lesson that if a question can be asked, a piece of information can be given in reply. After you have got the children thinking about details in terms of questions that can be asked give out the first of the two sheets on the item containing blank spaces for questions - get the children to complete these as far as possible under a time limit before giving out the second sheet. (Yateley example blank sheet and I/P/13
Winchester sheets I/P/9 and I/P/10)

Ask the children what the difference was in completing this exercise as opposed to completing the other exercise which asked them to answer questions on the spot - try to draw from them the idea that there are different levels of information and one way of telling the difference is in the amount of detail required. Establish the difference between general and detailed information. Ask them if they have now asked all the questions which could be asked either about the corner or about the single item - hopefully they will realise that they have found but a small fraction of the wealth of information to be discovered in any one spot, or even about any one object.

This should lead you to the summary discussion - if there is not enough time for this, start again during the next lesson by revising what has been done to date. It is important to begin to make things explicit at this stage - children often have an intuitive understanding of why they are doing particular things and at this stage, after three weeks of practical discovery, they benefit immensely from a summary which conceptualises the reasons for their work.

The following points comprise most of the lessons to be learned from the work the children have been doing. In discussing these, try to elicit from the children themselves what they understand from the experiences they have had, get them to verbalise and ask questions which gradually bring out the concept - the points are not in any particular order.

Point 1. What we see and consciously remember is only a small fraction of what we see. This is perhaps evidenced by the fact that the location of the visit had probably been passed many times by many of the children, and yet they were only able to answer a tiny number of the questions about the location. Try to get the children to quantify these points - how many times have you passed... etc. Take the example of a bus or car ride - what do people see and not remember? The colours of all the house paints, the numbers of all the cars passed, are examples - there are many more. And yet these things are seen. Why? Bring out the point that our brains perform an automatic sorting job, rejecting those things which are not important. What would happen if it didn't?

Point 2. Much of the information around us is coded so that it can be uniquely identified elsewhere. Examples of this should come from the children eg house numbers, numbers on gas and electricity signs(these also give other coded information such as depths of mains etc).Ask the children what other evidences there are of codes.

Module 1 An Introduction to Information

Point 3. Much of the information we see is designed for human beings and is a result of the superimposition of the human landscape onto the natural landscape. This may be a difficult point expressed in such terms - but it can easily be made by questions. Where are the signs for cows or birds or motor cars to read? What did this piece of ground look like 200 years ago?(or, if recently developed, less). What is there now? What services had to be supplied to provide for man's habitation? (Water Supplies, Gas, Electricity etc etc). What evidence is there of these things, and how do they make themselves known? - make a list on the board of the services and how they are manifest in terms of information. Questions like this hopefully make the point that a great deal of planning and preparation goes into a project before human beings can occupy a piece of ground. What information would be needed by whom before a start can be made? Further, the result after completion is a great proliferation of elements of information - perhaps the words'information* explosion' may be appropriate, though strictly out of context.

Point 4. Information changes. The bus which passed last week while the children were at the spot is no longer there. Ask for examples of changes in the information content which take place quickly(eg movement of cars), very slowly (eg over a period of years eg shops changing name and ownership) and fairly quickly (eg the weather). Make a list on the board by asking the children to visualise what the scene was like when they first went to visit as opposed to their second visit - what different pieces of information were there, what was the same?

Point 5. In many of the elements of information found in that spot, some of it will be stored by a computer somewhere. This is far from obvious, but ask the children to think awhile on what might be the connection between a computer and the location. We are trying to make the point that information is the fuel of the computer and that somewhere things like car numbers, peoples' names, maps including that spot are stored in systematic form. This is a point which is obviously taken up later on in the course in several different forms, but it is worth-while making the somewhat tenuous connection between the information often found in the form of numbers eg on the telegraph pole, ~~is~~ and that also to be found in the Post Office's, the Gas Board's or the Sewage Company's computer. The point can be further emphasised by asking how else the computer might be involved and pointing out that the number of bricks for instance in each house was calculated by

computer, the invoice to the house builder was created by computer, the letter of supply was printed by computer, the names of the men who erected the house were in a computer (they were paid on the basis of a payslip produced by a computer,) the Inn Sign at Winchester goes into the computer of the firm who produced (in information terms anyway) it and the brewery's computer which bought it. In terms like this, not only the information, but also the storer of information is ubiquitous.

Point 6. Many questions cannot be answered unless further sources of information are looked up. For example, the questions made up about the specific item demand a piece of information in reply (our definition again) but this cannot readily be supplied. So where can we find the answers? Make a list on the blackboard (it could be a written exercise for the children with the gaps filled in later) of the sources of information which the children know about. Make the list quite detailed by asking for examples. It may look something like this:

Books (what sort?)	reference books	encyclopaedias
	dictionaries	indexes
	bibliographies	newspapers
	pamphlets	magazines
	text books	descriptive books
Libraries (where?)	School Library	Class Library
	County Library	Local Library
	National Lending Lib	Bookshops
People (Who)	Librarian	Teacher
	Parents	Police
	P O Engineers	Specialists
	Locals	Inhabitants
Organisations (Which)		GPO
	County Council	Museums
	Police Station	School
	Community Centres	Citizens Advice Bureaux
Machines and Methods (Which?)		Computers
	microfilm	cards
	pictures	

To focus in on sources of information, if there is some difficulty in talking in general terms, give examples of the sort of question you may want to have answered. The sheet of specific questions might provide a good starting point. (eg I/P/16)

Finally, remind the children again that the theme of the first weeks has been 'information' - ask them how much they found, point out that there is a lot of it about. A final question about how much a stone age ancestor might have found would lead nicely into the recommended film, 'The Information Machine'.

Module 1 - Introduction to Information

Part 4 - The Information Machine.

The film lasts for approximately 12 minutes, and traces the cultural and technological development of man. It relates this to his ability to store and retrieve information and concludes that he needs an information machine to help store and process the vast quantities of information in the world today. (a follow-up on a grander scale to the exercise just completed by the children.) The machine needed is, of course, the computer.

It is recommended that it is shown at least twice, preferably at the end of the discussion session previously outlined and then the week later, when it can be used in conjunction with the sheets of questions. (sheets I/P/14 to I/P/17). These deal with the content of the film but also try to extrapolate its content into the everyday experience of the children by also asking questions about their opinions and their attitudes. There are rather a lot of questions involved and the teacher may not wish to set it wholly as a written exercise. Indeed, with less able children, it is preferable to deal with the sheets orally, asking the children to fill in the answers to those questione which the teacher thinks can be coped with. A third alternative involves not giving out the sheets at all but using them as a memento mori for an oral lesson. With older and abler groups successful incursions into the homework timetable have been made using the sheets.

At the time of writing the film can be obtained from

Random Film Library Limited
25 The Burroughs
Hendon
London NW4 4AT Tel 01 202 5342 (Free loan)

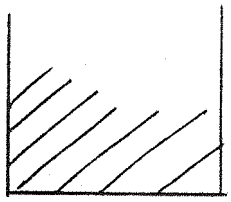
and one month's notice should be given.

The film itself is old, but the concepts expressed in the first three-quarters of the commentary are historical. Only in the last quarter are pictures of obsolete computers shown, although for children who have not had acquaintance with a computer this is not necessarily too noticeable.

Lastly,if the teacher feels that it would be valuable for the children to do some more creative follow-up work of their own, the following topics may form a basis for this

a) What have the children learned about information so far?
b) Setting up an information project of their own based on the home.
c) The place of information in the development of man (cf the films)
d) Making a list of the sources from which children get their information now.
e) Designing an information display for the classroom, or a poster.(As outlined in the introduction to the course (sheet).
f) The place of the school in their own information set-up - what info would they wish the school to give them - how would it be used?

POINT 1



YATELEY SCHOOL

DOCTOR'S SURGERY ↖

1. SEVERAL ELECTRICITY GRID SIGNS
2. WATER WORKS MAIN FEED SIGNS
3. DOCTORS' SIGN
4. PORTAKABINS
5. VARIOUS GRIDS IN THE PAVEMENT
6. HEDGES
7. GRASS VERGE
8. STREET LAMP
9. DIRECTIONAL POST TO PUBLIC AMENITIES

1

HOUSING ESTATE ↗

SCHOOL LANE SIGN POST
GRIDS (SEWERS)
TREES
PAVEMENT (TARMACADAM)
GRASS VERGE
GIVE WAY SIGN
STREET LAMP

→ WOOD

2

CARS, LORRIES, VANS, ETC.

4

1. 'OLD SCHOOL LANE' SIGN
2. SEWER GRIDS
3. VARIOUS MANHOLE COVERS
4. BLACKBERRY BUSHES
5. TREES AND BUSHES

3

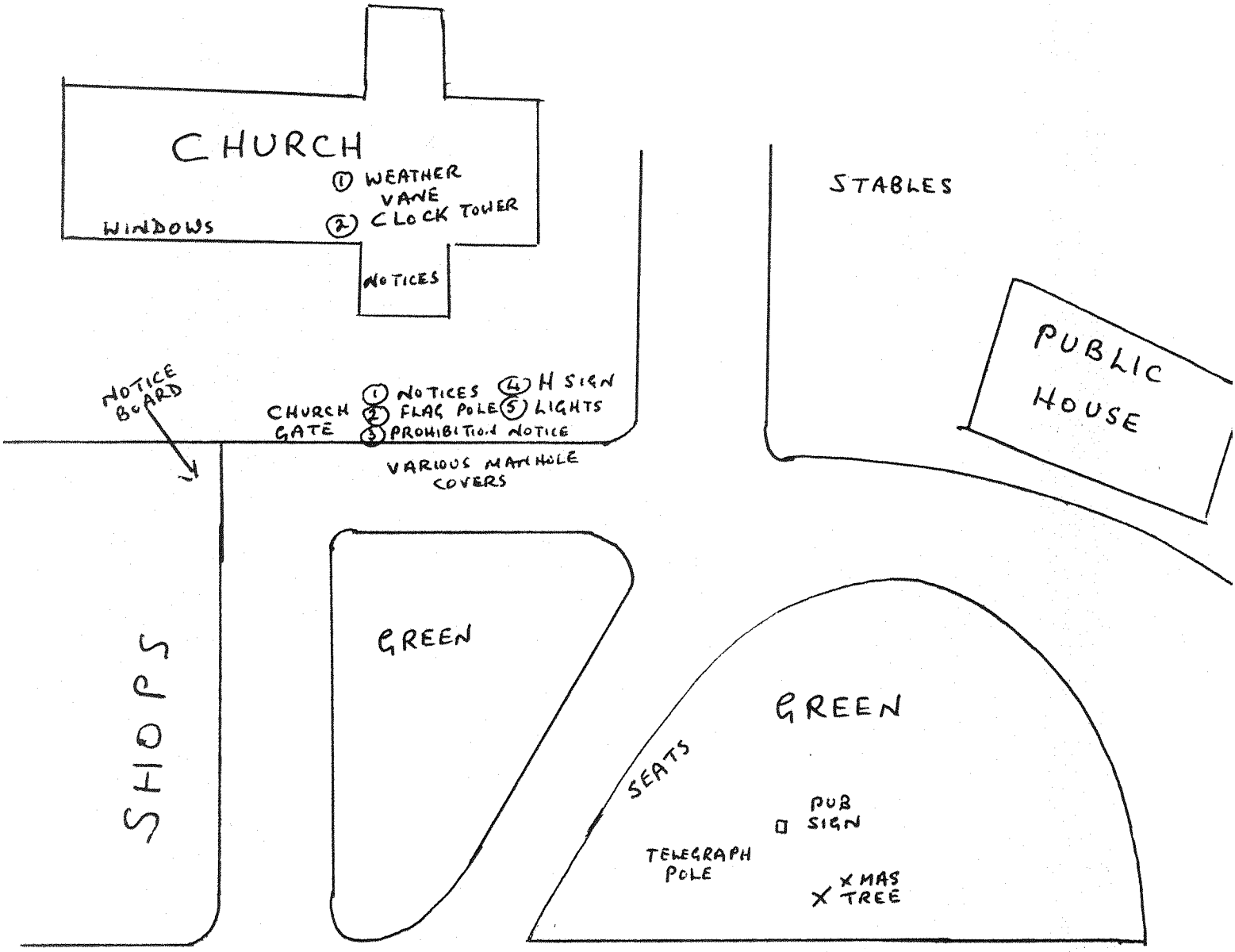
1. TELEGRAPH POLE
2. LAMP STANDARD
3. TREES
4. VARIOUS GRIDS AND MANHOLE COVERS
5. BENCH SEAT
6. BENCH MARK

→ SPORTS FIELD PAVILION HOUSES

OVERHEAD :- AEROPLANES, CLOUDS, SKY, SUN. ETC

I/T/19

POINT 2



MAIN ROAD (VEHICLES)

BUS SHELTER (T. TABLE)

BANK

THE QUESTION TREE ??? ???????? ????

Here are some questions about the film you have just seen. Read them carefully and try to supply the answers. Not all the questions are about the film. Some are about what you have been doing in your information project so far, and others ask your opinion about certain things. What you are supplying in every answer, though, is information. You are trying to build an answer tree.

---

1. The first picture was of the seashore. What was the boy doing at first?

2. Before any words were spoken a lot of information was given to you. In the boxes on the right write what some of this was. (You need not have actually seen it).	

3. In a similar way you can communicate information without speaking. In the boxes below write down three ways by which you could tell your mother something when you get home, without actually saying anything to her.

a)
b)
c)

4. Like most boys the one on the film was curious about the world around him. He asked some questions. On the right hand side below is the answer, on the left is the question. See if you can match the question to the answer as they were put in the film.

Where does the ocean come from?	
	The wind and the tide.
	It is the influence of the moon on the movement of the sea.
What makes a person remember?	
	No, not really, not yet.

5. You have recently been out to look at the world around you. Why do you think this is important in a course about 'information'? Use your own words.

6. Like the boy on the film you too have been asking questions. Use the rest of this sheet to write down some of these questions. It doesn't matter whether you know the answers or not.

After the questions the words on the right were shown on the screen and read. In the boxes on the left put in your own words what you think they mean.

	Man advances by understanding the nature of his world.
	Understanding is born out of questions and answers.

The film then invited us to 'follow man's journey across the centuries from the dim beginnings of recorded time down to this morning'. Let's do the same for our own town. Write down in the many boxes below those things which were not there when your stone age ancestor lived here. Think of the many things you saw on your walk.

The questions, always the questions. This was repeated many times during the film.Why, do you think?

_____

_____

The following is an extract from the film commentary while the boy was looking out to sea. There are some words missing and the number of dashes tells you how many letters are missing. Try to complete the passage.

What is the w____ made of? Rocks and cl____, seagulls and trade _____, mountains and mol_____, giant w_____ and marine cr_____ tiny beyond the vision of h____ e__. So many worlds within this world.

What do you think the last sentence means? Answer below.

_____

_____

_____

_____

12. The film then showed some protozoa in the water. a) Where would you find out what this is?_____

b) OK, then find out and write it below.

_____

_____

A famous scientist in the past observed the birds and then wanted to do something. a) Who was he?_____ b) What did he want to do?

_____

c) What did he actually do?_____

ARE THERE ANY MORE QUESTIONS?

??? ???????? ????

He then turned his attention to clocks. What was his problem?_____

_____

This great man was obviously a man of vision, who could see things, look ahead to the future and had a lot of curiosity. Boys and girls have a lot of natural curiosity. They look around them and try to understand the world about them. Are the last two sentences true do you think?_____

What have you done this week to try to understand the world you live in?(If you think hard you may surprise yourself).

_____

_____

In box A below write down a question which you know the answer to but which your teacher doesn't. In box B write down a question towhich neither of you know the answer. In box C write down a question to which your teacher probably knows the answer but you don't.

A	B	C

Now write down where the answers might be found in each case.

A_____

B_____

C_____

The film also mentioned three other famous scientists from the past. It said that they, too, were people who were always asking questions and then trying to find the answers. Who were they? G_____, N_____ and E_____.

It then went on to talk about explorers, who, in spite of the fear of the unknown, still went out to find places new. Complete the phrase below which was written on the map of the world.

BEYOND THIS PLACE THERE BE _____

Why do you think some people want to explore new worlds while others would rather stay at home?_____

_____

_____

. Which would you rather do? Answer below.

_____

23. Would you say that you are curious about the world?_____

Did you enjoy finding things out when you went out on the walk? Give a reason for your answer._____

_____

??? ???????? ????

A lot of people have lived and died, and a lot of them were the sort of people who invented and discovered and were always wanting to add something new to our lives. Look around your own house; list, in the boxes below, the things you have there which your great-great grandfather could not have had 100 years ago. Ask your parents to join in with you on this.

The film showed some of the many things you can see in an antique shop. Much of it is information about how our forefathers lived and the knowledge they accumulated. Some of it could help in our present day search for more information. Where did the film say this search is going on mostly?

Suppose you were a brilliant scientist investigating the type of fuel needed to send rockets to Mars. Put yes or no in the boxes depending on whether you would want to know about the following.

What other scientists in the same field are doing._____

What all the possibilities for fuels are._____

What the properties of each fuel are._____

Whether anyone else has solved the problem._____

The failures other scientists have had in the past._____

How the rocket is to be designed._____

If you do need this information, how do you think you would get it?

You have a project to do at school. Where do you get most of your information?_____

In the space below design a machine which will help you to do all your schoolwork whatever it is. Be as imaginative as you like. This is your design.

ARE THERE ANY MORE QUESTIONS?

The boy on the film emptied his pockets. They were filled with questions about one thing or another - information about this and that. Here is an enjoyable and puzzling thing to do. Empty your pockets, or if a girl your handbag. In the left hand boxes below list three of the things you find there. In the middle boxes ask one question about it to which you know the answer. In the right hand boxes ask one question about it to which you don't know the answer.

Object	Question I can answer	Question I can't answer

Now, in the boxes below list all the other things you found in your pockets/handbag.

33. Back to the film. Can you remember what happens when you put metals into extremely low temperatures?_____

34. If we could understand how the basic human cell works the film said we could expect to add ____ years onto our lives.

Suppose we could devise a machine which could store all the information we needed, like that about the basic human cell, how might we make use of it?

How do you think such a machine could help you with your homework?

The film described two problems and two answers. They are written below. Choose one of them and explain what the answer means and how it can be used.

Q. How to make machines smaller. A. Vapour growth

Q. How to make more communications channels. A. The Optical Maser.

ARE THERE ANY MORE QUESTIONS?

I/P/6

There is a machine which stores information, processes it and then makes it available to those who need it. Can you think what it is called?

Think back to your exploration. Name 10 pieces of information which you might ask questions about on that walk and where you might find the answer stored in a machine somewhere.

The questions,always the questions. This is the last one. Why do answers always create more questions? After you have answered it ask another question resulting from your answer and answer that one, and so on as far as you can go.

Answer _____

_____

Question _____

_____

Answer _____

_____

Question _____

_____

Answer _____

_____

Are you sure there are no more questions?
Perhaps the question tree is still growing.

How much did you observe?.....

Last week you went out to find some information - you took with you a piece of paper so that you could record the information you found. Let's see how much you found , and whether you found it all..... These are some questions about the things you must have seen on the corner. Answer as many as you can in pencil - you are not expected to know all the answers - perhaps there is a lot more information there than you realised. You can use the paper you recorded the information on last week for reference, and answer in the spaces provided.

++++++++++++++++++++++++++

1. What is the name of the Inn on the corner? .....

2. That was easy - what is the name of the landlord and where did you see it?

....

3. A little more difficult? - it is there all the same. Now, How many different shops are there in the parade? ..... In the boxes below write in the names of the shops and also what sort of shops they are. Don't be misled by the number of spaces...

Name	Type

4. There are two levels at which you might have observed things last week. This question shows an example. Firstly there is the general level like this...

a) What is the name of the road opposite the Inn (Across the main road)?.....

b) What is the name of the road along the side of the Inn (Leading into the main road? ..... You probably noticed the answers to these by reading the road names on the sign - but here are a couple of questions which show how you can observe things in more detail..... c) What colour is the sign on which the road name is written and what colour is the writing? .....

d) What is the main difference between the materials used for the two road signs we have just mentioned? .....

5. There were so many pieces of information you saw last week. Here are some more questions which test your memory, or your ability to write it down.

a) What sort of a day was it last week when you went to collect information? ..... b) How many steps would you have to climb to get from the front door of the Inn to the road down the side? ..... c) What is the name of the house on the corner of this side road and the main road? .....

6. Information doesn't only come to you by what you see either. For example, make a list below of the things you might have observed last week through your other senses (hearing, smell, touch etc) ....

....

.....

How much did you observe?.....

Sheet 2

The sheet of questions you have just completed shows just how much information there is on this small, minor corner. This sheet is in the form of a map of the same corner. This we will complete on the spot by revisiting the scene of last week's activity.

I/P/8

North West Corner 1. Number of house opposite Buriton Road .... 2. Colour of lines round outside of pavement?..... 3. Meaning of these lines?.....4. What is written on the manhole cover on the corner? ..... 4. No. of houses in this block without TV aerial?..... 5.What is written on the H signs? ....6. What are these signs? ..... 7. What is written on the grid at C ?.....8. What does it mean? .....9.What is the lighting standard made of?..... 10. What road sign is on the corner? .....11. What colours are there on it?.....

C

North-East Corner 1. Find signs of a water main on this corner - What else is written on it? .....2. Find a manhole belonging to the GPO - what is on it? .....3. What do you find on the edge of the pavement at H? .....4. Why is it there? ..... 5. What is painted on the garage door of No. 6? .....6. What is the lighting standard at H also used for?.....

H

South-West Corner 1. How many TV aerials can you see in this row of houses? ..... 2. What colour is the side gate of the top house? ..... 3. What do you see at point D .... 4. What number is Ravenda? .....

D

J

E

South East Corner 1. Which road sign do you see at point E? ..... 2. How is it fixed to the pole?..... 3. What is painted on the pole?..... 4. What number is the telephone at point B?..... ..... 5, What is written on the door? ..... 6. What time is the last post at point A?..... 7. What is written on the front of the Post Box?..... 8. What does it mean?..... 8.What three things can the landlord of the Inn sell?.....9. How many cocks can you see on this corner?..... 10.What does the notice on the Notice Board refer to?..... 11. What sort of beer is sold at the Inn?..... 12. How many steps b-tween the Inn and the shops? ..... 13. What do you see on the wall by these steps?..... 14. What do you see running along the front of the shops about 10 feet from them? ..... 15.What is on the pavement at point F?..... 16. What is written on it?..... 17. What can be inspected there?..... 18. How many litter bins are provided on this section?..... 19. Look at the Inn Sign picture. Which two animals are on it? .....20. What are they sitting on? ..... 21. What is one of them doing?..... 22. How much is the cheapest bag of chips you can get?..... 23. What else can you buy at the same shop?.....24. Which initials can you see on the front door of the Inn in green?.....25. What do the initials mean?..... 26.What sort of petrol does the garage at G sell?..... 27. What colour are the tables and chairs by the side of the inn?..... 28. What type of trees are growing on the fore-court of the Inn?.....29. Where is the Car Park?..... 30. What is different about the lamp standard at J from those on the main road? .....31. Look more closely at it. If something goes wrong with it how can the engineer mend it?..... .....32. What words are written on the middle of the Inn sign?.....

F

A B

G

How many questions?.....

You may think that all the questions on the map just about completes all the information we could possibly obtain from this corner. Think again..... There are lots of things there which haven't even been asked about - houses, windows, roofs, road surfaces, all the little manholes you found (next time you are there, count how many there are), the goods in the shops - we could go on all day - if you really want to prove it go and make a list of the objects on the corner down to the smallest brick in the Inn.

What is more, we haven't even started to ask all the questions we might about any one object. Think of the Inn sign, for example - think of who, what, where, why, how and when, all the words we use when we start to ask questions. Remember that, if we can ask a question about it there is at least one piece of information which can be given in reply. Concentrate very deeply on that Inn sign - picture it in your mind - even doing this makes you ask some questions to yourself (Hm.. what was exactly on that picture, what was it made of etc etc). Below you will find some lines - on each see if you can ask a question about that Inn sign. Once you get going you'll find it easy, and you will be amazed how many there are.....

1.....

2.....

3.....

4.....

.....

5.....

6.....

7.....

8.....

9.....

10.....

11.....

12 .....

13.....

14.....

15.....

16.....

17.....

.....

18.....

19 .....

20.....

You haven't even started yet - try looking at the other sheet

How many questions.....???????????

Here are just a few questions about the Inn sign which you may have missed....

1. Who put it there?
2. Who told him to put it there?
3. Who Paid for it?
4. What did it cost?.
5. Who painted the picture?
6. What is the sign made of?
7. How is it fixed into the ground?
8. Who put the lights on it?
9. How much did the lights cost?
10. How do they get electricity?
11. Who was the electrician who supplied it?
12. What does "Inn Food" mean?
13 What colour is the pole?
14. " " " " cock on top?
15. " " " " "Inn Food sign? (Plus a lot of other "what colour" questions.
16. When was it erected?
17. When was it ordered?
18. Where was it ordered from?
19. Who took the order?
2o. Who did the wrought iron work?
21. Who designed it?
22. How is the "Inn Food" sign fixed to the post?
23. Who supplied the padlocks?
24. Who keeps the keys?
25. What shape is the post?
26. Why are the lights on the post?
27. What is the picture of?
28. What does it contain ?.
29. How much did the picture cost?
30. Where did the material come from to make the post?
31. " " " "? " " " the "Inn Food" sign? (etc, etc)
32. How far from the Inn is the sign?
33. What does the cock on top mean?
34. Who painted it?
35. Why is it gold?
36. How deep does the post go into the ground?
37. How tall is the post?
38. Who decided on the height?
39. Is there a legal limit for posts like this?
40. What are the dimensions of the picture?

We could go on for a long time yet, couldn't we? Information is not in short supply - it is ubiquitous (

4/11/11

Just a few questions to test your observation

The following questions are all about the visit you made last week to St. Peters Church. You will remember that you spent some time there and wrote down some notes. What did you really see?..... You can use the notes you made.

---

1. Write down the year carved into the gate _____
2. In the box at the right hand side describe how the gate opens or draw a picture to show it.
3. What did the notice on the gate itself tell you? _____

4.The next few questions are about the main notice board facing the green and the main road.

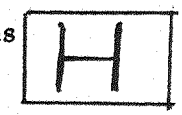
a) It has the name of the church written at the bottom. What word comes after? _____ How exactly is the first T (in ST) written? ____ There is a shield at the top of the notice board. Describe or draw the emblem on it in the box below. b) Is there an apostrophe sign between the R and S of PETERS as it is written on the notice board? _____

c) For a notice board it isn't very effective.Why?

_____

_____

5. There is an H sign next to the notice board. Write in the figures on it above and below the centre cross piece of the H. Use the box.



6. In the two boxes below write down what exactly is written on the two small notices on the right as you enter the gate from the road.

7. What is the name of the shop just outside the church gate? _____

8. What is written under the right hand window of the shop? _____

9. There is a manhole cover in the road just outside the church gate.

Who made it?	What initials are in the middle of it?	Where was it made?

10. How many bars on the fence surrounding the church? ____ 11.What is there under the Yew tree in the churchyard? _____

12. In the box below write down what it says on the inn sign out side the church.

13. What is tall between the gate and the notice board? _____

14. How much did it cost to restore the church clock in 1948? _____

15. How could you tell which way the wind was blowing when you visited the church?

_____

I/P/12

How much did you notice? Some questions about your first Stopping Point.

South-East Corner

1. Name the doctors →
2. In the 5 boxes below put in the shape and what is written on the 5 small signs on the corner.

3. There are two directional signs on the corner. In the boxes say where they point to.

4. What colour are they round the edge?.....
5. Find 2 grids with MWW on them. In the boxes show how the initials are written in each.

6. Who made the rainwater grid off the kerb and where? _____
7. What type of buildings do you see next to the doctors' surgery? _____
8. What happens to the kerb stones right on this corner? _____
9. Find the nearest brickwork to the corner. Why was it built? _____
10. What sort of road sign? _____

South-West Corner

1. In the box on the right draw the road sign at the corner.
2. What does the street sign on the corner say? _____
3. How many bolts is it held by? _____
4. On the map put in the white road markings as they appear at each corner.
5. If you look SSE from the corner, what do you see? _____
6. Find a large box without crossing the road from this corner. What initials are on its side? (And should be).
7. What number is on the telegraph pole on this corner? _____
8. How many wires go out from it in each direction? _____
9. What do you see if you look SW from the corner? _____
10. How is the pole held up? _____

North-East Corner

1. What does it say on the street sign at this corner?
2. What sort of fence surrounds the house?
3. What is the name of the house?
4. Who made the sewer cover right on the corner and where?
5. If you look due West from the corner what do you see?

North-West Corner

1. What number is carved into the telegraph pole at the back? [ ] Are there any others? _____
2. Who is the clerk to the Parish Council? _____
3. In the boxes below draw and put on any words or letters the following - find them first

A round manhole	A square manhole	2 rectangular covers side by side

4. Which number is on the lamp standard? _____
5. What colour is this number? _____
6. Which number byelaw prohibits riding? _____
7. How many stays are missing from the seat? _____
8. What is the brickwork on this corner? _____
9. Someone has written initials in black on the lamp standard. Which initials? _____
10. What other things can you notice but not see?

THE TELEGRAPH POLE AT THE BOTTOM OF SCHOOL LANE

How many of these can you answer? All the questions are about the one telegraph pole - how many more questions can be asked about it?

1. How high is it?.....
2. Is there a standard height for telegraph poles?.....
3. What type of wood is it made from?.....
4. Why this sort of wood?.....
5. Where was the wood grown?.....
6. Who made it into this shape?.....
7. How does the pole stand up?.....
8. When was it erected?.....
9. Who erected it?.....
10. Who decided that it should be put there?.....
11. Why is it in this spot?.....
12. Who transported it to the spot?.....
13. Who asked the transporters to bring it?.....
14. What does the number carved on the back mean?.....
15. Who carved it?.....
16. Where was it carved?.....
17. What are the 'iron steps' for?.....
18. Who put them there?.....
19. Why in that particular place?.....
20. How many wires run from the pole?.....
21. Where do they run to?.....
22. How many telephones do they service?.....
23. What are the wires made of?.....
24. How do they work?.....
25. Who is responsible for maintaining the pole?.....
26. Is it ever checked?.....
27. Is there a map of telegraph poles in Yateley?.....
28. What are the insulators made from?.....
29. Why are there insulators on the pole?.....
30. How much electricity do the wires carry?.....
31. Why can birds perch on them without getting burnt?.....
32. What is the noise you can sometimes hear caused by?.....
33. Where do the wires come from?.....
34. How many telephone calls a day go through the wires on this pole?.....
35. How long has the pole been there?.....
36. What part does this pole play in the provision of telephone facilities in Yateley?.....

THE INFORMATION MACHINE -- What did you find out from the film?

Here are some notes to remind you about the film and a few questions to see if you can fill in the rest. Answer as many as you can - if you can answer them all you must be very observant.

1. The first part of the film showed some of the problems which our ancestors faced. One of these problems involved a man and a tree. Explain in one sentence what happened.

---

2. Three things helped to make this happen. On the left hand side below is what the commentary on the film said. In the right hand box you put what the man felling the tree might have done if he had had this ability.

Man's inability to calculate.	
He was not able to predict the consequences of his actions.	
He could not relate all the factors in the problem.	

3. The film then went on to explain that people do not always make the wisest choice by reminding us of a well-known story. Which one?

---

4. Look at the three things in question 2. Which of these do you think mainly caused the failure to profit from the situation in the story?

---

5. There were certain exceptions to the rule, otherwise man would not have made any progress to civilisation. The film showed three examples of how simple things which we take for granted have helped to advance man beyond the primitive state in which he used to live. The three pictures shown on the film are described on the left below. Take any one of these and explain in your own words on the right why you think it was important.

a) A man rolling a wheel.	I have chosen number
b) An Indian planting.	
c) An Indian weaving and spinning.	

6. The sort of person who helped to increase human knowledge (and still does) is the one who is interested in all the things about him and who was able to store a large variety of objects in his own personal memory banks. The film showed a man walking along a beach. What was he doing?

---

7. When , in the future, he was faced with a problem what could he do about it? and how?

---

8. You, too, have been doing something like this. When, and what were you doing?

---

9. Name as many things as you can which you have seen, stored in your memory banks and could perhaps use in the future this week.	1.	2.
	3.	
	4.	
	5.	
6.	7.	
8.	9.	

10. The film mentioned five famous people from the past who have been responsible for advancing the state of mankind. It also named what they were famous for. See if you can fit the name to the activity or the activity to the name by completing the boxes below.

Name	Activity	Name	Activity
a. Brunelleschi		b.	Mechanics
c.	Medicine	d. Caesar	
e.	Relating Facts	f.	

In f. name one other famous person and say what he or she was famous for.

11. That was a difficult question. If you didn't notice it in the film or you have forgotten what else might you do about it?

---

12. Children who can answer questions from their own observations or by referring to their own memory banks were classed as normal, bright, superbright or-_____. Which category are you? _____.

13. The film then continued by showing the importance of numbers in solving problems. It showed how numbers are not only used to count with but also how they can be used as symbols in describing things or people. Think about this and put in the boxes below what it is about you which can be expressed in numbers. Just to help it has been started off.

My house address		

14. The main advantage this gives is the ability to calculate, the ability to think creatively and the ability to predict.

15. Problems in this century have increased manyfold largely because there are more people, more amenities, more gadgets, more sources of energy etc. The film showed how this was occurring by adding more to the picture until it was completely blacked out. In the boxes below name the things you have in your house which you could not have had if you had been living 50 years ago. (Perhaps your parents can help with this one.

16. Because there are so many more problems and people, and because the problems tend to be bigger ones and therefore more urgent, we need to have more and better calculating tools to solve them. The film showed some of the aids to calculation which we have used in the past. One of them can often be found at the end of baby's cradle. What is it called?

A_____ What did man use to count with at first? F_____

17. Name 10 things which you saw on your walk which would not have been there 10 years ago.

18. Which machine has recently been developed to help with our calculations? Describe what it does.

_____

_____

_____

19. See if you can put in the missing words. The number of dashes tells you how many letters are missing.

The electronic c_____ is a machine which stores i_____. Just as we observe what is around us through our e___ and our e___, our senses of s____ and t____, so the com_____ has i_____ given to it in a form which it can understand. eg through h_____ in cards or by m_____ spots on a tape. Just as we p_____ all the facts in our m_____ when we want to solve a problem, so the c_____ is told how to look at the facts in its m_____, to p_____ them and to produce an a_____. (It may not be always the c_____ one).

20. The film showed how the computer can be used in three ways.

A tightrope walker	To show how it is controlled by human beings.
A woman doing up her hair	To show that it can be used to design things
A look at the crystal ball	To show? _____

21. After the film had shown what the computer could do for a manufacturing company, the commentary made a very important statement. It said that a computer can remove the drudgery from a job, but, because the computer has to be told exactly what to do (like any other machine it is quite dead) it changes the sort of job people do. The picture was of a man who kept thinking. What do you think he was thinking about?

22. Lastly, the film showed how the computer can be used to predict what might happen if a certain course of action is taken, perhaps so that the course of action could be rejected in favour of a better way. It showed this by designing a chemical plant. There is a word which describes how the computer tests ahead to see what the likely outcome may be. Can you remember it?

Si_____. (The number of dashes tells you how many missing letters)

23. Say in your own words how the film tried to tell you how the computer is one of the most important inventions of the 20th century.

24. Remember that the computer is an information machine. Last week you went out in search of information. Which of the information you found could be put into a computer memory? What use might be made of it? One of the items has been filled in below. See how many you can add to it.

Information	Use(s)
The stream and the way in which water flows in Yateley.	So that the Planning Department can know where bridges have to be built, and where they can lead the sewers to from houses etc etc.

H/T/1

MODULE 2

THE HEADMASTER INFORMATION SYSTEM

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Module 2 - The Headmaster Information System

Introduction: The children have learned in module 1 much about the general nature of information. In module 2, we take a closer look at information in an organisation with which the children are most familiar, the school. In particular, this study concerns information in a much more formal sense, in which there is an obvious need to collect it, analyse, store it, process it and retrieve it when necessary - a function performed many times during every working day. Thus the setting up of a system, however poorly organised or haphazard, in the school to do these things is an essential prerequisite to carrying out its designated function, and in observing how the elements of information included in that system interact , children may often be able to suggest how to organise them better. Information systems in schools tend to have evolved rather than to have been created to fulfil their special purpose - this is not to say that they are necessarily bad systems, but often they have led to much duplication of effort and been constructed to hinder rather than help the communication of information, some of which is vital to efficient teaching. The use of those mechanical aids which assist in the storage and retrieval of information is conspicuous by its absence in many schools, not because they are difficult to maintain and costly, but because their existence and potential is not appreciated. The computer may have a use in the school but it may often be the sledgehammer to crack the nut, and the use for example of edge-punched cards is often an equally valid means of doing the jobs which have to be done quickly and efficiently. This module, in fact, ends with an edge-punched card exercise which serves not only to introduce children to a practical technique in the storage and retrieval of information, but also offers a means of revising in a practical way the elements of information systems they have previously learned.

In accordance with the spirit and philosophy of this course this module tries to enable the children to see the problem before they attempt to answer it - thus a Case Study in which the essential element is the gleaning of information in a school environment from a given set of circumstances helps to define the subject and the nature of this study. It also helps to highlight the deficiencies of a manual system of recording information, and goes on to discuss other problems which crop up frequently in schools, including the perennial timetable.

Having looked at some of the information problems which have to be solved by the Headmaster and/or his staff, the module goes on to look at the nature of the information in a school; at all those variables which must at some time and in some way be recorded, updated and checked. The children find out that there is a great deal of information like this in a school, and that it covers people as well as objects. As in the last module, they discover that the primary purpose of holding this information is so that other people may use it for many different purposes.

The structuring of information into a system for the school is looked at next and this is studied with reference to a particular problem - that of recording details about

the children themselves; what does a personal record contain? how is it acquired and who has access to it? what is involved in its storage and processing? These aspects are broadened out into the general principles of Information Systems, in which the chaos of information is translated into the order of a system. Lastly this is illustrated by a practical exercise in the use of punched cards on which personal information is recorded, the edges cut away to represent this information and then selected attributes retrieved with the aid of a knitting needle.

There is nothing in this module which is outside the experience of all teachers, except perhaps the use of edge-punched cards. The worksheets and exercises are designed to put over the more difficult aspects of designing an information and no special expertise or knowledge is needed on the part of teacher or taught. Perhaps, for interest's sake and since he has involved himself more closely with school administrative problems, the headmaster may wish to devote a small amount of time to teaching this topic,; it may be that those very administrative problems preclude this in which case the module itself may provide some valuable hints on how to make it possible.

Material required - worksheets as follows:

a) Case Study 1 (for each pupil or shared) (sheet H/P/1)

b) How about these for information problems..... (for each pupil or shared) (sheet H/P/2)

c) Some questions about your school. (for each pupil) (sheet H/P/3)

d) Information about you in the Headmaster Information System. (for each pupil) (sheet H/P/4)

e) Eight stages in setting up an Information System (for each pupil) (sheet H/P/5)

f) A sheet to help you plan the information on the edge-punched card. (for each pupil) (sheet H/P/6).

and

Edge-punched cards - at least two for each pupil. (Obtainable from suppliers recommended in the introduction)

several pairs of scissors for the edge-punched card exercise.

a knitting needle for the epc exercise.

(Page H/T/17 contains two illustrations of one type of edge-punched card)

Module 2 - The Headmaster Information System

Resume of Module; This module is designed to last approximately five weeks at one hour per week. The following breakdown suggests how this may be achieved but there are obviously factors in every classroom environment which may alter this schedule.

Part 1 - a) Introduction to the module and revision of the last module.

b) Defining the problem - discussion of a Case Study in which information is required fairly urgently and how the information problem may be solved using current methods. (Using sheet H/P/1)

Part 2 - c) Further information problems in the school - a few Case Studies which somehow require an answer. (Using sheet H/P/2)

d) Information in the system - a study of the different variables involved in the school information system to discover what we need to know before we start to organise. (Using sheet H/P/3)

Part 3 - e) Personal Information in the school information system - what it is, how it has been collected, what it contains. (Using sheet H/P/4)

f) Collecting information about people. Designing a form to collect information with reference to one of the problems on sheet H/P/2 and uding it. Discussing the implications of this.

Part 4 - g) Generalising into the elements of an Information System. The sequence of collecting, analysing, prepar ing, storing, processing and retrieving information in an Information System. (Using sheet H/P/5)

h) A first look at edge-punched cards. - what they are, how they may be used - a demonstration of their use with a simple exercise.

Part 5 - i) A closer look at edge-punched cards. Better ways of storing information. Using Codes. A larger exercise for the children to do. (using sheet H/P/6)

j) A revision of the things learned in the module with particular emphasis on the 8 stages in setting up an information system.

Teaching Notes: The space on the left-hand side of this page is to enable the teacher to make his/her own notes, perhaps as a resume parhaps as an amplification, or perhaps to alter what has been expressed here into something which fits more exactly what the situation in his/her own classroom demands. The spirit of this course is always to enable teachers to teach according to their own ideas and inclinations - these notes are a bread framework to be fitted to varying situations.

Part 1 - Information problems of the Headmaster

Revise quickly the previous module pointing out that the children have discovered much about information but that the majority of it has not had much structure - it has dealt mostly with isolated items. Only in the last film was it suggested that there is a way of organising information so that it can be made useful to human beings. Outline the objectives of the next few weeks laying emphasis on the place of the school as an organisation containing much information which has to be organised if it is to function as such. Make the point that the children themselves frequently have organisation problems which a system might help to solve - a diary is a storer of information which can be retrieved. How many keep diaries? What for? What are the drawbacks to holding information in this way? What are the advantages?

Having made this initial point, discuss with the children what they think the information problems of the school are - many of the answers may be vague since the children often have had little experience of thinking about problems of this type - if this is so indicate that they will have a better idea if they try to solve with you a particular problem.

Hand out Case Study 1 (Sheet H/P/1) - it is a problem which the children can easily understand and which crops up quite frequently in schools. Ask the children to read it or read it with them. You can then either ask them to write down what they think happens next, or discuss it with them orally. Your in itial objectives are to point out that the problem is principally one of information (identification as quickly as possible of the boy from the clues given and the clues which can be elicited on the spot), and then the communication of information (to the parents, the police and to the hospital). Treat the Case Study as if it were your own school and make the following facts fit if they are not true at first.

Problem 1 How do we go about identifying who has been knocked down?

You are recommended to write the salient points raised by the children on the blackboard. Lead the discussion by asking what we should first ask ourselves ie What do we know already?

The blackboard, after some minutes may look like this:

What we know.

i) The boy belongs to our school

ii) Doesn't stay to school dinner (probably)

or Isn't on 2nd sitting at dinner (possible but breaking school rule)

or Is playing truant (not likely to be in school uniform)

or has changed dinner sitting with someone (possible but again against rule)

iii) Lives on the village side of the school (probably)

This is the information given in the Case Study. Is there enough? Discuss how a shortage of information such as this produces many assumptions which in turn tend to obscure the path to the answer. How many of these can be tested fairly quickly? Go through the list and decide what can be done to eliminate some of the alternatives.

What can now be done to solve the problem? Ask the children how to find out more in the immediate circumstances. Lead them to appreciate that the policeman has said that he has just come from the scene of the accident - could not he provide a little more information? Write on the board the suggestions about what information they would want to hear from the policeman.

What we can find out

His hair - what colour? Is it long? Curly or straight? What else about his hair?

His age? (What are the difficulties - who would this info eliminate?)

What other useful questions are there? (eg glasses?)

Assume that the description of the policeman could fit many boys eg dark hair, about 13/14/15, straight hair not too long, medium size nose and no glasses. Are we any nearer solving the problem? Point out that we may have eliminated many other boys with this additional information but we have still not enough information to solve the problem.

What other possible courses of action are open to the Head? Discuss what he can do next and list on the blackboard all the possibilities raised, but also raise valid objections.

What we can do to find out more

i) Send a teacher (and perhaps a boy) round to the hospital.

He might be so ill he can't be seen
The teacher doesn't teach everyone - might not know
The hospital is 10 miles away - takes a long time

ii) Send all school to classes and take a roll-call

Takes a long time
Many not due back until 1.30
Some classes out on a Field Study
Not all teachers are in

iii) Go to scene of accident and ask witnesses

Too long ago - none about now
Takes time
might not know the boy

iv) Ring up hospital to ask about the boy's state

might not have been booked in

By this time the children should be appreciating that what seemed at first to be a straightforward problem is not easy to solve after all, and that the information which the Head has at his disposal is not always relevant to problems of this sort.

This purpose having been achieved, assume that course of action No 4 was taken. The hospital statement was that the boy is seriously ill, that he has not recovered consciousness, but that a clue to his identity is the initials JLB on the back of his watch.

At this the answers to the problem will probably come through the floodgates, but rather than accepting the general answer about looking up the school registers try to get the children to go through step by step what happens, from asking for the registers from the secretary (and don't forget that the dinner registers are also required - where are they? - all of them?) to the making of the final elimination ask for an estimated time to look through the registers in this way. How long has the whole process taken since the policeman first arrived? Point out that this may have been a matter of life or death - is there any way to reduce the time taken? - perhaps if there were some automatic way of retrieving information from the school records.... Explain that later on the children will be examining one of

Problem 2 What do we do about it now?

Information by itself, without the benefit of action based upon it, is often quite useless. The fact of having identified the victim of the accident is not,of itself, the point of the exercise. Ask the children what happens now - elicit that there is now a need

to inform the paremts (how do we know where they are)

To inform the hospital (Why? medical records? Doctors name any other information?)

to inform the police (why?)

in following up the problem in this way you are making two main points

the existence of further information already in the system

the need to make use of information, and to communicate it to others.

#. A list of further,smaller case studies is given ~~in Appendix~~ on Sheet H/P/2

#. You can, if you wish use these to link up to the next topic which concerns the type of information kept in the existing system and the way it may be used. Alternatively, you may wish to spend slightly longer discussing the problems as a means of giving greater insight into the answers.

Part 2 -

#. Information in the System

As an introduction to this topic look at ~~appendix 3~~ sheet H/P/3 and the questions on it about the school. You can use this to give the children something practical to do in preparation for the ~~next session~~ follow-up work. The point of the exercise is, of course, to isolate all the variables which have to be taken into account in designing an information system and to give an initial idea of the complex interaction of these variables. The Head's task is thus brought more into focus. The questions on the sheet are factual - the object of the ensuing discussion is to extrapolate from these facts into the need for a system and thence into the system itself.

Give the children 10 minutes or so to complete the questions - they may require some information from you in doing so. When they have had enough time ask them what the questions are all about. Had they considered before the enormous number of different types of people, for instance involved in running a school? W hy was it easy to answer the questions? Would they have found it easy if they had been given a blank paper to

write upon. This is leading up to the appreciation that the designing of a form can make the collection of information so much easier. However this is also a practical exercise later and a detailed analysis of the matter is not appropriate at this stage.

The main points to be brought out during this discussion session are extensions of the information completed on the sheet. What are the variables which the Head has to juggle about with when designing his information system? What does he have to keep information about. It is worth going over these points again with the children, partly to see what they have assimilated during the exercise and also to remake the very necessary point that before anyone can design an information system one has to know what one is dealing with. Write on the blackboard the different things about the school which have to be kept on record - don't ask for too much detail but ask for a few examples:

People - pupils
teachers
cleaners
parents etc

Buildings etc - classrooms
laboratories
toilets
craft rooms etc

Furniture - tables
chairs
waste paper baskets etc

Equipment - globes
pipettes
chemicals
books etc

Where do we classify school subjects?

Having identified the items of information concerned, have a look at the present system. Take a number of the things on the board and ask which records are kept, how they are kept, who refers to them, how often they are referred to, what use is made of them, are they duplicated in case there is a fire, where are the duplicates held, if you ask a question about any one of them now how quickly could you get the answer, - [illegible]

try playing a sort of 'Chase the Rec-rd' game. Where for instance is the record for some item in the classroom? Where are the records kept about the children?

Take the concept one step further by asking the children to make a further breakdown. Ask them to choose one of the people, for example, and identify exactly what the Head would require to about them. You could ask them to write this down, or produce ideas for the blackboard, but all the time offer them some help by asking pertinent questions;

suppose they want to be paid.
what if one of them doesn't turn up ?
How do they know what to do? etc.

For example, the information needed for the system about the cleaners would perhaps be:

Name
Address
Age
Sex
Next of Kin
Hours worked
Hourly rate of pay
Pension scheme?
Equipment used
Where in the building each one works.

You could, if you wish, analyse this information into that which is essential, that which changes frequently, that which is used only occasionally and that which would be physically placed on record in the system.

Part 3 What information is already in the system about the children? This part of the lesson is to be taught in conjunction with the sheet ~~given in Appendix E~~ H/P/4 - 'Information about you in the Headmaster Information System'. The questions are quite self-explanatory, and the following notes are mainly suggestions as to how you use the sheet and what you make of the questions.
Give the children five to ten minutes to complete what questions they can. If you are able to, and if the children have difficulty in remembering what information they have given so far, hand out one or more of the forms they have filled in. Give them one or two minutes to make the necessary amendments, and take the discussion further by making together a short analysis of the form along the lines of the discussion about cleaners' information, ie what changes are necessary frequently and infrequently, is there anything on the forms which is irrelevant? etc.

Questions numbered 5 to 10 will offer you plenty of scope for opening up these areas, and could lead to some pertinent points being made. However, the social implications of information systems is a topic which is given much fuller scope later on in the course, so you needn't spend too long in doing this at this juncture.

The essential point to be made is the fact that information is held about the children, is accessible to the Head, is continuously being added to, is an essential constituent of any school system and is modifiable in case of error but not by the people to whom the information refers.

A data collection exercise.

The link between this and the last section lies in question 4 on the sheet the children have just completed. In referring to the Case Studies you are also referring to particular problems of an information system ie where does the information come from in the first place and how can we get at it?

(Sheet H(P1a)

Refer in particular to Case Study B on last week's sheet "How about these for information problems". Discuss what information is already in the system which could be used to answer this problem, and what information might need to be obtained. How do we go about obtaining it?

Point out the difficulties which have already been experienced in obtaining information a) in lesson 1 when personal information, a lot of it, was required from a lot of people and b) in the walk when a lot of different sorts of information was required. Which have been the easiest parts of the course so far? - You are angling for the fact that it is easy to fill in forms, and guiding the lesson along the lines that, if you spend some time designing a form on which to record information, you are far more likely to get the information you want, and to know what information you want.

So, what is, in most cases, an essential first step to gathering information? The answer is to design a form, and with special reference to Case Study B ~~from last week~~ on Sheet H/P/2 ask the children to do this. Give them four or five minutes to do this.

Ask them how they went about their task and elicit the information that a well-designed form should :

take into account the space available
take into account the questions to be answered
be easily understood by the person answering

To test the efficiency of the forms the children have designed for Case Study B, pass them round to each child to be filled in.

Having done this, the next most important question to be asked is 'How do we know that the information filled in is correct?'. Discuss the possibility that some people would cheat in order to obtain a free bus ticket. Discuss also the possibility that a checking condition might be put into the form eg how many children asked for the mileage to be put in as well as the address so that one could be checked against the other?

Two further questions which arise and could be discussed are the difficulties which could crop up by people who don't know how far away from the school they live - how do we answer that problem?, and b) what happens when people move?

Part 4 ●. Eight Stages in the setting up of an Information System.

In this section you are trying to draw together all the threads of the Headmaster Information System you have been discussing during the past two lessons. The Sheet ~~in Appendix 4~~ H/P/5 could comprise the lesson notes for this section. It is suggested that you hand out the sheet and deal with each part in turn, referring to the problems already experienced and those which could crop up when the extra dimension of a machine is added. It is acknowledged that some confusion may occur in the latter part of the sheet, since

specific information storage and retrieval methods have not yet been discussed, but sufficient about the nature of information has been taught to enable the children to extrapolate into the difficulties of the problem. The boxes, when completed, should give the following sequence of events in information handling.

Information Analysis

Information Collection

Information Checking

Information Preparation

Information Input

Information Storage

Information Processing

Information Retrieval.

The concepts of this sequence will be made clearer as we begin to discuss methods of Information Storage and Retrieval in greater depth.

An edge punched card exercise. (an example of an edge-punched card is shown on sheet H/T/17)

The purpose of this section is to teach the children the elements of one particular information storage and retrieval method which can be carried out without special machinery. It is proposed to approach the exercise in four steps

a) Familiarise the children with the card

b) Perform a simple exercise to illustrate the concept

c) Discuss, within the concept of the eight stages, the methods by which personal information may be used as a vehicle for extending the use of the method

d) Carry out a more complicated exercise based on the personal information in the Headmaster Information System.

Give out to the children two punched cards, a pair of scissors and make sure that they have a pen.

Examine, with the children, the cards. Ask them to describe them to you, making sure that they notice the following points:

- the holes round the edge
- the fact that they are numbered or lettered, and also differently on each side
- the space in the middle for the information to be written
- the corner cut on the edge so that they will all be stored the right way round.

Go through the following exercise with the children.
Supposing that we wanted to store your birthday on the card in front of you. Assuming we are allowed to use 2 sides of the card and the scissors. How would we go about it?

The children should tumble to the idea of cutting the hole in the side to represent the number of the day and the number of the month. If not lead them to it.

Make sure that the children have their cards the same way up - with the corner-cut on the top left. Ask them to do the exercise. Make sure that they write their name on the card.

Collect all the cards up and put them together in a stacked pile - ask for someone's birthday, and ask the children to tell you how to retrieve the right card. Complete the exercise by picking out the card using the knitting needle.

Part 5

Point out that it is very wasteful of holes to use two complete sides for just two figures. What alternative ways are there to record the same information but using perhaps only one ~~side~~ edge of the card? Hand back the cards and ask the children to do just this using A) only the bottom side of the card and then b) only the smaller untouched side. Discuss how it has been accomplished afterwards.

Make two further points about how information can be compressed onto the card.

i) It is possible to have a separate code sheet referring to the card holes. This is particularly useful when you have two-state answers to questions eg yes or no to a question of whether you have had a polio vaccination or not. Thus each separate hole could refer to a completely different piece of information.

ii) To store series of numbers you could use groups of four holes for each digit, each hole representing 7 4 2 1. Thus to record the figure 8 you need to clip the 7 and the 1 in the same group of four holes.

Show the planning sheet H/P/6 and point out its use.

At this stage we wish to relate the method to the Headmaster System which is the subject of the whole lesson, and in particular we want to involve the personal information which is a part of it. If you find yourself short of time at this juncture you could set this as a homework task, but it is rather a difficult one at this stage and the children should be given some guidelines for solving the problem. Since we also need to bring in the third dimension to the lesson ie the eight stages in setting up a system this could provide some help in this.

Module 2 - The Headmaster Information System

Look back at the information you discussed ~~in section B this week~~ on Sheet H/P/4. How much of this would be the sort of information which would be recorded in the centre of the card and how much could be punched as information in the edges, either as it stands or by using a separate sheet of codes. eg sex can be a punch for male or no-punch for female. Get the children to look at the problem from the point of view of the usefulness of retrieving it - for example, while it would be perfectly possible to make up a series of codes which would enable one's name to be punched into the edge of the card, this would have absolutely no practical use to the person retrieving information from the card and would be very wasteful of holes.
A far more practical problem is the following.

The Head has been asked to find potential blood donors in the school.
We know that blood donors must have the following attributes

they must be immunised against diphtheria
they must be vaccinated against smallpox
they must be vaccinated against polio
they must not have ever had jaundice
they must not be anaemic
particularly important are those who have a negative rhesus factor and an AB or B Blood group. (There are 4 possible blood groups O,A,AB and B)

Taking this problem we can now go through the stages of setting up an information system to make sure that this is added to the current one and identify the constituent stages as we do so.

Analysis - what is the problem? What information do we need? - obviously medical. How much do we need? Answers to these questions will help us in

Collection - design a form to collect this data. Design the questions to go on the form. Find ways of distributing the form and ways of making sure that you get it back. And then..

Checking - how do we know that the information is accurate. We can do very little about this except perhaps make sure that, if someone is not sure it should be left blank. Perhaps the children would come up with other ideas.

Preparation- this is an aspect of the more mechanical information retrieval systems and is not so relevant in this instance beyond making sure that the necessary equipment is at hand.

Input - this would be the process of writing the information on the card itself, and of clipping the holes with the relevant information which can be retrieved.

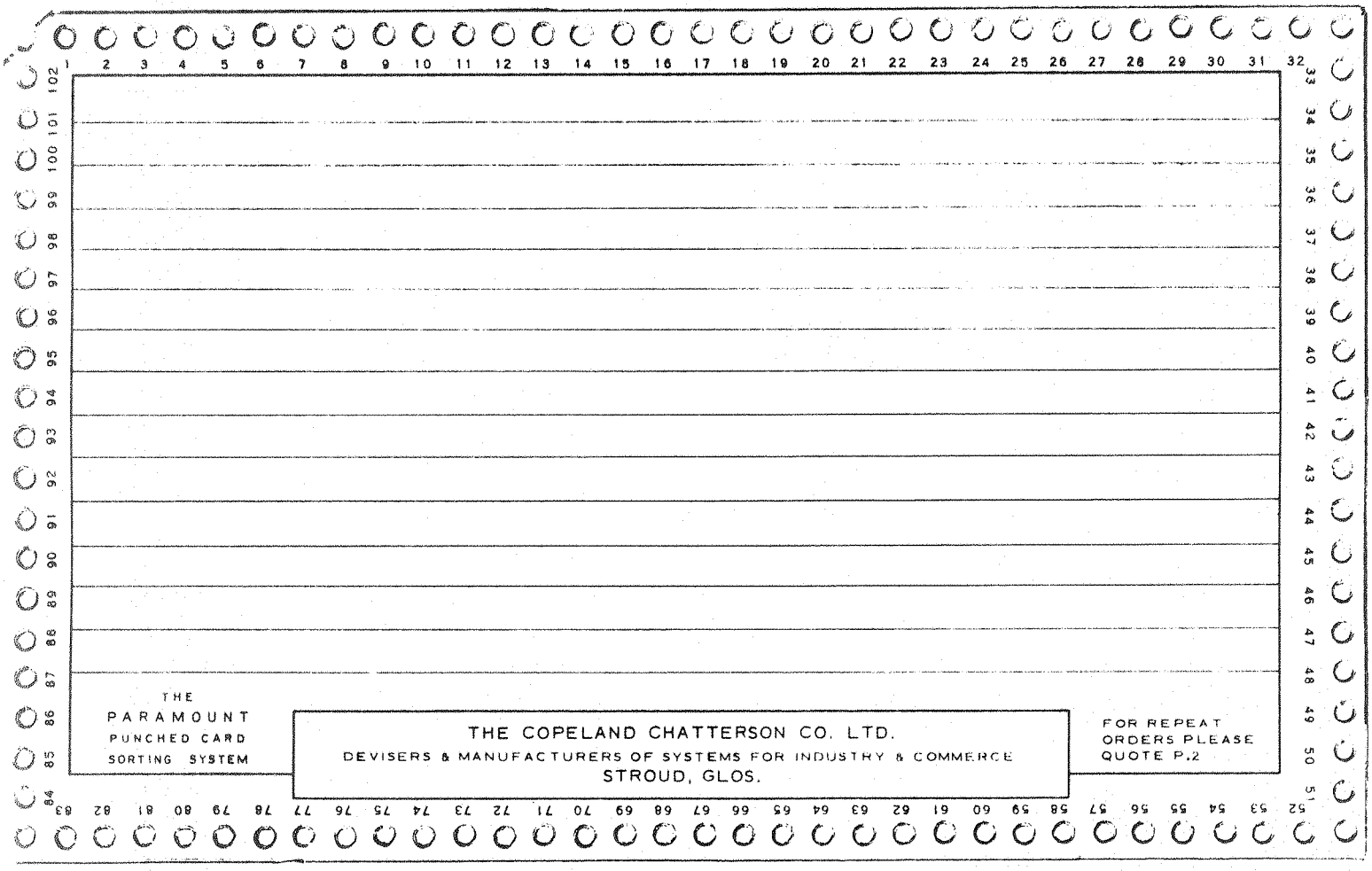
Processing - again is a function of more sophisticated systems. In this problem the processing function would depend on the way in which the records are kept eg sorted into classes or years. With this particular method there is no need to sort into alphabetical order.

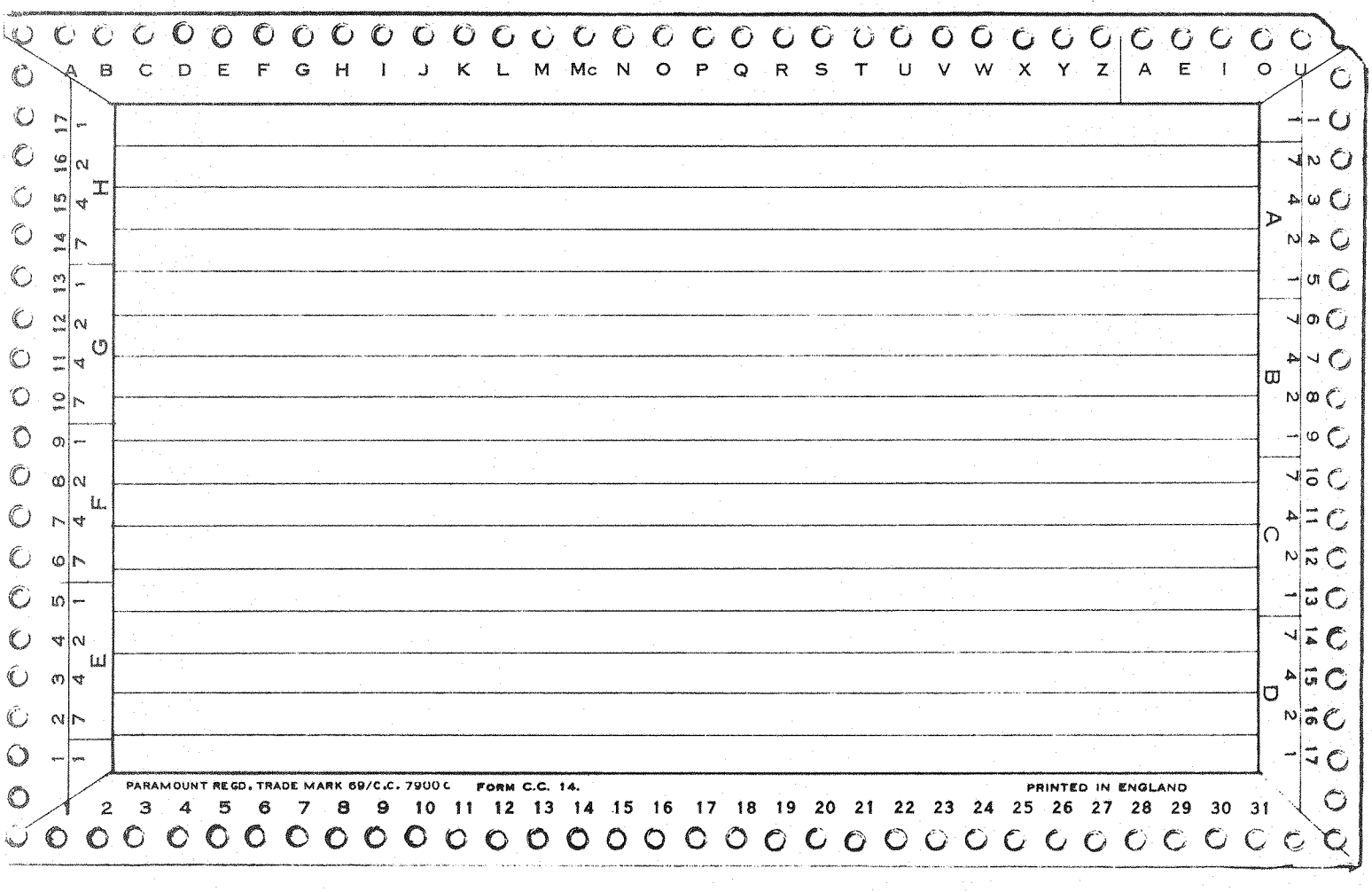
Retrieval - retrieval methods have been dealt with elsewhere in your demonstration using birthdays. This is a more complex problem which demands that you think which cards you are dealing with in the next selection phase, but the principle is the same.

Storage - again a function of all systems which needs little action on the part of anybody. In this case it refers simply to the medium in which it is stored.

This gives some idea of how the problem may be tackled. You may wish to set this problem later for a small group to deal with, or as an individual task, or as a homework exercise for the whole class. It is suggested however that, at the present time, you set as a homework task something more simple using the punched cards and a subset of personal information. The correctness of the work can be checked next week by knitting needle.

The illustrations below show both sides of one type of edge-punched card - there are other types on the market which operate the same principle.





CASE STUDY 1

This could happen at your school.
Read the account carefully and then say what you would do if you were the Headmaster of your school.

It is 12.45 pm and the second sitting for lunch is well under way. The playgrounds are full of running, jumping, shouting, falling and fighting children. The teachers who are not on duty are either in the staffroom drinking tea and marking exercise books or out of the school shopping.
The Headmaster sits in his study filling in aform which he received from the Education Authority in the morning post, and at the same time dictating a letter to a parent for the School Secretary to type in the afternoon.
He is wondering, too, where he will get two extra teachers from next year when the school population is expected to rise by 50.
Number 3693 Police Constable John Berry, obviously in a great hurry, drives up to the school entrance in his green and white Panda car. He quickly switches off the ignition, leaps out of the car and runs up the wellworn steps two at a time into the school. Something must be amiss; it isn't every day that a policeman in a hurry and looking worried rushes into the school building. No wonder everyone is watching and wondering.
He knocks loudly on the Headmaster's door and,in response to the reply of "Come in", disappears from the general view by closing the door behind him.
Before the Head can look surprised the constable breathlessly makes his urgency known. "I'm sorry to bother you" he says,"but there has been an accident in the village, I've just left there, a boy knocked down by a lorry, seriously hurt, taken to hospital, your school uniform, no name in his pocket". All this came in short bursts from the constable and the urgent tone of his voice betrayed the need for quick and efficient thinking, and for information as soon as possible.
The Headmaster scratches his head. He is worried."What do I do now?" he asked himself.

How about these for information problems.....

These are just a few of the things which could crop up in your school in one day

A. In May it is time to be looking ahead to the next year. Your Head begins to think of problems like this.

Next year we have approximately 1500 children
hopefully 75 teachers and
definitely 0 more rooms than we have now.

This is the beginning of the process which provides you and every other boy and girl in the school with somewhere to go in school hours every day of the school year. Ask 5 questions which will either tell the Head what to do about his problem or tell him what more he needs to know.

B. The Education Committee at last night's meeting decided that all pupils at your school who live more than 3 miles away from it shall have their bus fares paid for them. What information is the Head to be asked to provide and how does he go about it, in your recommendation.

C. The School Meals Supervisor rings up on Monday Morning after register. She wants to know how many dinners to provide this week. Where do you find this information? What information do you find there?

D. In all schools there is a need for teachers to supervise certain places at certain times. Which times?

Which places?

On another piece of paper help make out a duty roster for the staff. List at the top the duties they have to do first.

E. How would your Head go about finding the following information:

How many pupils next year?

How many children have had their polio inocculation?

Some questions about your school.

Write down those answers you can. Leave blank those you can't answer. When you have completed those you can answer find out the answers to those you left blank and complete them.

++

1. People

a) Read Case Study 1 again. In the boxes below put the sorts of people in the story in who might have a connection with the school. One has been done for you.

b) Now think of all the people you have ever seen in the school who have a job to do in it. Fill up the boxes below as before.

c) You will notice that the boxes in the two questions above have a space at the end. This is for the number of each type of person you have entered. Fill them up.

d) Find out how many Heads of Department there are in your school. Name them with their subjects in the boxes below.

Name	Department

2. The site

a) Name, in the boxes below, the various buildings which make up your school. If one building is divided into different blocks list the blocks separately.

b) At the right hand side of the boxes above enter the number of rooms in each building or block.

c) Every school has to have specialist rooms ie rooms which are not ordinary classrooms. Fill in the boxes below with some of these rooms. Say how many too.

3. In the boxes below fill in the subjects you take this term

d) Name some of the subjects taken only by boys at your school

_____ _____

_____

_____

e) And by girls only..

_____

_____

_____

f) How big is the school including its playing fields? _____ _____

4. Name the items of furniture in the ordinary classroom.

Information about you in the Headmaster Information System.....

The Head knows a lot about you - it is his job to do so. Let's think what it is he knows, or can find out, about you.

++

1. When you first came to the school you were asked to complete a form giving information about yourself. You have probably completed others while you have been there. In the boxes write down what you can remember you have been asked to say about yourself.

2. While you have been at school information has been added to that already in the system.Think what sort of information this might be. Put some examples in the boxes.

3. The Headmaster has, of course, other ways of obtaining information about you. Think of and name some of the sources from where he might get this information.

4. Look at the Case Studies on the sheet entitled 'How about these for information problems'. What extra information about yourself would be needed to answer all of these?

5. Name some items of information about yourself which is not in the Head's information system.

a)
b)
c)
d)

6. How do you know that all the information in the Head's system is accurate?

7. Which of the questions on this sheet says most about the real you?

8. How long would you like the information in the Head's system to be held?

9. Who would you want to have access to it?

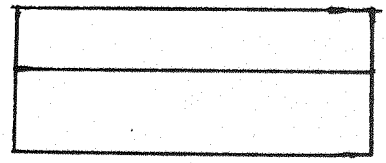
10. W ho would you not like to see it?

EIGHT STAGES IN SETTING UP AN INFORMATION SYSTEM

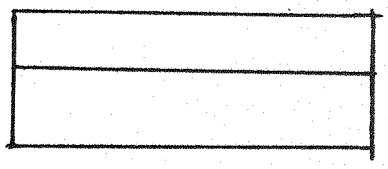
During the last few weeks we have talked a lot about information, where we find it and what it is. Recently we have looked at the information which the Head needs to run his school - all this information put together we have called an 'information system'. Let us look back at what we have done so far to see if we can put an order to the setting up of an information system. It might help us to understand what we need to do when we wish to set up our own system for ourselves.

---

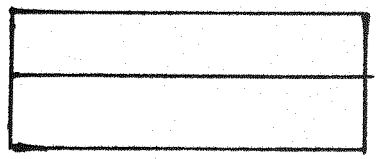
1. Before we can start our system we need to look hard at all the things we want to include in it. For the Head's system we thought about the many items we need to know about - people, furniture etc. and analysed the needs of the system for the sort of information it contains



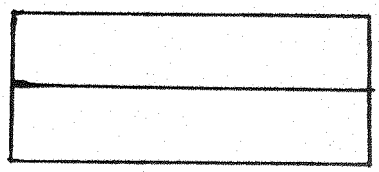
2. Next, we need to gather in the information we want. In the Head's system this meant designing forms and finding some way of getting them completed. This could mean some legwork on our part, or perhaps we could find other ways.



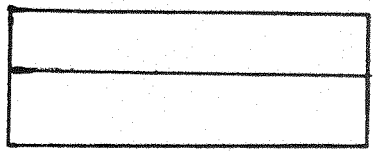
3. But, of course, we are not always sure that the information we have collected is correct. If we are to rely on it we have to be sure of it.....



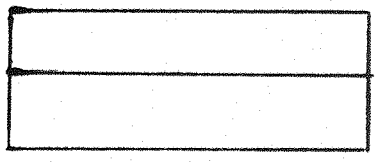
4. Once we have the information on our forms, we usually want to transfer it into a system which will enable us to refer to it quickly and accurately. Some information systems can only understand information which is given to it in a certain way.....



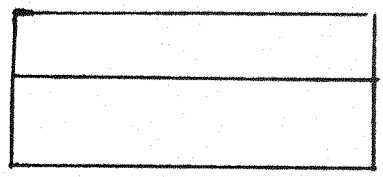
5. So, after the information has been prepared for the particular system to be used, we can now go ahead and put it into the medium we are using...This is not always easy.



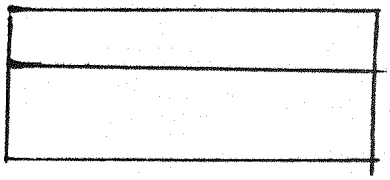
6. And once the information has been entered into the system it can be put away until needed. All systems are methods of information.....



7. Occasionally, we may want to bring it up to date, to change it. We may even want to put it in a certain order so that we know where to find things quickly. We may need to add some figures together to produce a total.....



8. And lastly there is no point in doing any of the former things, unless the information we have stored in the system can be made available whenever we need it.



H/P/6

A sheet to help you plan the information on the edge-punched card.

Hole number		
1	35	69
2	36	70
3	37	71
4	38	72
5	39	73
6	40	74
7	41	75
8	42	76
9	43	77
10	44	78
11	45	79
12	46	80
13	47	81
14	48	82
15	49	83
16	50	84
17	51	85
18	52	86
19	53	87
20	54	88
21	55	89
22	56	90
23	57	9L
24	58	92
25	59	93
26	60	94
27	61	95
28	62	96
29	63	97
30	64	98
31	65	99
32	66	100
33	67	101
34	68	102

This sheet is to help you plan the information you would like to put in each hole. The numbers refer to the hole numbers on the edge-punched card and in the spaces you put the sort of information the holes refer to.

P/T/1

MODULE 3

INFORMATION IN POLICE WORK AND THE LAW

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Introduction : The launching of the Police National Computer in 1974 is the beginning of a significant new era in the area of record storage, detection and the relationship of the guardians of the law to their 'clients' and the public they serve. To the layman the use of the computer is the use of just another tool which may, or may not, help to increase efficiency - after all computers have been used in the United States of America for the past few years - but quite often the layman has but a hazy idea, often gleaned from the misleading impressions disseminated by the media,of the range of duties carried out by the police, and their nature. About the computer he is even more confused, having little knowledge of how it may be used in the police environment, or abused...

Information is essential to police work, as perhaps we are all intuitively aware. But it is not just the receipt of information,which may be obtained from 'well-established sources' or from patient legwork, which is important, but also the way in which that information is handled, preserved and acted upon. The extrapolations which may inevitably have to be made before an offender is brought to justice or a problem solved are often the result of long years of experience combined with a highly organised system of storing documents, details and facts. It is in this latter field that the computer is most useful, and the module leads children towards understanding how the police make use of the information machine to carry the records they need, and some of the methods they use to make retrieval possible.

But the module goes further than this., both before and after the computer is established as a useful artifact. On the one side it supposes a world not very far into the future in which the machine may be used to make decisions, and points out how, in our current state of knowledge, this can be a dangerous thing to do. On the other hand , lessons are included which lead children to understand and to some extent participate in the real work of the police and the role of information in that work. They learn something of the world in which they live in terms of such items as the difference between information and knowledge, the actual police as opposed to their television image, the type of jobs policemen have to do and the crimes they may have to solve, the difficulty of establishing objective evidence from subjective impressions and the increasingly complex nature of police work in the face of a rapidly changing society. As an example of this last aspect, the computer again is taken - Computer fraud and embezzlement is a rapidly growing area of activity in which the modern police need to be abreast of current technological developments. The man on the beat may be the point of contact with the public but he hides behind him a sophisticated array of specialists and machinery and systems without which today's police could not keep up with those who break the law of the land. Not only do we need to be made aware of the benefits of up-to date methods but also we should understand the possibilities of misuse which indiscriminate use may bring. This module attempts to teach both.

Module 3 - Information in Police Work and the Law

Resume of Module : The following outline of eleven lessons is merely an extension of eleven ideas for which teaching notes have been written and worksheets and visual material created. The order in which they are presented follows a pattern - from understanding the work of the policeman through such items as the television presentation and Sherlock Holmes, which are familiar to children, to the use of the computer as a storer of information, and its possible misuse as a diagnostic tool. The lessons are complete in themselves and designed to last approximately an hour (although this can be extended or reduced with imaginative treatment), and the order in which they are presented can therefore be modified to suit the individual need. Also some lessons may be excluded if there are time constraints.

Lesson 1 - An Introduction to the work of the policeman. The policeman as observer - what he looks for, how he does it. (Information seen, information processed). The difference between information and knowledge. Exercises on this.

Material needed: Worksheet 'How much do you know about your friend?' (for each child) (sheet P/P/1)

Lesson 2 - The policeman on television v his actual job and methods. How television oversimplifies in the interests of the plot either by introducing coincidence or characters larger than life. Example of a Z-Cars script (or, if you can find one, a tape of a 20 minutes/half-hour radio play).

Material needed: Worksheet ' The police on television' (sheet P/P/2)
Script '200 Tartan Teddy-Bears - a Z-Cars Story' (for each child or 1 between 2)(sheets P/P/3 and P/P/4)
(Your own tape of a radio play)

Lesson 3 - Deduction from information. A Sherlock Holmes story illustrating the importance of observation, information, knowledge and deduction in the solving of a problem.

Material needed: Tape/filmstrip sequence 'Problem-solving with Sherlock Holmes'(P/V/1)
Script of tape 'Problem-solving with Sherlock Holmes' (for each child or 1 between 2) (sheets P/P/5 to P/P/8).

Lesson 4: - A simulation of the policeman on his beat. A walk around the school some with no information, others with sheets of things to observe. A test of observation on return. This is a lesson which will obvoiously have to be developed by the teacher so that the following material needed is a suggestion for what you will need to create for the children.

Material needed: (a map of the beat for each group of children)
(a list of things to observe for half the groups)
(a list of questions on what was seen for each child)
(a set of slides to accompany this).

Lesson 5 - Case Studies of typical police problems. Five problems which may

also used as role-playing exercises. Discussion work on how the problems may be solved and the information needed to solve them. (A computer may be used in each of these and it is up to the teacher whether this is an aspect to be introduced here or later when the police National Computer is discussed).

Material needed: 'A sheet of Case Studies in Police Work' (for each child or 1 between 2) (sheet P/P/9)

Lesson 6 - Evidence - its reliability and source. The difficulty of obtaining objective evidence as opposed to subjective impressions. Exercises on the reliability of childrens' appreciation of time, space and observation.

Material needed: (Exercises suggested in teaching notes)

Lesson 7 - The use of computers in police work in the near future. A Crime Story outlining the several ways by which the computer may be useful in catching a criminal. Story may be used as a Case Study, a roleplaying exercise or as a straight story - further work may involve children writing their own stories in a similar vein.

Material needed: Story 'Is this the way it could happen?' (for each child or one between two) (sheets P/P/10 and 11).

Lesson 8 - The use of the Police National Computer. Police applications on the computer. The computer as a storage bank of information. Role-playing of the way in which the computer might be used in the police station and out in the field.

Material needed: Worksheet ' Areas of Police Work in which the computer might be useful' (for each child) (sheet P/P/12)

(used in conjunction with the sheet of the same name in the teaching notes - sheet P/T/20).

Lesson 9 - The equipment used by the police in the station and the police car. Communications equipment and how it is used. Discussion/Case Study followed by worksheet using pictures and pamphlets.

Material needed: Worksheet 'A question sheet on the display screen and the teleprinter' (for each child) (sheet P/P/13).

Manufacturers pamphlets ' The 3270 Display Terminal'
' The 2740 Communications Term.'
(for each child or shared) (pamphlets P/V/2 and 3)

Lesson 10 - The misuse of computers in police work. Tape/slide demonstration of story 'Computers Don't Argue'. Discussion afterwards of why the machine was wrongly used and where the mistakes occurred.

Material needed: Tape plus 37 slides 'Computers Don't Argue' (P/V/4)

Script of tape 'Cmmputers Don't Argue' (for each child or shared) (sheets P/P/14 to P/P/21 inc).

Worksheet 'Computers Don't Argue' (for each child) (sheet P/P/22)

Lesson 11 - Computer Fraud and Embezzlement. Some examples of how the computer is helping to contibute to crime as well as to solve it. Case Studies.

Lesson 11 (contd)

Material needed: A sheet of Computer Crimes (Sheet P/P/23) (for each child or shared).

Teaching Notes: The following teaching notes are recommendations based on successful methods used in the past. However each teacher's situation may be different and you are by no means obliged to follow the letter of the notes in every detail. You may use the stories, worksheets, filmstips, slides and tapes in the ways which suit your own classroom environment and in the order which you think would best achieve the aim of helping children to understand the role of information and information handling in the work of the police. Personal involvement is the best way to encourage motivation, so that if you have the opportunity to engage a real policeman, or security man, in talking to the children about his work, do so. Equally if you have the opportunity to visit a police station, a control room or an operations room, use these notes as back-up material for such a visit.
The notes below are copious - this is to help those who are unsure of the material - the space on the left is for your own notes, either to insert comments, or to paraphrase or to alter the sense.

Lesson 1

Revise the course so far, laying emphasis on the role which information has played in the solving of problems. Introduce the idea of the police as an area in which there are many problems and a lot of information to be stored. Ask for some examples. Remind the children of the problems they had when asked to observe - compare the exercise they first had to the job of the policeman on his beat.

The object of the first part of the first lesson is to enable the children to identify with some of the problems which policemen face and to experience some aspects of the job. Starting with the policeman on the beat, it is one of the most important facets of the job that he be observant. Try to elicit this from the children. Observation, however, goes just a little further than recognising physical objects as they are seen, and noticing when all is not as it should be - it involves also knowing something of the background to why objects are where they are, and also, more important, the human factors at work on the beat he patrols every day. Not only should he be able to recognise people when he sees them, but he should also have the ability to read people, notice signs of stress and unusual characteristics.

The policeman on his beat meets thousands of people every day and so he must operate some selection mechanism of his own as to which people and situations are worthy of more consideration than others, and to help him in this he needs information - this he may obtain from others perhaps at the police station and from colleagues, - and experience, knowing how a community ticks and when the ticking is being obstructed or distorted.

Try to get the children to make these points by imagining that they are in the position whereby they have the responsibility for policing their own area of the town. These same points will be made more practically in later exercises, but as an introduction to the problem of observation of people and knowing about them take the sheet entitled 'How much do you know about your friend'. (sheet P/P/1) Point out that there are three levels of knowing a person

i) By noticing physical characteristics

ii) By knowing facts about them at a superficial level eg date of birth, sisters and brothers etc.

iii) By knowing how they feel about things, their opinions hopes and aspirations, and how they would react in certain situations.

The question sheet deals with people at a fairly superficial level and tests the childrens' knowledge of a friend (who, by the nature of the word they should know a lot about) and yet may indicate the difficulty of'knowing' , recognising, and taking for granted. Emphasise that they must not cheat by looking (perhaps an absent friend or a relative would be better) or asking. The exercise is meant to show that, even with friends, information is by no means total, and on the wider subject how difficult it is for a stranger to obtain enough information which would enable him to 'know' the person.

It is not necessary to spend considerable time in following up the exercise - the fact that there are some questions unanswered makes its own point and if the children wish, for their own peace of mind, to find out all the answers, they can do so in their own time.

However make the following points as a debriefing

i) Although we have friends and spend some considerable time with them, we cannot know everything about them. This becomes even more marked as we grow into adulthood and make more friends but probably less close.

ii) The difference between 'knowledge' and 'information' - while we may consider that we know a friend even though we could not answer all the questions about him/her, a perfect stranger could take the form and answer all the questions about the physical appearance of the same person and not know. In this sense he has information but not knowledge while we have knowledge but not necessarily information.

iii) The policeman on the beat will have information about many people on his beat, but knowledge of only a few.

iv) The type of information contained in the top half of the sheet is the sort of factual information which could be put into a computer file and then retrieved. This tells us something about a computer - it contains information, not knowledge, and cannot differentiate between the two. This will be raised again in a later part of the module.

An alternative method of teaching this lesson and which often captures the imagination of the children, is to ask them to draw up a 'WANTED' poster about a friend., without the benefit of a photograph or picture. These can then be collected up and recirculated so that the other children may guess to whom it refers. Follow-up to this can take several forms. For example, for those that are difficult, an elimination technique might be used so that those who do not fit a particular piece of information sit down until either only one is left, or the description has been found inadequate..

Again the same points i) to iv) above can be made with respect to this exercise.

Lesson 2 Television thrillers and police series. The object of this session is to focus more closely on what the children already know, or think they know, about the police by referring to what television produces in the form of entertainment. The point however must be made that this often bears little resemblance to the reality of police work in preparation for the case studies which follow.

See how many police or thriller series the children can name which have been on television during the past few years. Sheet P/P/2 will help with this or List them on the blackboard as they name them. For your reference the following lists those in current issues of the Radio Times and TV Times. Include radio if you feel that you may be running short of topics (although this is unlikely)

Dixon of Dock Green	A Man called Ironside
Z Cars	The Governor and J.J.
Search Control	Barlow
Thriller	The Secret Service
Streets of San Francisco	The Avengers
Police Surgeon	Barnaby Jones
Crown Court	Callan
The Protectors	Hawaii Five -O
Within these Walls	The Saint

There are, of course, many others which if not currently being shown, will undoubtedly be making a return.

Why is it that Police Work is so popular as a spectator sport? Perhaps the children would be able to supply some answers based on the action and possibly violence opportunities in such programmes. Try to turn this short discussion from the superfluousness of the action to the need for information which the main characters have in the programmes, and how the problems are insoluble without the information they receive. Get one of the children to describe the plot of a recent programme - it will probably be very unstructured and a garbled account, but take the plot as it is told to pieces, concentrating on the nature of the problem to be solved and the information which enabled the hero to solve it. How did our hero turn up at the right place at the right time with the right person? Where were his sources of information? In such a discussion, the unlikeliness of the characters and the situations often comes out, and under such scrutiny the sameness of many plots if one ignores the fighting and the local colour is brought out. An analysis of a different episode of the same programme might be attempted. If you are in difficulties with plots the storyline of a recent episode of Z-cars (often called the most realistic of police series) is printed on the sheet entitled '200 Tartan Teddy Bears - a Z Cars plot'. A list of questions which follows may be discussed [illegible] P/P/3 etc.)

For the less able children, the questions on sheet P/P/2 provide a useful summary of the concepts learned in the lesson. Look at the sheet first though since the lesson has a slightly different sequence. A more creative follow-up may involve the writing of their own scripts and even having them acted. Beware of the time taken however.

Lesson 3 Sherlock Holmes Problem Solving Filmstrip. For this part of the module you will need the filmstrip entitled Sherlock Holmes Problem Solving, the tape which accompanies and provides the commentary, and possibly the text of the tape which is given (sheets P/P/5 & P/P/8) at the end of these notes. The object of this exercise is to demonstrate how observation, deduction and knowledge (or experience) taken together can lead to the solving of a mystery, and the filmstrip brings this out well. Should you not wish to use the tape in order perhaps to involve the children more, an alternative method is to have two of the children reading out the text as the filmstrip is shown. The follow-up to the main part of the presentation can take many forms. You may feel that the point is made and not wish to take it any further. As in the television discussion there are great loopholes to be found on a close reading of the narrative. However, there is a connection between the content of the filmstrip and reality which may be taken further. This concerns the information which is needed by any problem solver to come to the right conclusion, and from which to make the right inferences and deductions. In connection with the red earth point you may wish to illustrate how, quite often, such apparently trivial deatails may be highly important, and how the services of specialists who would know the geology of a particular place could be useful to the police in particular types of investigation. You could , having opened up this line of thought,ask the children which other specialist activity might also be useful in a different context. Ideas should come from their own experience of watching television series on police pathologists, fingerprint experts, psychiatrists etc. It is also worth making the point that these are specialists in their own right and that none of them have a sufficient depth of knowledge of all the different needs of police work for evidence. Perhaps, at this stage,you may wish to float the idea of having a machine which stores information of this nature which can be referred to as details are required. This is a point which will be taken up in some detail later in the module when the uses of computers by the police are dealt with. As an example you may wish to refer back to the filmstrip and the 140 types of tobacco ash which Holmes claimed to have identified.

Another aspect of the follow-up may be to attempt to enumerate those area of the text which dealt specifically with information eg

the scratches on the watch
the colour of the earth in Wigmore Street
the ashes of the tobaccoes
the pawnbroker marks
the postcards and stamps
the price and age of the watch.
the initials on the watch

you may wish also to take a personal or classroom object for analysis.

Written exercises if required are relatively easy to imagine. Using personal objects either supplied by the teacher or by other members (unspecified origin) the art of deduction and recording observations is a popular lesson.

Lesson 4

A simulation of the policeman on his beat. This will need some preparation so that a) the beat is set up b) the questions are asked at the return of the 'policeman' and c) the points to look for on the beat (which only some of the children will receive) are printed.

The object of the exercise is twofold

i) to demonstrate how observation is a difficult task when taken at its face value and how the multiplicity of information tends to be ignored.

ii) to show how observation is much improved when one knows what one is looking for and is able to select what is worth noticing.

A third, educational, objective is to increase the appreciation of the children of the policeman's job and hence their involvement with the subject matter of the module.

There are several methods of approach.

Eg 1 - children are given a map of the 'beat' and sent out at two minute intervals in groups of 2, 3 or 4. Thay are given a time to report back at the 'station' (punctuality is a requirement of the policeman). A sheet of questions asking detailed questions about the things they should have noticed is given on return, followed by a discussion of difficulties.

Eg 2 - as in 1 above except that half the children are told beforehand what to look for while the other half are given no specific instructions as before. The difference in test performance is measured.

Eg 3 - a variation of the same whereby the children compose the questions themselves for the next group which arrives.

Conditions may be such that it is unwise to send unsupervised children out of the classroom - compromises will still be successful if the necessary motivation is achieved.

Module 3 Information in Police Work and the Law

Lessons 5 and 6 Case Study. In this case study we hope to get much closer to the heart of a problem, so that the children may understand how to sort out the essential elements from the non-essential, and the information which may be useful from the verbiage. In doing so they will encounter some of the human problems involved in the solving of an investigative problem, and, by learning how difficult it is to be precise in some situations, they should recognise how important accurate information is. Also, while not specifying yet which machines may be used to hold and make available this information, the implication will be that they have a place in the solving of police type problems.

Sheet P/P/9 ' Case Studies in Police work' sets some typical problems and it is suggested that you discuss the first one with the children in some depth. Read through it with the children and make sure that they understand what the issues are. A certain amount of information is given, which of it is important and which is not? Is, for instance the piece of information that the constable was walking by the village church useful in this situation? Or that the woman in the green coat was breathless? Write down a list of the questions on the board as the children suggest them so that the nature of the problem is understood. It may look like this;

Who is the woman in the green coat?
Who is the driver of the car?
Was the accident avoidable?
Who is the small boy?
Is he seriously injured?
What does the policeman do immediately?
Which school did the boy attend?
How fast was the car going when it hit the boy?
Did it hit the boy or did the boy run into it?

By all means prompt the children to ask relevant questions - there are many more possible, but cut off the discussion when you feel that value has been obtained from the session, that is when all the essential points have been made.

Having done this, it is time to make a preliminary sort of the situation. Put the children in the place of the policeman on the spot at the time of the action. He has certain things which he must do immediately. By reference to the questions, ask the children to put them in some order of priority. Point out that some action has to be taken before any of the questions can be answered. What? The suggestions may be as follows;

Get in touch with the police station.(How?)

Take names and addresses of witnesses.
Take name and address of car driver.
Draw a plan of the scene of the accident.(What does he include)
If there is a traffic holdup clear the road.
Clear the traffic jam.
Ask if anyone knows the boy's name.
Find out where the boy has been taken.
Ask about the woman in the green coat(the key witness?)

More suggestions may be forthcoming from the children but these are the essentials. What is the next problem?

You should try to obtain the next course of action from the children as being to identify the boy.(WHy? So that the parents may be informed, and the school etc). So set up the next question to be answered by indicating that the bystanders did not know him and it is the next task of the constable to find out who the boy is? Since it is a schoolday and lunchtime where does he go to find out? One of the people at the accident recognises the school badge the obvious place to visit is the school up the road. So he does. He is shown into the Headmaster's study. What is his problem now? Try to lead the children to the idea of giving a description of the boy, and how this may be more easily said than done.

At this point in the discussion it may be a good idea to follow this line by inviting one of the children to try giving a description of one of his/her classmates, first by specifying who and then without benefit of prior identification so that the children have to guess who is being described. The descriptee could be a teacher or other well-known person, the main restraint being that familiarities known to all are not allowed.(The policeman would not have this knowledge). Obviously policemen are trained to give descriptions but this does not make the problem in this case any easier. You may wish to mention identikit applications here but, since they are to be taken up later in the module, you do not need to spend a lot of time on them.

Back to the problem in the head's study - the constable duly gives his description, a young boy, about 12 or 13 years old, dark hair, blue eyes, round chubby face and wearing a school uniform. Are we any nearer to identifying him? Point out that there are many boys of this description and that this information only serves to exclude perhaps 40 per cent. What other clues are there which the headmaster may use to pinpoint who it is? Encourage the children to write down other pieces of information which may be helpful or write them on the blackboard as follows;

What we know

i) The boy belongs to our school

ii) Doesn't stay to school dinner (probably)

or Isn't on first sitting at dinner (possible but breaking school rule)

or Is playing truant (unlikely to do so in school uniform)

or Has changed dinner sitting with someone (also against school rule)

iii) Lives on the village side of the school (probably)

iv) Not known by bystanders so could be a new boy to the area(possibly)

On the basis of this are there any questions which the children would now like to ask of the constable?(Perhaps they would like to confirm point iv) by asking the condition of the uniform - was it new?)
Is this enough information? What course of action may be taken either to eliminate some of the alternatives or to establish an identity. (You might here mention how a computer with all the school records in it which could be interrogated on this basis would be a useful tool). Ask if any other information might be given about the appearance of the boy,such as whether his hair is straight or curly, (is 'dark' good enough?), does he wear glasses? Has he a big nose. Assuming that the answers to these may be straight hair, neck length, brown, nose medium size and no glasses, point out that we may have eliminated several possibilities but there is still not enough information to solve the problem.
So what are the next set of possibilities? What can the head do now? List the possibilities.

What can be done to find out more information

i) Send a teacher to the hospital

He might be so ill that he can't be seen.
The Teacher doesn't teach everyone - might not know him
The hospital is 10 miles away - takes a long time.

ii) Send all the school to their classes and have a rollcall

Takes a long time
Second sitting dinners would go cold
Some children go home to dinner
Some classes away on a Field Study
Not all the teachers are in school yet

lii) Go to the scene of the accident again and ask witnesses

Too long ago - none about now
They don't know the boy anyway
Takes a long time

iv) Ring up the hospital to ask about the boy

Might not have been booked in
Has not become conscious yet

By this time the children should have seen the nature of the information problem, and this is only the beginning of the investigation into the accident. Assume that course of action iv) was taken. The Head rang the hospital and was given the information that the boy was still unconscious but that on the back of his watch were the initials HLB.

The children will now see that the answer is in sight, but don't let them get away with platitudes about looking up the registers for someone with those initials. This has now become an information storage and retrieval problem. Go through step by step what happens, from asking for the r registers from the secretary(Where are they? are they all where they should be?Don't forget the dinner registers) to the making of the final elimination. How long would this take - ask for a time for each step and add up. How long has the whole process taken? It is now worth making the point that one piece of information can, added to others, help solve a problem but that that problem could not be solved unless records are kept somewhere in a way that people can understand them.

And then, having made the identification, some new courses of action are forced upon the constable. What are they?

to have the parents informed(How? Where are they? What do they have to know?)

to have the hospital informed.(Why? -medical records. Doctor's name etc)

to inform the police station (Why?)

Point out that the obtaining of one piece of information(in this case the name of the accident victim) leads to the communication of the information to other people and places and to the development of other pieces of information - for instance the hospital may, on looking up the medical records,decide that the boy needs special treatment).

This is, of course the first step in the police investigation into the accident. Go back to the list of questions. What is the next one to be answered? Who is the key to the answering of most of them? Indicate that the identity of the lady in the green coat must now be identified since she is the sole witness to the accident. This presents a different problem altogether because there is no record which can be looked up to identify ladies in green coats with dark hair. Since there has already been a lot of discussion about identification, little time need be spent on this but you may wish the children to write down or describe orally how they think this problem may be solved, concentrating on the information available at first and how this may be enlerged.

Lastly, assume that the lady is found and that she gives a graphic description of how the motorist, travelling at 60 miles per hour, knocked

down the boy, who spent a full minute waiting to cross the road which was 12 yards wide at that point.
This brings you on to the question of reliability of descriptions of events and times. Most people are vague about these or very certain and often wrong. The following two exercises may help to illustrate this.

1. Have a watch with a second hand handy. Ask the children to close their eyes and to raise their hands when they think that a minute has passed. (A recent experiment with adults(35) showed that 1 raised his hand after only 8 seconds, 75% before 30 seconds and all before 45 seconds). This helps to illustrate the unreliability of timings when given in evidence.

2. Ask the children to estimate the width of the room, or the length, or a room which they all know. (Ask them to write it down first).
A recent study with magistrates estimated the width of a 12 foot road as between 5 feet and 75 yards(sic) with only 10% within one foot of being right. This might help to illustrate the general unreliablity of distance judgments.
You may wish to point out(if your experiments are successful) that, if people cannot estimate time and distance accurately, how can they estimate speed in mph when this is a function of time/distance.
A classic experiment which demonstarates a third point about the way in which people may be influenced is the metronome experiment. Five people are asked to count the clicks of a metronome many times. Four are 'stooges' and at a predetermined signal they subtract one or add one to the actual number of clicks. All five are asked to say out loud how many clicks they heard. The stooges agree each time whether this is real or not and the 'victim', not wishing to admit to a defeat in hearing soon agrees with the group. You may wish to try this out, but it takes time to set up.

Case Studies 2 to 5 on the sheet may be dealt with in discussion, oryou may ask the children to do some written work on them. They also give an opportunity for small group discussion if the children are mature enough, each group taking a different problem.

Lessons 7, 8 and 9) The Computer in Police Work. This section has two main parts. First of all there is a case study/story of a crime. It is a crime which is solved by the use of the computer in various ways and outlines how computers may be used in the near future in police work. The second part deals with the way in which the Police National Computer Network is being used in this country and how one section of the force, that in the region of the county of Hampshire, is hoping to make use of this and other computer facilities.
The first part is self-explanatory. You will need the sheets entitled 'Is this the way it could happen?' (SHEETS P/P/10 2 11) and it is suggested that you read through the story with the children and then set them loose on the question at the end.

Sources of information. Part 2. Now that the children have read about the possible uses of information machines in the case study/story, they should be well-prepared for a more general approach to the possible applications in police work. If you read the story with them last lesson, it would be a good idea to remind them of its contents, and also to get an impression of their reaction to it.

The object of this next session is to enable the children to appreciate that the machine is nothing more than a tool, an information tool, which helps the policeman to do his job - it can't do the job for him. Perhaps it is worth recalling the four steps of the Sherlock Holmes method which the children saw in the filmstrip, observation, deduction, knowledge(for which you may substitute the word information and experience) and action. Point out that it is the job of the policeman to know, but ask if it is possible for him to know everything. What sort of things might the policeman on your local beat not know - make a list which might look something like this:

the number of the car stolen in Southampton yesterday
the faces of the 500 missing people reported each month
the type of fingerprints of the burglar in the local store
the name of the boy injured in last weeks accident
the reason why his beat is what it is
the names of all the safebreaking experts in his patch
the name of the drunk in the White Lion Hotel
the whereabouts of most roads on his beat
the criminal record of most people on his beat
your name (why?)

You may, as an alternative, treat this by reading out examples like this and asking the children to say or write down 'yes','no', or maybe.

This illustrates that one policeman cannot know everything, but point out that this information is known to someone in the police force. Where would such information be found? Try to extract the idea of the computer holding files of information about all these things, and ask how it can be obtained from the machine. Put the children in the situation of needing information on the spot by identifying with the beat policeman in a problem. Assume that he finds a suspicious looking car parked miles from anywhere and wishes to find out some details. Go through the sequence of events from that point. Put as much detail as possible by insisting on it - write it on the board if necessary.

Policeman finds car.
Uses Communicator to contact the station(What does he say?)
Station Sergeant or clerk looks up local list of stolen cars.

No number there. Says he will contact policeman again.
Rings Computer Department (What does he say?)(Who replies?)
Computer Section Head tells clerk to find number
Clerk enters number into computer(Why?) (How?)
Computer finds details of stolen car (How?)
Clerk brings details to Section Head
Section Head telephones details back to Police Station
Police Station communicates with policeman(What do they say?)

Estimate how long this process has taken from the time the first enquiry was made., then point out that there are some thousands of stolen cars and go through the process again assuming that there is no such thing as the computer.The point should be made that the computer can take five milliseconds to search through a file of five thousand car numbers(a millisecond is a thousandth of a second), but it should also be pointed out that it takes some time for the human operator to enter the number. You may wish to finish off this study by asking what is likely to happen next.

Now take the same problem from the other end. Assume that someone,perhaps a father of the children, reports to the beat policeman that his car has been stolen. What happens next? Go through the sequence of events again to the point where this information is made available to all the police forces of the country, and then compare a system with no computer. (In fact the savings in time are most marked.Previously, before the computer was used, it took eight days for this information to be circulated - it now takes eight minutes...).

This is just one way in which the computer can be used as a tool to help the police in crime-fighting. There are many others. Ask the children to think what sort of information the police must have at their disposal. Ask them to write down lists on some of the following;

The different types of crime eg burglary, parking offences etc)
The different types of people they need to keep information on.

eg	Known offenders (by type)	prisoners in jail, etc
	Private Enquiry agents	shopkeepers by type
	Gun License holders	policemen
	police clerks etc	Local Dignitaries
	Mentally disturbed people	Traffic Wardens
	Suspects	Missing Persons
	Owners of Stolen Vehicles	Magistrates, Solicitors etc
	Security men, nightwatchmen etc	Heads of Companies etc

The equipment which might be used by the police(eg cars, Communicators, identikits,in laboratories, computers)
The different types of job the police as a whole may do.

Point out that all this is information which must be made available when it is required - refer back to the Case Studies as examples where particular information was required at a particular time. Indicate that the computer, as an information storing machine which can quickly make its contents known to the enquirer is probably the most efficient way of keeping this information. Later we shall be looking at a couple of the machines which the police could use.

First, however, let us make a round-up of the police computer applications. (Sheets P/P/12 and P/T/20) You will need the two sheets entitled 'Areas of Police Work in which the computer might be useful'. One of them has blank boxes so that the children can fill them in as you mention the application (or, preferably, as they mention it) - the other is your own reference sheet. There should therefore be enough of the former for the children to have one each. Ask the children to suggest ways by which the computer may help in police work - some of them will have been dealt with in previous work and so they should have some ideas already. As they mention them ask them to enlarge on how and why the computer can help and fill in the sheet. When this has been done, read with the children the piece in the centre about the Police National Computer and the sentences at the bottom about the way in which the Law is administered in this country.

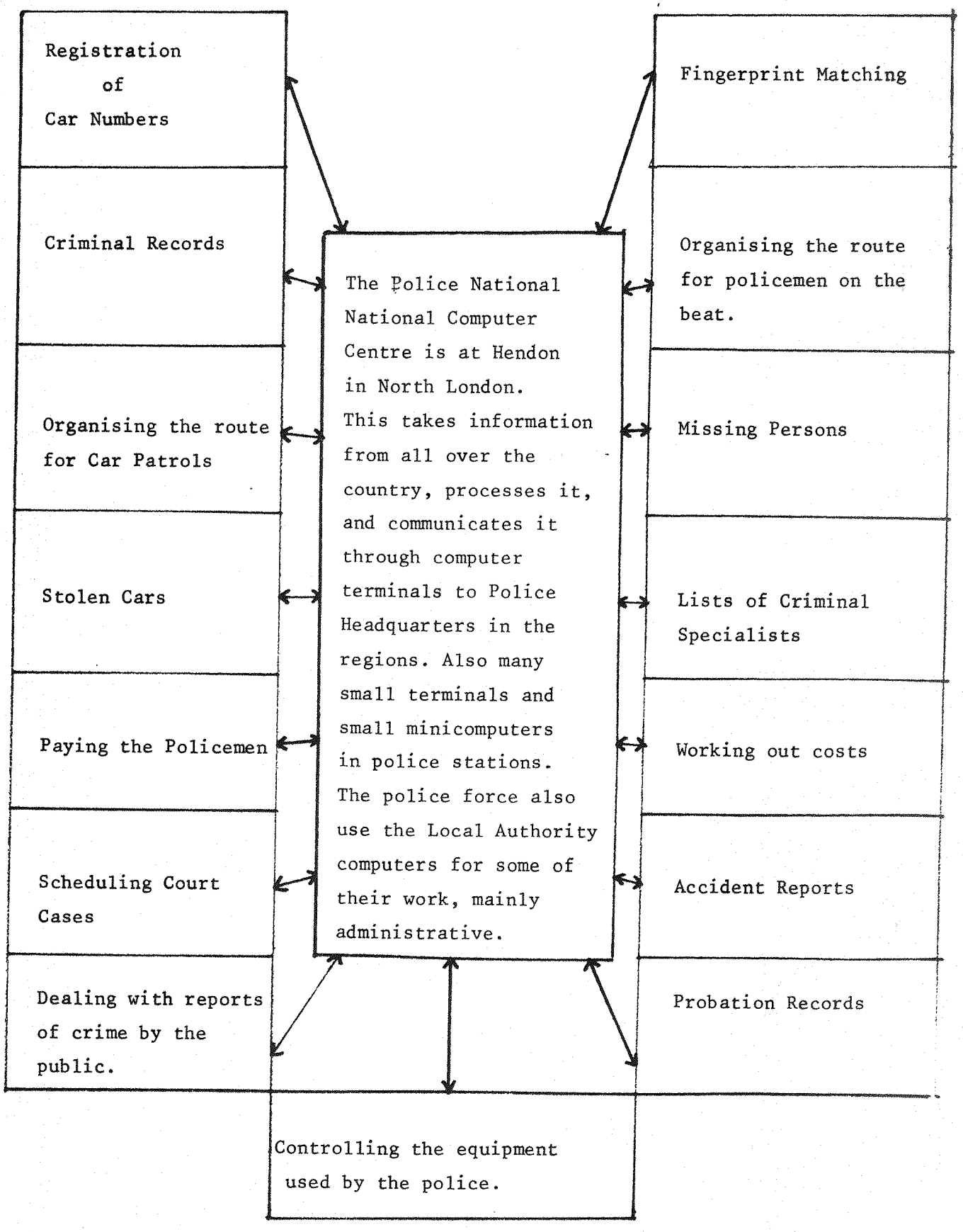
Lastly, to bring home the reality of computers to the children, you should have enough ~~sheets~~ pamphlets of information about the display screen and the teleprinter for one between two, and a sheet of questions to go with the information sheets. (Sheet P/P/13) It is emphasised that these may not be the actual types used by the police but they illustrate the difference between visual display and teleprinter and help to bring home that this sort of equipment can be used in the ways outlined. Since some of the language used in the pamphlets is not easily intelligible to children it is suggested that you look through them together first, pointing out the difference between the methods and explaining how the machines work. There is no necessity for technical detail - the general principles are sufficient, but you may need to explain such terms as light pen, display characters etc and the details of the machine as shown on the pictures of them. When you have done this the work sheets should be handed out and the questions answered by the children. The questions are fairly simple - the difficulty lies in interpreting the language and you will probably be required to give help.

Lesson 10 - The subject matter of 'Computers Don't Argue' concerns the misuse of the computer in police work. In the last three lessons the machine has been presented as the 'good guy', the method of the future which will be of inestimable help to the police in most aspects of their work. Suppose, however, that it was attempted to use the machine as a diagnostic tool - to solve problems without reference to the context in which the questions were asked, or to make decisions on the guilt or otherwise of a person, or even to pass sentence... 'Computers Don't Argue' is a beautifully constructed story written entirely in the form of communications eg letters, telegrams and punched cards, between individuals who use the computer in these ways. It has now been converted to a tape/slide presentation which puts over the concept well but which needs some follow-up to bring out the real message to children. Thus the script itself should also be made available (sheets P/P/14 to 21) for the follow-up - or even during the presentation - and a sheet of questions bringing out the salient points in this script (sheet P/P/22) has been also produced. How the teacher uses this sheet, whether as a reference for his/her own purposes or as a worksheet for the children is a matter of preference. With less able classes it may be necessary to explain as you go through the slides - this, of necessity obviously destroys the continuity of the story, but is preferable to a complete lack of understanding - and it is probably important that this image of the computer as a possible 'bad guy' be established.

Follow-up to this once the story has been understood using the existing sheets and aids could take you right into the realms of databanks and computer privacy - if so let the discussion flow, it is an important thing to know.

Lesson 11 - The last lesson in this module (always assuming of course that the teacher does not wish to add lessons of his/her own) extends the dimension of the computer into crime and points out that it can not only assist in the solving of crime but also help to create a different kind of crime. It makes the further point that modern policemen must be up to date with modern methods of crime. Sheet P/P/23 gives a few examples of computer crime which you may treat as required. It is suggested that you read through them making sure that the children know what has happened and how any system can be abused. You may then follow up by discussing the wider implications some of which are outlined above and/or asking the children to compose their own 'computer crime'.

Areas of Police Work in which the computer might be useful



In fact, the way the Law works in this country means that the activities of the police force and the activities of the courts are entirely separate. It is the job of the police to catch the offender, and the job of the judiciary (the magistrates, lawyers and judges etc.)to deal with the offender. Also the administration of the police force in the non-criminal area is carried out by clerks. The police force therefore would not itself make use of the computer in five of the boxes on the diagram.Which are they?

How much do you know about your friend?

Choose one of your friends. Put his or her name here .....

++++++++++++++++++++++

This is a sheet of questions which you must answer without looking at the friend you have chosen. Since it is a friend of yours you probably reckon to know a lot about him or her. Let's see if you do.....

++++++++++++++++++++++++

Some questions about your friend's physical appearance. How much have you noticed?

1. What colour of eyes?.....2. What colour of hair?.....

3. What colour of shirt(or dress) is he (or she) wearing?.....

4. Has he/she any teeth missing?..... If so, how many?.....

5. What colour shoes is he/she wearing now?.....6. Are they the slip-on or the lace-up type?.....

7. The small areas of pink where the finger nails go into the finger are called half-moons. How many half-moons are visible on your friend's fingers?.....

8. Has he/she a dimple on his/her chin?..... 9. How many fillings has he/she?..... 10.(Boys only) Do your friends sideboards end above the level of his ears, half-way down his ears or below his ears?.....

11. Which is your friend's weakest eye?..... 12. Describe any physical feature which makes your friend different from others.....

13. On the lines below give a description of your friend which would enable him/her to be recognised by someone who has never seen your friend.

.....

.....

.....

++++++++++++++++++++++++++++

Some questions about your friend to which you may know the answers.

14. Date of birth?.....15. Brothers - number..... age(s).....

names.....16. Sisters - number.....age(s).....

name(s).....17. Father's christian name?.....

18. Has he/she a middle name?..... If so, what is it?.....

19. Has he/she ever had an operation?.....If so, what for?.....

20. What illnesses has he/she had?.....

21. What does his father or mother do at work?.....

22. Favourite football team?.....Second favourite?.....

23. Favourite pop singer?.....Second favourite?.....

24. What is his/her ambition when he/she leaves school?.....

25. Favourite school subject?.....Second favourite?.....

26. Where did he/she go for holidays last year?.....

27. What are his/her likes and dislikes? Continue over the page if you wish under the headings "What he/she likes" and "What he/she doesn't like". See if you can

P/C/2

The Police on Television

We know, or think we know, a lot about the work of the police because police series are very popular on television. Do we...?

1. Let's see how popular the police are on television. How many programmes can you name which are either regular programmes now or have been?

1._____ 2_____
3._____ 4._____
5._____ 6._____
7._____ 8._____
9._____ 10._____
11._____ 12._____
13._____ 14._____
15._____ 16._____
17._____ 18._____
19._____ 20._____
21._____ 22._____
23._____ 24._____
25._____ 26._____
27._____ 28._____
29._____ 30._____
31._____ 32._____
33._____ 34._____
35._____ 36._____
37._____ 38._____
39._____ 40._____

2. Let's think why television shows so much about the police. What is your opinion? Complete the sentence below.

Police series are so popular on television because_____

_____

_____

3. What is the missing word below:

To solve a crime a policeman must have I_____.

4. Now let's look at the way that television treats the police. Read the Z-Cars plot. A scene each might be a good idea.

5. From what you have read you will see that coincidence plays a large part in the story (hint:scenes 19,23 and 27). Draw two pictures in the boxes below which might show this.

6. You will also think that some of the characters did some very silly things - things ordinary people would not do. Who? - and what did he do?

Character	What he (or she) did

7. CONCLUSION: In order to solve a crime, real policemen rely on INFORMATION not COINCIDENCE. Next time you see a police story on television, look to see if you can spot the coincidences, and also for people who don't act normally.

200 Tartan Teddy Bears - A Z- cars plot

Scene 1 - a garage . Scotsman (leckie) spraying a van and arguing with friend (Favisham) about the colour needed to make it inconspicuous. During the course of the conversation we learn that he has spent 3 periods in prison and that they intend to stop a van containing 4000 cigarettes.

Scene 2 - Newtown Police Station. A welshman dressed in drab clothes telling Lynch (one of the sergeants at the desk) that a man in a suit has given him the tip that 4000 cigarettes are to be stolen. Asks for money. Lynch says he will see to it if it happens - he is doubtful.

Scene3 - Another part of the Police Station. Quilley (a police constable) on the phone receiving information about another job.Enter 2 old ladies - hear Quilley mention CID sergeant Stone's name on phone and insist on seeing him. Quilley reluctant to see him about the matter.

Scene 4 - Stone's Office. Stone discussing possible cigarette robbery with Lynch and Skinner. Enter Quilley, who mentions phone call and also 2 old ladies.

Scene 5 - Station Desk. Stone comes to talk to ladies, who introduce themselves as Miss Martin and Miss Holtby, flatter Stone on how understanding he is and make a complaint that Miss Holtby has been assaulted.

Scene 6 - The Garage. Leckie and Havisham talk about Havisham's record and we get the impression that he is a beginner to crime impressed with Leckie's ideas on how to make quick money. Leckie's father a bigtime Scottish criminal.

Scene 7 - The Police Station. Stone talks to old ladies. They describe what happened but don't want to give any details.

Scene 8 - Stone's Office. Skinner and Lynch still discussing possible cigarettes robbery. Enter Quilley,drops tea pot.

Scene 9 - Interview Room. Two old ladies complete signing of statements. Enter Stone to ask Miss Holtby to see a doctor to verify complaint. Ladies not keen. The culprit is named as Mr Rubichek, the owner of the local shoemender's shop. Miss Martin confirms that she, too, saw the man.

Scene 10- The garage. Leckie and Havisham discuss the fence who will take the stolen goods.

Scene 11- Mr Rubichek's shop. Mr Rubichek is closing up. Enter Stone, who asks questions to identify Mr Rubichek and then asks him to come to the station. Mr R is unwilling to do so because of his experiences with the police in other countries.

Scene 12- Interview Room at Station. Stone asks questions of Rubichek. Where was he Tuesday? Went to pictures alone. Gets very upset about the accusations about him.

Scene 13- Home of Misses Martin and Holtby. They chat about the situation at the Police Station and the doctor's examination. They say that they will have to move again since they can't live near Rubichek's wife. The bumps and bruises are confirmed by the doctor.

Scene 14- The Police Station. Stone shows Lynch the doctor's report. Lynch says that anything could have caused them. Stone out to get Rubichek.

Scene 15- Rubichek's shop. Rubichek talks to his wife about how he is losing customers because of rumours. Says he didn't even know the woman. Wife upset.

Scene 17- The garage. Leckie and Favisham prepare to leave in van. It won't at first start. One gets the impression that they are a couple of idiots.

Scene 18- The Police Station. Stone enters to tell Lynch that he has been to pictures where they can't remember seeing Rubichek the previous Tuesday. Mrs Rubichek enters and asks to see Mr Stone.

Scene 19- Outdoors on a piece of spare land. Leckie and Favisham drive up to a gate. Favisham waits at a gate five yards away heavily disguised in a colourful scarf. Leckie opens up bonnet of van and peers inside. More chat to himself about how his father had called him an idiot and how he is now going to show him. Man in car stops and offers help - Leckie relieved when he drives away. Yellow van arrives. Leckie waves it down and asks for help. As man is bending over the bonnet Favisham sticks a pipe in his back, says it is a gun and the two of them bundle the driver into the back of the van, tie him up and drive

200 Tartan Bears - a Z Cars story (contd)

Scene 20 - The Police Station. Stone talks to Mrs Rubichek. She tells him of her husband's torture in prison camps and at the hands of the political police in other countries. Pleads that he is a good man and could not have done the assault. Stone points out how prison life and torture does funny things to people and convinces that it was possible. Stone convinced too.

Scene 21 - The garage. Two delighted thieves drive in. They open boxes to look at the cigarettes and find tartan teddy bears instead.They are not pleased.

Scene 22 - Quilley reports to Stone about the hijacking of a van containing Tartan Tartan teddy bears. Skinner, who was watching the van containing the cigarettes is recalled.

Scene 23 - The garage. The final count of Teddy Bears is 200. They discuss how to sell them. Leckie, the mastermind thinks that the fence may still want them.

Scene 24 - The home of the 2 old ladies. They discuss why they have seen nothing in the press. Enter Stone and Lynch, they go over the story again, Lynch looks through window which Miss Martin saw the attack from.

Scene 25 - The Police Station.Quilley and Skinner discuss the theft of the Teddy Bears and make it known that all toy shops are being warned.

Scene 26 - Enter Stone and Lynch. Stone wants to press charges against Rubichek. Lynch points out that Miss Martin could not possibly have seen an attack from the window as they said.

Scene 27 - A toy shop. Enter Leckie with a box of teddy bears. Policeman talking to shop assistant about teddy bears theft. Leckie buys 2 Ludo Boards.

Scene 28 - The police station. Stone and Lynch discuss the recently received criminal background of Misses Martin and Holtby. Stone amazed but now satisfied about Rubichek's innocence. Can't understand why though.

Scene 29 - The garage. Scotsman Leckie drives van away to dump it. At street corner Quilley and Skinner in a patrol car stopped so that Skinner can call in for some cigarettes. Van passes police car, Skinner checks number from his list of stolen cars and they follow.

Scene 30 - Waste Land. Leckie dumps van and is then accosted by Quilley and Skinner. Denies knowledge of van.

Scene 31 - Home of Misses Martin and Holtby. They are accused of fraud and Miss Holtby admits that the story was made up. Won't say why. Taken away to Police Station.

Scene 32.- The garage. Enter Leckie, Skinner and Quilley. Leckie says that is his home but garage belongs to Favisham. Denies knowledge of Teddy Bears but Skinner finds them in cupboard.

Scene 33 - Rubichek's shop. Stone explains that he has been cleared. Mrs R remembers refusing credit to Miss Martin in past thus providing a motive for her nasty rumour. Rubichek upset - he has lost his customers and his wife's confidence. Is not happy when Stone leaves saying 'no harm done'.

That was the story of a recent episode of Z Cars on television. Television is very popular as a place for showing crime series and stories about the police, but we must remember that it is only a story and therefore fiction. There are several places where television fiction conflicts with reality, not least in the way it reduces time scales. Read through the story and list below the coincidences which occurred which would not be likely to happen in real life.

Now look at the characters and point out the things they did which real life people would not be likely to do.

continue on the back if you need to

Text of Sherlock Holmes Filmstrip P/P/S

Most people, young and old alike, have heard of Sir Arthur Conan Doyle's famous fictional detective, Sherlock Holmes. He and his friend, the faithful Doctor Watson, have been the subjects of television series and films for many years, and their popularity has not diminished with age. Sherlock Holmes was a problem solver., and like many problem solvers of today, he would spend many an hour just thinking about all those things which affect the solution to his problem before taking quick and decisive action. He based his technique for solving crimes on just four steps - Knowledge, Observation, Deduction and Action - and in the story which follows we shall see ~~all~~ the first 3 of these steps at work. Perhaps we, too, can learn something about the organisation of our own thoughts by observing the great man in action. Our story begins in London in the late 1800's in the apartments at Baker Street.....

Frame 2 "My practise has recently extended to the continent. I was consulted last week by Francois Duval, who, as you know, has been making quite a mark in the French detective service. He possesses three of the four qualities necessary for the ideal detective; he has a good sense of observation and dedustion, and he knows when to act. The only thing to fault him on is his lack of knowledge and that will no doubt come in time. As a matter of fact he is at this moment translating my small works into French".

Frame 3 "Your works"?

Frame 4 " Oh, yes, didn't you know? Yes, I have been guilty of writing a few monographs. They are all on technical subjects. Here, on this stool is one of them, which I have called 'Upon the distinction between the ashes of the various tobaccoes'. In it, I enumerate 140 forms of cigar, cigarette and pipe tobacco with coloured plates illustrating the differences in the ash. It is a point which is continually turning up in criminal trials and it is often of supreme importance as a clue. If you can say, for example, that some murder was comitted by a man who was in the habit of smoking Indian Lunka it obviously narrows your field of search. To the trained eye there is as much difference between the black ash of a Trincanopoli and the white fluff of a Havana as there is between a cabbage and a carrot. "

Frame 5 " You have an extraordinary genius for isolating the smallest detail."

Frame 6 " I appreciate their imortance in some cases. But perhaps I am wearying you with my little hobby."

Frame 7 " Not at all. It is of the greatest interest to me, especially as I have seen how you put your ideas into practise. But you spoke just now of observation and deduction. Surely, if one can observe, one can also use this without the need for deduction?"

Frame

Frame 8 "Why, hardly. For example, observation shows me that this morning you paid a visit to the Wigmore Street Post Office, but deduction tells me that, when there, you despatched a telegram."

Frame 9 "Right, Holmes. Right all the way. But I must confess I don't see how you arrived at it. It was a sudden impulse on my part and I mentioned it to no-one, not even the housekeeper."

Frame 10 " It is simplicity itself. Indeed it is so absurdly simple that an explanation may bore you. And yet, perhaps it will help to show the difference between observation and deduction. Now, observation tells me that you have a little reddish clay sticking to your left instep. That much is simple. Just opposite Wigmore Street Post Office they have taken up the pavement and thrown up some earth which is difficult to avoid when entering. The earth is of that peculiar reddish tint which is, so far as I know, found nowhere else in the neighbourhood. So much is observation - the rest is deduction."

Frame 11 "But how on earth did you deduce that I sent a telegram?"

Frame 12 " Why, of course I knew that you had not written a letter, since I sat opposite you all morning. I see also in your open desk that there you have a sheet of stamps and a thick bundle of postcards. What could you go into the Post Office for then but to send a wire? Eliminate all other factors and the one which remains is the truth.

Frame 13 " In this case, it certainly was the truth. It certainly sounds so simple when explained like that. However you must still give me leave to doubt your theories. Would you mind if I put them to a more severe test?"

Frame 14 "On the contrary, I would be delighted to look into any problem you wish to put to me."

Frame 15 " I have heard you say that it is difficult for any man to have an object in daily use without leaving some clue as to its ownership. You have further said that a trained observer would be able to detect that owner from observing those clues. Now I have here a watch which has recently come into my possession. Would you be kind enough to let me have your opinion on the late owner and what his character and habits were?" (I handed him the watch with some slight amusement in my heart, for the test was, to my mind, an impossible one and I intended it to teach him a lesson because of the way in which he claimed to know all things. He balanced the watch in his hand, put on a perplexed face as he gazed hard at the dial. Then, with a sigh, he opened up the back and examined the works, first with the naked eye and then with a powerful convex lens. I could hardly keep from smiling as he snapped the case shut and, with crestfallen face, handed the watch back to me.)

Frame 16 "There is hardly any information. The watch has been recently cleaned and that robs me of my most suggestive facts."

Frame 17 "You are right. It was cleaned before being sent to me. (In my heart I accused my companion of making a lame excuse to cover his failure. What information could he expect from a cleaned watch?)

Frame 18 "However, though unsatisfactory, my research has not been entirely barren - subject to your correction, I should judge that the watch belongs to your older brother who inherited it from his father, and yours.

Frame 19 "That you no doubt gathered from the initials HW on the back."(At least I could have expected that information to yield something).

Frame 20 "Quite so. The W suggests your own name. The date of the watch is nearly 50 years back and the initials are as old as the watch - so it was made for the last generation. Jewellery usually descends to the eldest son and he is most likely to have the same name as the father. Your father has, if I remember rightly, been dead many years. It has therefore been in the hands of your eldest brother. "

Frame 21 "Right so far, anything else?"(Ismiled to myself knowing that this was the limit of his deliberations.)

Frame 22 "Hm... He was a man of untidy habits - very untidy and careless - He was left with good prospects, but threw away his fortune. He lived for some time in poverty with occasional short intervals of prosperity, and finally, taking to drink, he died. That is all I can Gather."

Frame 23 "This is unworthy of you, Holmes. I could not have believed that you would descend to this. You must have made enquiries into the private life of my unhappy brother, and now you...you pretend to deduce this knowledge in the most illfitting way. You cannot expect me to believe that you have read this from an old watch. It is unkind, and, to speak plainly, I resent your intrusions into the affairs of my family. "

Frame 24 "My dear doctor. Please accept my apologies. So immersed was I in the problem you set me, I had quite forgotten how personal and painful a thing your brother's death would be. But let me assure you that, until you handed me this watch, I didn't even know that you had a brother."

Frame 25 "Then please would you explain how you come to know all this now?"

Frame 26 "Ah, that is partly good luck. I can only say what is most probably true from the information I have before me. I did not expect to be so accurate."

Frame 27 " Then it was not mere guesswork?'

Frames 26 + "No,no Inever guess. We are given a logical faculty which should avoid our having to guess, if only we will look at the information before us. What

What seems strange to you is only so because you do not follow my train of thought or observe the small facts on which large inferences depend. For example, I began by stating that your brother was careless. Now if you will look carefully at the watch you will observe that, on the lower part, it is dented in two places and also it is cut and marked all over. This can only be the result of keeping other hard objects such as keys and coins in the same pocket. Surely it is no difficult deduction that a man who treats a 50 guinea watch in such a cavalier fashion must be a careless man. Neither is it farfetched to deduce that a man who inherits a valuable article such as that watch is pretty well provided for in other respects. The next point was even more simple. It is customary for pawnbrokers to make a special mark on the inside of the watch when it is brought to them. On this watch there are no less than four such marks visible to my lens. deduction - your brother was often at low water. Secondary deduction - hehad occasional bursts of prosperity otherwise he would never have been able to redeem the pledge. Finally, I ask you to look at the inner plate which contains the keyhole. Look at the thousands of tiny scratches all around the hole - marks where the key has slipped - what sober man's key could have made those scratches? But you will never see a drunkard's watch without them. He winds it up at night and leaves these traces of an unsteady hand. Where is the mystery in all this?"

Last frame. "Why, it is as clear as daylight. I regret the injustice I gave you. I should have had more faith in your marvellous faculties. You have developed your powers of observation and deduction so highly, and you have such great knowledge, that I believe you could solve any problem. If there were a machine into which all this knowledge could be put so that it could be retrieved when it was needed, why,it would be of invaluable help to the detection of crime over all the world..... Perhaps, in the next century, someone will invent such a machine.....

P/P/9

A SHEET OF CASE STUDIES IN POLICE WORK

1. Police Constable William Black was walking by the village church one day when a woman of about 40 with dark hair and wearing a green coat rushed up to him and breathlessly told him that she had seen a boy knocked down at the crossroads five minutes walk away. He hurried to the scene of the accident and found a crowd of people surrounding a small boy, about 11 or 12 years old and wearing a school uniform, who was unconscious at the side of the road. The driver of a car, looking very worried and agitated, came to him, admitted that he had knocked the boy down but said that a woman in a green coat had jumped out into the road and made him swerve into the boy. The woman was nowhere to be seen. Just then an ambulance, called by the driver, came up and toook the boy away on a stretcher to the local hospital. None of the other bystanders had seen the accident. What does PC Black and the rest of the police force do from here?

2. The Police Panda Car was patrolling along the Winchester by-pass when it was overtaken at 70 miles per hour by a fast Mercedes. As they put on speed to catch the miscreant a car in front came out to overtake and by the time the road was clear again the Mercedes had got clean away. The police officer in the passenger seat however was quick-sighted and had obtained the first three letters of its number plate, the rest being obscured by dirt. What can now be done to catch the driver of the Mercedes and how might it be done?

3. Police Sergeant George Carkit was cycling home after a hard night's work. In a field by the side of the road he saw a blue Mini which appeared to be abandoned. He dismounted from his cycle to have a closer look, and found that indeed it was empty and that the number plates had been taken off. Further inspection revealed that the instrument panel was torn out. The farmer who owned the field was surprised to know that there was a Mini in his field. "It wasn't there last night," he said, "I don't rightly know anything about it." Where does George go from here, and what happens next?

4. Detective Sergeant Bill Longman was reading through the Police Gazette and having his mid-morning cup of coffee. The telephone rang. A soft voice at the other end of the line said "There is a suspicious character looking into the back window of number 37 Ranelagh Gardens. He's been around this area for some days now." Who is that speaking?" asked Bill, but the voice had gone. What can Bill do immediately? If he finds out that the call was a hoax? If he finds out that the call was true and needs evidence?

5. The Clerk to the Local County Court was totting up the work schedule for the next month. It came to 15 Breaking and Enterings, 119 cases of illegal parking, 12 other felony cases, 72 speedings, 25 disturbing the peace, 8 drunk and disorderly and 36 other unspecified offences. He had summonses to serve, bails to arrange, pleas of guilty and not guilty to attend to, postal fines to deal with and a lot more.How does he go about it all?

Is this the way it could happen? A crime story P/P/10

The time was shortly after midnight. A burglar moved quietly around the large house looking for an entry point, perhaps a darkened room with an unlocked window. He tried to open one on the ground floor but no luck, it was tightly fastened. He looked up, and of a sudden he saw what he was looking for. A window showing a gap of six inches or so at the bottom was lit up by the fitful moon, and leading up to it was a drain pipe. He climbed quickly and easily, gently lifted the window so that he could enter, and as his eyes became accustomed to the gloom, he tiptoed across the floor to the dressing table. On it there was a radio and an electric razor which disappeared into the black cloth bag he always carried with him on visits of this sort. He opened the top drawer and pocketed the gun lying there, while the handful of brooches, rings and necklaces followed the radio into his bag. In the next room he was equally lucky. A chequbook, two credit cards and a camera completed the haul and within three minutes of entering the house he was descending the drainpipe hand over hand, well pleased with the night's work.

A shock was to greet him as he neared the ground. The owners of the house chose that very moment to return and,as the big car swung into the drive headlights blazing, the burglar was lit up against the white background of the house as if he were singing a song on the stage with spotlights full on him. At first confused, he turned a startled face towards the intruders, dropped the last few feet,and ran blindly off in the opposite direction. The owner gave immediate chase, while his wife ran indoors to dial the police emergency number, 999. As she did so, the Post Office computer identified her number, looked up the address and transmitted it to the Police network computer. The owner returned to comfort his distressed wife, the burglar had got clean away.

Meanwhile, at police headquarters, a flashing light originated by the computer alerted the duty sergeant. He lifted the telephone and, as he did so, a television screen in front of him showed a map of the area surrounding the burgled house together with the name and address of the subscriber. In a brief conversation, the sergeant discovered that only one man was involved, confirmed the address and had a brief description. From the time the emergency call had been started, only one and a half minutes had passed.

A police car was patrolling through the night. A buzzer sounded on the dashboard, specially fitted with a display screen or a teleprinter. This car had been specially chosen by the computer since it was the closest to the crime and was not investigating another incident. The details were displayed in the police car and the driver confirmed that they were understood and that he was on the way to the house. Other police cars in the area were warned to look out for a running man - a brief description followed.

The computer tracks the movements of all police cars. Each car has a small transmitter which continuously puts out a signal indicating its number. These signals are picked up by receivers all over the area. The cars identification number and direction are sent straight to the computer as a coded message so that, at any time, the central computer has the position of each car and a record of the job assigned to it.

The police car arrived at the scene to find the woman in a state of shock. The computer in the car arranged for the ambulance to be on the scene within minutes, and while it was on its way the extent of the damage was assessed.The missing property was listed, and the serial numbers of the gun, the credit cards, the camera and the radio were asked for, The gun was easy - everyone has to have a certificate for possession of fire-arms and this was soon produced. It could be checked with the master file in the morning. The owner had not, however, taken a note of the numbers of the credit cards, so the computer was instructed to ask the credit card company's computer for this and the answer was obtained within a few minutes. At the same time, the serial number was added to a file of numbers of stolen credit cards which is sent out to all the customers of the credit card company. As for the jewellery, the camera and the radio, these were put upon the police lists of stolen goods and sent out to all pawnbrokers weekly. In return, all pawnbrokers have to record all the serial numbers of the articles they receive and this is compared on the computer with the police list of stolen goods.

In this case, however the burglar moved faster than the police were able to. He pawned the radio and the camera by 10 a.m. next morning. By the same evening they had been discovered, and the police were testing them for fingerprints. They also checked the address given to the pawnbroker, but found it to be a false one.

In fact there were several sets of figerprints found on the radio. These were quickly checked by computer against those already on the police files but without much luck. The pawnbroker's prints and those of the houseowner and his wife were found but no other persons. The burglar had worn gloves. In spite of these setbacks the police did not give up. They checked their computer files on description of the man, and against all those crooks who were known to operate in the same way and in the same district. Every time new material on the crime was found, the appropriate files were searched.

But in this instance too little reliable information and too many similar crimes proved too much to make a positive identification. The police had to wait for the man to make a mistake. He had been very lucky so far but this was bound to run out at one time or another.

One week later. a three year old Jaguar car pulled into a petrol station in a town 200 miles away. The driver, wearing a smart suit,asked for 10 gallons of five star petrol and handed over a credit card to pay for it. The garage attendant took it into his office and inserted the card into a notch at the base of his touchtone telephone. This immediately transferred the serial number to the credit card company's computer for checking and suddenly a light flashed above the notch. This could mean only one thing-the credit card was lost or stolen. The attendant glanced through the window of his office. The smartly dressed gentleman was watching him closely. Perhaps he sensed that there was something wrong, for he got into his car as the attendant approached. The attendant asked him where he had obtained the card, and was answered abruptly by exhaust fumes as the Jaguar screeched off into the main road traffic.

Now, the 'alert' routine went into action. The police were informed and given a description of the car, its driver and the number of the credit card which he still clutched in his hand. All nearby patrol cars were warned via their displays, and, while this was going on, a rapid exchange of computer information identified the card as the one stolen in the burglary, listed the stolen items and told the police about the gun. Within twenty seconds, and still only two minutes after the car had left the pump in a hurry, the patrols knew they were after a man who may be armed.

Another minute passed by and on the outskirts of the city, a Jaguar stopped at a red light. Immediately a patrol car drew up across the front, and the chase was over. The computerised police force had proved its worth.....

++

The story you have just read is a fictional story. In nowhere in the world are computers being used to that extent, but it is only a little ahead of its time. The story tells us what computers can be used to do now, this year, if we could afford the time and the money to set them up in this way. It may be that, in the future, they can be employed on even more things than we have told in the story. Just to remind yourselves, read the story again and in the spaces below write down what the computer was used for as you come to it.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

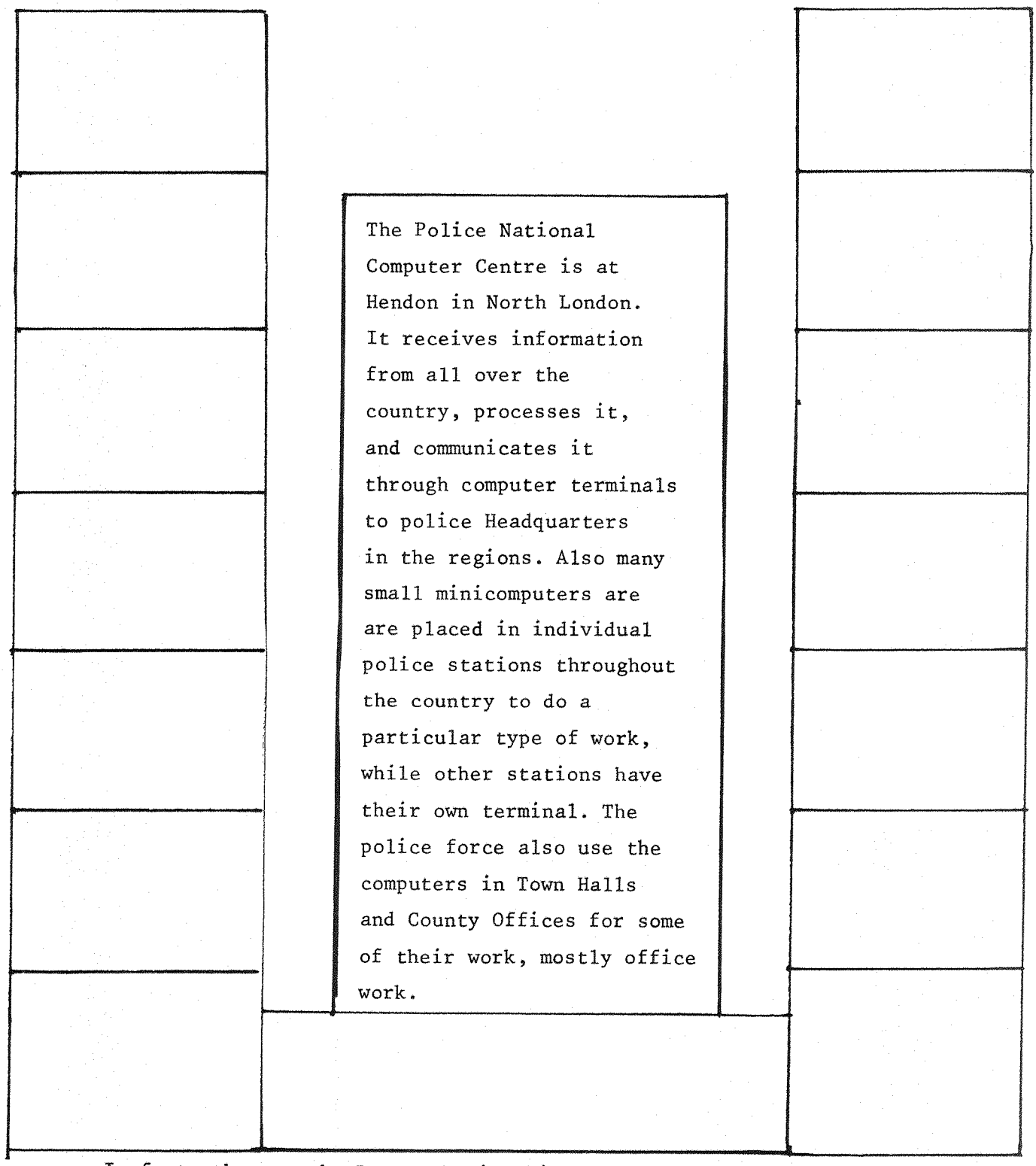
8. _____

9. _____

10 _____

continue over the page if you need to

Areas of Police Work in which the computer might be useful



In fact, the way the Law works in this country means that the activities of the police forces and the activities of the courts are kept entirely separate. It is the job of the police to catch the offender, and the job of the judiciary (that is, the magistrates, lawyers and judges etc) to deal with the offender. The administration of the police force is carried out by clerks and office workers. This means that the police force itself would not make use of the computer in five wf the ways shown in the boxes on the diagram, but they would be affected by it.(After all, they would want to be paid for instance). Can you spot the five boxes which the police themselves would not involve themselves in?

P/P/13

A Question Sheet on the display screen and the teleprinter

The questions on this sheet are fairly simple. They are about two of the machines used by the police to communicate with a computer, that is to ask the computer for information and to read out the computer's reply. You should have two pamphlets in front of you, one about the 3270 Display System and the other about the 2740 Communications Terminal. Don't worry about the numbers - they are merely used to identify a particular type of machine.

++

The 3270 System - a display screen

1. In the box below draw a display terminal. Include the keyboard.

2. Look closely at the picture on the front page. What is on the screen?

3. The lady is holding a 'light pen'. This is a pen which can be used to touch the screen so that the computer knows which part of the information she might want more details of. Suppose she touches the name 'Luckhurst' with her pen. What do you think the computer will show next?

4. What do you think the keyboard might be used for?

5. Describe how you think the Police Station Sergeant might use a display screen like this one and what would he use it for?

The 2740 Communications Terminal

1. What is the difference between this and the display screen. Look at the picture.

2. In the box below draw the terminal.

3. The keyboard is used to key in requests for information. How do you think the answer is obtained from the computer?

4. How many characters per second does the machine type at its fastest?

5. How does the teleprinter communicate with the computer?

P/P/14

Anyone who has had dealings with a book club lately will readily agree with me that this next story is frighteningly plausible.

Computers Don't Argue

Treasure Book Club

PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

Mr.: Walter A. Child Balance: $4·98
Dear Customer: Enclosed is your latest book selection. 'Kidnapped', by Robert Louis Stevenson.

437 Woodlawn Drive
Panduk, Michigan
Nov. 16th, 1965

Treasure Book Club
1823 Mandy Street
Chicago, Illinois

Dear Sirs:

I wrote you recently about the computer punch card you sent, billing me for 'Kim', by Rudyard Kipling. I did not open the package containing it until I had already mailed you my cheque for the amount on the card. On opening the package, I found the book missing half its pages. I sent it back to you, requesting either another copy or my money back. Instead, you have sent me a copy of 'Kidnapped', by Robert Louis Stevenson. Will you please straighten this out?

I hereby return the copy of 'Kidnapped'.

Sincerely yours,
Walter A. Child

Treasure Book Club

SECOND NOTICE
PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

Mr.: Walter A. Child Balance: $4·98
For 'Kidnapped', by Robert Louis Stevenson
(If remittance has been made for the above, please disregard this notice)

437 Woodlawn Drive
Panduk, Michigan
Jan. 21st, 1966

Treasure Book Club
1823 Mandy Street
Chicago, Illinois

Dear Sirs:

May I direct your attention to my letter of November 16th, 1965? You are still continuing to dun me with computer punch cards for a book I did not order. Whereas, actually, it is your company that owes *me* money.

Sincerely yours,
Walter A. Child

Treasure Book Club
1823 Mandy Street
Chicago, Illinois
Feb. 1st, 1966

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Dear Mr. Child:

We have sent you a number of reminders concerning an amount owing to us as a result of book purchases you have made from us. This amount, which is $4·98, is now long overdue.

This situation is disappointing to us, particularly since there was no hesitation on our part in extending you credit at the time original arrangements for these purchases were made by you. If we do not receive payment in full by return mail, we will be forced to turn the matter over to a collection agency.

Very truly yours,
Samuel P. Grimes
Collection Mgr.

437 Woodlawn Drive
Panduk, Michigan
Feb. 5th, 1966

Dear Mr. Grimes:

Will you stop sending me punch cards and form letters and make me some kind of a direct answer from a human being?

I don't owe you money. *You* owe me money. Maybe I should turn your company over to a collection agency.

Walter A. Child

FEDERAL COLLECTION OUTFIT

88 Prince Street
Chicago, Illinois
Feb. 28th, 1966

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Dear Mr. Child:

Your account with the Treasure Book Club of $4·98 plus interest and charges has been turned over to our agency for collection. The amount due is now $6·83. Please send your cheque for this amount or we shall be forced to take immediate action.

Jacob N. Harshe
Vice-President

FEDERAL COLLECTION OUTFIT

88 Prince Street
Chicago, Illinois
April 8th, 1966

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Dear Mr. Child:

You have seen fit to ignore our courteous requests to settle your long overdue account with Treasure Book Club, which is now, with accumulated interest and charges, in the amount of $7·51.

If payment in full is not forthcoming by April 11th, 1966 we will be forced to turn the matter over to our attorneys for immediate court action.

Ezekiel B. Harshe
President

MALONEY, MAHONEY,
MACNAMARA and PRUITT
Attorneys

89 Prince Street
Chicago, Illinois
April 29th, 1966

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Dear Mr. Child:

Your indebtedness to the Treasure Book Club has been referred to us for legal action to collect.

This indebtedness is now in the amount of $10·01. If you will send us this amount so that we may receive it before May 5th, 1966, the matter may be satisfied. However, if we do not receive satisfaction in full by that date, we will take steps to collect through the courts.

I am sure you will see the advantage of avoiding a judgment against you, which as a matter of record would do lasting harm to your credit rating.

Very truly yours,
Hagthorpe M. Pruitt, Jr.
Attorney-at-law

437 Woodlawn Drive
Panduk, Michigan
May 4th, 1966

Mr. Hagthorpe M. Pruitt, Jr.
Maloney, Mahoney, MacNamara and Pruitt
89 Prince Street
Chicago, Illinois

Dear Mr. Pruitt:

You don't know what a pleasure it is to me in this matter to get a letter from a live human being to whom I can explain the situation.

The whole matter is silly. I explained it fully in my letters to the Treasure Book Company. But I might as well have been trying to explain to the computer that puts out their punch cards, for all the good it seemed to do. Briefly, what happened was I ordered a copy of 'Kim', by Rudyard Kipling, for $4·98. When I opened the package they sent me, I found the book had only half its pages, but I'd previously mailed a cheque to pay them for the book.

I sent the book back to them asking either for a whole copy or my money back. Instead, they sent me a copy of 'Kidnapped', by Robert Louis Stevenson—which I had not ordered; and for which they have been trying to collect from me.

Meanwhile, I am still waiting for the money back that they owe me for the copy of 'Kim' that I didn't get. That's the whole story. Maybe you can help me straighten them out.

Relievedly yours,
Walter A. Child

PS.: I also sent them back their copy of 'Kidnapped', as soon as I got it, but it hasn't seemed to help. They have never even acknowledged getting it back.

MALONEY, MAHONEY
MACNAMARA and PRUITT
Attorneys

89 Prince Street
Chicago, Illinois
May 9th, 1966

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Dear Mr. Child:

I am in possession of no information indicating that any item purchased by you from the Treasure Book Club has been returned.

I would hardly think that, if the case had been as you stated, the Treasure Book Club would have retained us to collect the amount owing from you.

If I do not receive your payment in full within three days, by May 12th, 1966, we will be forced to take legal action.

Very truly yours,
Hagthorpe M. Pruitt, Jr.

COURT OF MINOR CLAIMS
Chicago, Illinois

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Be informed that a judgment was taken and entered against you in this

court this day of May 26th, 1966, in the amount of $15·66 including court costs.

Payment in satisfaction of this judgment may be made to this court or to the adjudged creditor. In the case of payment being made to the creditor, a release should be obtained from the creditor and filed with this court in order to free you of legal obligation in connection with this judgment.

Under the recent Reciprocal Claims Act, if you are a citizen of a different state, a duplicate claim may be automatically entered and judged against you in your own state so that collection may be made there as well as in the State of Illinois.

COURT OF MINOR CLAIMS
Chicago, Illinois

PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

Judgment was passed this day of May 27th, 1966, under Statute $15·66
Against: Child, Walter A. of 437 Woodlawn Drive, Panduk, Michigan.
Pray to enter a duplicate claim for judgment

In: Picayune Court—Panduk, Michigan
For Amount: Statute 941

437 Woodlawn Drive
Panduk, Michigan
May 31st, 1966

Samuel P. Grimes
Vice-President, Treasure Book Club
1823 Mandy Street
Chicago, Illinois

Grimes:

This business has gone far enough. I've got to come down to Chicago on business of my own tomorrow. I'll see you then and we'll get this straightened out once and for all, about who owes what to whom, and how much!

Yours,
Walter A. Child

From the desk of the Clerk
Picayune Court

June 1st, 1966

Harry:

The attached computer card from Chicago's Minor Claims Court against A. Walter has a 1500-series Statute number on it. That puts it over in Criminal with you, rather than Civil, with me. So I herewith submit it for your computer instead of mine. How's business?

Joe

CRIMINAL RECORDS
Panduk, Michigan
PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

Convicted: (Child) A. Walter
On: May 26th, 1966
Address: 437 Woodlawn Drive
Panduk, Mich.
Crim: Statute: 1566 (Corrected) 1567
Crime: Kidnap
Date: Nov. 16th, 1965
Notes: At large. To be picked up at once.

POLICE DEPARTMENT, PANDUK, MICHIGAN. TO POLICE DEPARTMENT CHICAGO, ILLINOIS. CONVICTED SUBJECT A. (COMPLETE FIRST NAME UNKNOWN) WALTER, SOUGHT HERE IN CONNECTION REF. YOUR NOTIFICATION OF JUDGMENT FOR KIDNAP OF CHILD NAMED ROBERT LOUIS STEVENSON, ON NOV. 16TH, 1965. INFORMATION HERE INDICATES SUBJECT FLED HIS RESIDENCE, AT 437 WOODLAWN DRIVE, PANDUK, AND MAY BE AGAIN IN YOUR AREA.

POSSIBLE CONTACT IN YOUR AREA: THE TREASURE BOOK CLUB, 1823 MANDY STREET, CHICAGO, ILLINOIS. SUBJECT NOT KNOWN TO BE DANGEROUS. PICK UP AND HOLD, ADVISING US OF CAPTURE . . .

TO POLICE DEPARTMENT, PANDUK, MICHIGAN. REFERENCE YOUR REQUEST TO PICK UP AND HOLD A. (COMPLETE FIRST NAME UNKNOWN) WALTER, WANTED IN PANDUK ON STATUTE 1567, CRIME OF KIDNAPPING.

SUBJECT ARRESTED AT OFFICES OF TREASURE BOOK CLUB, OPERATING THERE UNDER ALIAS WALTER ANTHONY CHILD AND ATTEMPTING TO COLLECT $4·98 FROM ONE SAMUEL P. GRIMES, EMPLOYEE OF THAT COMPANY.

DISPOSAL: HOLDING FOR YOUR ADVICE.

P/P/18

POLICE DEPARTMENT PANDUK, MICHIGAN TO POLICE DEPARTMENT CHICAGO, ILLINOIS

REF: A. WALTER (ALIAS WALTER ANTHONY CHILD) SUBJECT WANTED FOR CRIME OF KIDNAP, YOUR AREA, REF: YOUR COMPUTER PUNCH CARD NOTIFICATION OF JUDGMENT, DATED MAY 27TH, 1966. COPY OUR CRIMINAL RECORDS PUNCH CARD HEREWITH FORWARDED TO YOUR COMPUTER SECTION.

CRIMINAL RECORDS
Chicago, Illinois

PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

SUBJECT (CORRECTION—OMITTED RECORD SUPPLIED)
APPLICABLE STATUTE NO. 1567
JUDGMENT NO. 456789
TRIAL RECORD: APPARENTLY MISFILED AND UNAVAILABLE
DIRECTION: TO APPEAR FOR SENTENCING BEFORE JUDGE JOHN ALEXANDER MCDIVOT, COURTROOM A JUNE 9TH, 1966

From the Desk of
Judge Alexander J. McDivot

June 2nd, 1966

Dear Tony:

I've got an adjudged criminal coming up before me for sentencing Thursday morning—but the trial transcript is apparently misfiled.

I need some kind of information (Ref: A. Walter—Judgment No. 456789, Criminal). For example, what about the victim of the kidnapping. Was victim harmed?

Jack McDivot

June 3rd, 1966

Records Search Unit
Re: Ref: Judgment No. 456789—was victim harmed?

Tonio Malagasi
Records Division

June 3rd, 1966

To: United States Statistics Office
Attn: Information Section
Subject: Robert Louis Stevenson
Query: Information concerning

Records Search Unit
Criminal Records Division
Police Department
Chicago, Ill.

June 5th, 1966

To: Records Search Unit
Criminal Records Division
Police Department
Chicago, Illinois

Subject: Your query re Robert Louis Stevenson (File no. 189623)
Action: Subject deceased. Age at death, 44 yrs. Further information requested?

A. K.
Information Section
U.S. Statistics Office

June 6th, 1966

To: United States Statistics Office
Attn: Information Division
Subject: RE: File no. 189623
No further information required.

Thank you.
Records Search Unit

Criminal Records Division
Police Department
Chicago, Illinois

June 7th, 1966

To: Tonio Malagasi
Records Division
Re: Ref: Judgment No. 456789—victim is dead.

Records Search Unit

June 7th, 1966

To: Judge Alexander J. McDivot's Chambers
Dear Jack:
Ref: Judgment No. 456789. The victim in this kidnap case was apparently slain.

From the strange lack of background information on the killer and his victim, as well as the victim's age, this smells to me like a gangland killing. This for your information. Don't quote me. It seems to me, though, that Stevenson—the victim—has a name that rings a faint bell with me. Possibly, one of the East Coast Mob, since the association comes back to me as something about pirates—possibly New York dockage hijackers—and something about buried loot.

As I say, above is only speculation for your private guidance.

Any time I can help . . .

Best,
Tony Malagasi
Records Division

MICHAEL R. REYNOLDS
Attorney-at-law

49 Water Street
Chicago, Illinois
June 8th, 1966

Dear Tim:

Regrets: I can't make the fishing trip. I've been court-appointed here to represent a man about to be sentenced tomorrow on a kidnapping charge.

Ordinarily, I might have tried to beg off, and McDivot, who is doing the sentencing, would probably have turned me loose. But this is the damndest thing you ever heard of.

The man being sentenced has apparently been not only charged, but adjudged guilty as a result of a comedy of errors too long to go into here. He not only isn't guilty—he's got the best case I ever heard of for damages against one of the larger Book Clubs headquartered here in Chicago. And that's a case I wouldn't mind taking on.

It's inconceivable—but damnably possible, once you stop to think of it in this day and age of machine-made records—that a completely innocent man could be put in this position.

There shouldn't be much to it. I've asked to see McDivot tomorrow before the time for sentencing, and it'll just be a matter of explaining to him. Then I can discuss the damage suit with my freed client at his leisure.

Fishing next weekend?

Yours,
Mike

MICHAEL R. REYNOLDS
Attorney-at-law

49 Water Street
Chicago, Illinois
June 10th

Dear Tim:

In haste—

No fishing this coming week either. Sorry.

You won't believe it. My innocent-as-a-lamb-and-I'm-not-kidding client has just been sentenced to death for first-degree murder in connection with the death of his kidnap victim.

Yes, I explained the whole thing to McDivot. And when he explained his situation to me, I nearly fell out of my chair.

It wasn't a matter of my not convincing him. It took less than three minutes to show him that my client should never have been within the walls of the County Jail for a second. But—get this—McDivot couldn't do a thing about it.

The point is, my man had already been judged guilty according to the computerized records. In the absence of a trial record—of course there never was one (but that's something I'm not free to explain to you now)—the judge has to go by what records are available. And in the case of an adjudged prisoner, McDivot's only legal choice was whether to sentence to life imprisonment, or execution.

The death of the kidnap victim, according to the statute, made the death penalty mandatory. Under the new laws governing length of time for appeal, which has been shortened because of the new system of computerizing records, to force an elimination of unfair delay and mental anguish to those condemned, I have five days in which to file an appeal, and ten to have it acted on.

Needless to say, I am not going to monkey with an appeal. I'm going directly to the Governor for a pardon—after which we will get this farce reversed. McDivot has already written the governor, also, explaining that his sentence was ridiculous, but that he had no choice. Between the two of us, we ought to have a pardon in short order.

Then, I'll make the fur fly . . .

And we'll get in some fishing.

Best,
Mike

OFFICE OF THE
GOVERNOR OF ILLINOIS

June 17th, 1966

Mr. Michael R. Reynolds
49 Water Street
Chicago, Illinois

Dear Mr. Reynolds:

In reply to your query about the request for pardon for Walter A. Child (A. Walter), may I inform you that the Governor is still on his trip with the Midwest Governors Committee, examining the Wall in Berlin. He should be back next Friday.

I will bring your request and letters to his attention the minute he returns.

Very truly yours,
Clara B. Jilks
Secretary to the Governor

June 27th, 1966

Michael R. Reynolds
49 Water Street
Chicago, Illinois

Dear Mike:

Where is that pardon?

My execution date is only five days from now!

Walt

June 29th, 1966

Walter A. Child (A. Walter)
Cell Block E
Illinois State Penitentiary
Joliet, Illinois

Dear Walt:

The Governor returned, but was called away immediately to the White House in Washington to give his views on interstate sewage.

I am camping on his doorstep and will be on him the moment he arrives here.

Meanwhile, I agree with you about the seriousness of the situation. The warden at the prison there, Mr. Allen Magruder will bring this letter to you and have a private talk with you. I urge you to listen to what he has to say; and I enclose letters from your family also urging you to listen to Warden Magruder.

Yours,
Mike

June 30th, 1966

Michael R. Reynolds
49 Water Street
Chicago, Illinois

Dear Mike: (This letter being smuggled out by Warden Magruder)

As I was talking to Warden Magruder in my cell, here, news was brought to him that the Governor has at last returned for a while to Illinois, and will be in his office early tomorrow morning, Friday. So you will have time to get the pardon signed by him and delivered to the prison in time to stop my execution on Saturday.

Accordingly, I have turned down the Warden's kind offer of a chance to escape; since he told me he could by no means guarantee to have all the guards out of my way when I tried it; and there was a chance of my being killed escaping.

But now everything will straighten itself out. Actually, an experience as fantastic as this had to break down sometime under its own weight.

Best,
Walt

FOR THE SOVEREIGN
STATE OF ILLINOIS

I, Hubert Daniel Willikens, Governor of the State of Illinois, and invested with the authority and powers appertaining thereto, including the power to pardon those in my judgment wrongfully convicted or otherwise deserving of executive mercy, do this day of July 1st, 1966, announce and proclaim that Walter A. Child (A. Walter) now in custody as a consequence of erroneous conviction upon a crime of which he is entirely innocent, is fully and freely pardoned of said crime. And I do direct the necessary authorities having custody of the said Walter A. Child (A. Walter) in whatever place or places he may be held, to immediately free, release, and allow unhindered departure to him . . .

P/P/21

Interdepartmental Routing Service

PLEASE DO NOT FOLD, MUTILATE,
OR SPINDLE THIS CARD

Failure to route Document properly.
To: Governor Hubert Daniel Willikens
Re: Pardon issued to Walter A. Child, July 1st, 1966

Dear State Employee:

You have failed to attach your Routing Number.

PLEASE: Resubmit document with this card and form 876, explaining your authority for placing a TOP RUSH category on this document. Form 876 must be signed by your Departmental Superior.

RESUBMIT ON: Earliest possible date ROUTING SERVICE office is open. In this case, Tuesday, July 5th, 1966.

WARNING: Failure to submit form 876 WITH THE SIGNATURE OF YOUR SUPERIOR may make you liable to prosecution for misusing a Service of the State Government. A warrant may be issued for your arrest.

There are NO exceptions. YOU have been WARNED.

COMPUTERS DON'T ARGUE P/P/22

You have just seen and heard a story about the use of computers in police work. Computers can be very helpful in all sorts of ways but when they are not used in the way for which they were intended many problems arise - they might not be as drastic as the ones you have just seen, but they are problems nevertheless. Let's have a closer look at this story to see how Mr Child finally met his end....

****

1. On what date did he first write his letter?..... 2. Which book did he really want?..... 3. Who wrote this book?.....

4. Which book did he receive?..... 5. By whom?.....

6. What else was wrong with it?.....

7. What did he want from the Treasure Book Club?.....

8. What did the Treasure Book Club want from him?.....

9. What makes you think that Walter A Child was writing not to a person but to a computer?.....

10. Who was right and how do you think the mistake occurred?.....

.....

11. Why did the amount he was supposed to owe keep on rising?.....

.....

12. To which organisations did the following people belong?

a) Ezekiel B Harshe? .....b) Tonio Malagasi.....

c) Hagthorpe M pruitt?.....d) A.K. .....

e) Michael R Reynolds?.....f) Clara B Jilks.....

13.What could Walter A Child have done to avoid all this trouble?.....

14. How much did the Court of Minor Claims fine Walter?.....

15. How did it try to help him pay?.....

16. Look at the punched card sent by the Court of Minor Claims. There is a serious error on it . What is it?.....

17. Did the clerk of the Picayune Court look at the card closely enough?..... What mistake did he make?.....

18. How did Walter A Child's name come to be changed?.....

19. Why did the police department think that he had kidnapped a child?.....

.....

20. What did they think the child's name was?.....

21. Who wanted to know more about Walter A Child's background so that he could administer justice and why?.....

22. What question did he ask?.....

23. How did the police find out that Robert Louis Stevenson is dead?.....

..... 24. Read Tonio Malagasi's report to the judge. What might be the significance of 'buried loot' and 'East Coast mob'?.....

..... 25. How did Walter A Child become sentenced to death?....

..... 26. Why was there only a short time to appeal against the death sentence?(See M R Reynolds' letter).....

27. Why was it difficult to get the Governor?.....

28. Did he get his pardon?..... 29. What went wrong?.....

..... 30. On the back of this sheet say why you think the computer was misused - and what should have been done to avoid this tragedy.

Computer Fraud and Embezzlement - some Case Histories

We have seen so far how the computer can be used by the police to help in their work. We have also seen how it can be misused by the police. Other people can misuse it too. These are true stories of how some people have used the computer to commit crimes - the modern police force has to be up to date with all the latest technology in order to detect crimes of this sort.

****

Case History 1

An American Bank was going over to a new mwthod of computerising their customers' records. For a long time the money they pay out in the form of cheques has been automatically taken from their accounts by using a machine which can read the account number written on the cheque (ask your teacher if he or she has a cheque book - look for the account number - it is written in a special magnetic ink which a special reader can detect). This bank thought that it would also be a good idea to use the same principle for payments in, so they had the account numbers printed in special ink on the paying in books of their customers so that their accounts could quickly and automatically be credited with the money they brought in. Now, most banks also keep a stack of paying in forms on the counter so that customers who forget to bring their books can use these instead. One customer had a bright idea. He removed all the forms from the counter and substituted those from his own paying in book. Forgetful customers, not knowing any different,automatically picked up the bank form, filled in the amount they were paying in and presented this to the bank clerk. Because they had the special number on them they were automatically and quickly entered into the account for that number - ie our bright customer's account. He came into the bank the following day, withdrew 50,000 dollars and was never seen again.,....

Case History 2

A programmer is a person who writes the instructions which tell the computer what to do. One programmer employed by a bank had a bright idea. He noticed that when you multiply and divide numbers you often get a remainder which comes to more than two places of decimals. So he wrote the program which worked out the customers accounts and arranged that any figures after the hundredths column should be paid into his own account. He was only entering thousandths of a penny in but when a bank does thousands of these transactions every day, the odd figures soon mount up. He soon had many thousands of pounds in his own account, and of course there was nothing wrong with the other accounts either.-.....

Case History 3

Ask your teacher to show you a credit card and explain how it works - note that it has the signature of its owner so that any purchases can be checked against the signature of the buyer. A gang of thieves robbed a train - in one of the sacks they found a consignment of thousands of unsigned credit cards. In the other sacks there was about 98 pounds in money. What did they do? They kept the money and threw the credit cards away.....

S. U. Theses
M. Phil 1974 Longworth

M/T/1

MODULE 4

THE COMPUTER - AN INFORMATION MACHINE

SOUTHAMPTON LIBRARY UNIVERSITY

16-108563

Module 4 - The Computer - An Information Machine

Introduction: It is inevitable that, in a course on Information, one should eventually need to describe the machine which is responsible for its storage, processing, retrieval and proliferation. This module is intended to fill a gap in the information story insofar as the children themselves will want to know more how the computer works and what it may be used for.

It is recognised that many teachers unfamiliar with teaching about technical topics or who know nothing at all about the internal functions of a machine as complex as the computer would approach the content of this module with a certain amount of trepidation. Certainly it is does not lend itself to the more didactic approach of some classroom environments in which the teacher knows, or appears to know, all while the children have the facts presented to them - unless of course the teacher has some special knowledge obtained from personal reading or from attendance at a course. Many teachers do not have this and so the module is written in such a way that it is not necessary to learn great quantities of factual material about computing and computers before teaching it - rather this is a joint effort between teacher and children to understand some of the bits and pieces which go together inside a computer, wrapped around a presentation sheet which makes sense of them.

The computer can be a hideously complicated and specialised subject of study fit only for the peculiar type of brain which is capable of understanding its jargon and its logical processes, or it can be a simple piece of machinery built to perform simple conceptual tasks such as taking information in, processing it and making it available for retrieval. This module employs the second approach, using bits and pieces which are fairly easily identified to build up a concept of the input-processing- output functions of the machine. Worksheets incorporated into the lesson help to emphasise the essential simplicity of the machine and jargon is reduced to a minimum. Do not allow the myths surrounding the computer industry or the apparent confusion of electronic bits and pieces to distract you - they are only the means to an end, that of understanding the simple nature of the machine which handles the information which is the subject of the course as a whole.

The module deals with four different aspects of the computer in four distinctly separate lessons which may be taught consecutively or interspersed among the rest of the course as the teacher sees fit.

Lesson 1 (which takes longer than one week) deals with the computer as an information tool, using bits and pieces of scrap computer and worksheets to construct a picture of the concepts by which the machine performs its function as such. The teaching notes explain what the bits and pieces are - there is no need to pretend that you know all about them - this is a joint effort between you and your class.

Lesson 2 looks at the people who work with computers, finds out by means of some mock-logical questions what sort of personal attributes they need and discusses some of the jobs they perform in their different capacities.

Module 4 - The Computer - An Information Machine

Lesson 3 looks at the growth of computer technology over the past twenty years, discusses its implications on the world in which we live and expands into the impact of change on the world of the future.

Lesson 4 deals with the uses of computers in the context of our everyday activities and discovers that whatever we do there is a computer involved somewhere whether or not we can see it (and more often than not we cannot). It then deals briefly with the possible uses of computers in the future.

Four lessons which attempt to put the information machine into its place in our contemorary society, and which afford the possibility of much creative follow-up work.

Material needed

For lesson 1 - A box of bits and pieces from scrap computers containing

a piece of ferrite core storage
several 80 column punched cards
a length of punched paper tape
a magnetic tape reel
a magnetic tape head assembly
a magnetic disk pack
a magnetic disk read/write head
a length of 24 or 16 channel computer wire
a piece of computer printout paper
a print wheel (M/V/1)

.. A set of slides of the above plus other bits and pieces. (M/V/2)

.. A blank version of the 'Input-Processing-Output' Diagram (M/P/1)
(completed version in Teaching Notes page M/T/17)

.. Worksheet 'How does a computer store information?' (M/P/2)

.. A message in computer code - (M/P/3)

.. Work sheet 'The Information Machine and its peripherals' (M/P/4)

.. Peripheral Units attached to the Computer - 5 worksheets (M/P/5 to 9)

.. Pamphlets for the above worksheets (M/V/3).

For lesson 2

.. Can you answer these? - worksheet (M/P/10)

.. Slides of Card Punch and Operator (M/V/4)

.. The Programmers (pamphlet) (M/V/5)

.. ~~How does a~~ Would you be a programmer ~~program~~? - worksheets (M/P/11 and 12)

..Diagram of a typical company organisation (M/T/25)

.. Diagram of the work of a Systems Analyst (M/T/26)

(These last two may be made into OHP transparencies)

.. Diagram of the work of the Operator (M/T/23)

.. Diagram of the work of the programmer.(M/T/24)

Module 4 - The Computer - An Information Machine

For lesson 3

.. Further bits and pieces comprising:
   a first generation valve holder and valve
   a second generation SMS card with transistors etc.
   a third generation SLT Card with integrated circuits.
   (M/V/6)

.. Uncompleted 'Input-Processing-Output Cycle' Diagram (M/P/1)
.. Eniac (Electronic Numerical Integrator and Calculator) (M/P/13)
.. Booklet 'More About Computers' (M/V/7)
.. A few questions about Technology 'How things have changed ~~Where are we going?~~' (M/P/14)

For lesson 4

.. 'What did you do today?' sheet
.. Transparencies - Computer Applications (M/V/9-15)
.. Worksheets (4) ' How Computers are used in...' (M/P/15 to 18)
.. Set of Applications pamphlets (M/V/8)
.. Pamphlet or transparency on Point-of-Sale Terminal (M/V/9)
.. Predictions - Is this What the Computer will do? (M/P/19)
.. What do you think of these? (M/P/20)
.. Transparencies 'What did you ~~do today~~ purchase yesterday?' M/T/37
   'Manufacturing Information held on Computer Files' ~~M/V/10~~
   'Work out for ...' M/T/38
   M/T/39

Teaching Notes These notes are presented in the form of four lessons. However, most of these take longer than the hour you have set aside and the word 'lesson' is here used in the sense that it forms a set of teaching material which may take more than one week to teach. Again the approach is a recommended one - change it if you feel so inclined.

Lesson 1 For this you will need the box of bits and pieces (M/V/1) as your main demonstration objects, and also a slide projector with the slides (M/V/2) of those bits and pieces which are not in your box. The lesson has three major parts A) to C) as outlined in the following notes.

A.) Introduction and link to previous lesson. In this lesson you are bringing the computer as a storage and retrieval tool into the picture formally for the first time. The first part of the lesson therefore is devoted to establishing the knowledge which the children already have about the machine, either from the previous lessons in the course or from their own exposure to the media. In effect, the word 'computer' has cropped up quite frequently during the past few weeks - it was dealt with probably most explicitly in the film, but the possibilities of using a computer to deal with information have probably also been mentioned in discussions. At this stage, you are recommended to spend about five minutes reminding the children that computers are a recurring topic on the subject of information and discussing with them why this may be so. What connection have the children had with computers in their everyday lives? What do they know about them? It is not necessary to write the childrens' suggestions on the blackboard but it is important to get them talking about them, and it is possibly also a good idea to get them to draw what they think a computer looks like.

B) Now let's have a look at the bits and pieces. It is a good idea to allow the children to handle these first of all so that they are given a sense of involvement with the lesson. This can be done without comment on the main teaching part of the lesson, by indicating that we are going to find out a lot more about how computers work, these are bits and pieces of scrap computer what do you think they do? Allow five minutes or so for the children to discuss the items among themselves and to stimulate curiosity.

C) Building up a computer system.

Hand out the blank sheets containing the unfilled boxes. (M/P/1) Ask the children what they think it represents. Point out that you will be building up the same diagram on the blackboard and that, as you complete the labels, they too should do the same. (If you wish to teach this differently, it is also possible to be effective by stopping at various selected points and allowing the children to catch up with the diagram on the blackboard.)

paragraph

The numbers at the left hand side refer to the numbers on the master version of the Computer Systems Diagram (M/T/17) and therefore form a teaching sequence based on the completion of the diagrams which the children have in front of them. Where you are required to show a computer part as demonstration the name of the part is underlined in the commentary.

1. Ask the children what they think a computer looks like. What shape is it? Find out from the class who has seen one and get them to describe it. In effect you are merely after the idea that its shape is boxlike. Once you have elicited this information draw a box on the blackboard.(Quite large, remember you are now reproducing the diagram on the sheets.)

2. What does this box do? Get some ideas from the children about what the computer can do. Where, for instance, would they find one? What would they do with it? What does the computer use for fuel? You are trying to get over the idea that one of the functions of the computer is to process information in the form of numbers and letters. Try to get the children to produce the word 'process', and make one third of the box you have just drawn 'processing unit' as shown.

3. However, before the machine can do any processing it must have access to the information it needs. For example, before it can sort a list of names into alphabetical order, what must it have? Before it can add two numbers what must it know? Lead the children toward the idea of a bank, or store, of information in the form of numbers and letters, from which it can, by also referring to instructions in the same store, choose the right information to process. Label another third of the box ' storage' or 'memory' as shown.

How does it store information. Show the children the piece of Ferrite core store. Ask them to describe it. It is unlikely that, in fact, they can see the thousands of tiny 'doughnuts' which are inside the frame. If you have access to an overhead projector, you could use it to focus right across the room to show the doughnuts; alternatively, magnifying glasses serve the same purpose. Point out that each ring has a number of wires running through it, and that if a current is passed down a wire in one direction, it magnetises the ring in a certain direction. If it is passed down the wire in the opposite direction then the reverse magnetisation takes

place. The ferrite ring can therefore be a two-state device. Give out the sheets (M/P/2) entitled 'How does a Computer store information?', and ask the children to complete it. This process should take approximately 5 to 10 minutes.

Now point out that, since we have decided that a computer stores characters in its memory by giving each a unique 8 bit code, ask what the code is. Show the children the character codes at the bottom of the sheet entitled 'A message in Computer Code' and relate it to what they have just learned (page M/P/3). Is this how the computer knows what is in its memory? (what do we mean by 'knows'?). Indicate that the computer also stores in its memory the key to its character code, which is, in fact the one the children have just been looking at. Encourage the children to simulate the computer by cracking the code on the sheet (10 minutes).

4. We have established that the computer has a processor and a store and that the one is fed by the other and then puts its results in the store again. We know too that this happens very fast - in the order of millions of times in every second - what therefore do we need as the third part of our box? Establish the need for some sort of control over all these operations and complete the middle box with 'control' as shown in the master diagram. The nature of this control function need not be gone into in detail, but you can indicate that the TROS Module (Transformer Read Only Storage - what does this mean, do the children think?) is a means of keeping what are called micro-programs within easy access of the store. Some of these micro programs are the often-used routines which are used time and time again, such as an adding sequence of instructions or the instructions to a card reader to send some more information into the processor. There are thousands of these control programs which comprise instructions for housekeeping in the processor. (The CCROS Board has much the same function.)

If you do not have the TROS module, show the slide of this. Explain that this could be, say, the addition routine (the + in A + B) - the whole routine can be accessed by the memory in 240 nanoseconds (10 to the -7 seconds) which gives a good indication of how computers are very fast. In fact, where no working parts are needed they work at electronic speeds (186,000 miles per second).

5. Thus we have identified so far three functions of the box we recognise to be the computer. Let us give this box its real name 'The Central Processing Unit'. Put this label in on your diagram as shown.

6. The Central Processing Unit may be the heart of the system but by itself it is a worthless box. We have said that it can do wonderful things very fast with information, but one cannot shout at the box and hope that it takes it all in. Ask the children what sort of information the box might process, and having elicited the ideas of files of information about people, names, addresses, dates of birth etc. Ask them what the problem is in getting this wonderful box to do its stuff. Draw from them the need to somehow get this information into the box's store so that it can begin to work on it. Try to get them to approximate to the technical word and label your box 'input' as shown. Make sure that it leads to the control function since the scheduling of the available space in storage and the feeding in of information from the peripheral units to fill that space is also part of the control function.

7. Having examined the input function it should not be too difficult to explain that there is also an output function to go with it. Ask what the main form of this output might be. What would they, the children, expect to be able to do with the output of a computer. You are seeking to instil the idea that they should be able, first and foremost, to read it. Put in the label 'output' and, if you wish at this stage to emphasise the concept of meaningful output show the computer paper as an example. Many of the children will have seen it before.

8. You are now in a position to complete the title 'The Input-Processing-Output Cycle'.

now go into a little more detail about the way in which information is input to the machine's storage and output from it.

9. Establish the general principle that the computer is an electronic machine and that therefore the means of input must bear some relationship to magnetism and electricity. Give out an 80 column punched card to each child and ask them to study it. Each one should be punched with all the

characters of the alphabet and numeric digits. Point out that, since the computer has no eyes, it cannot read, but that perhaps some way may be found to enable it to sense the holes in the card. Ask the children to describe the card - How many columns has it got?(80) How many rows?(12). Why is there a corner cut?(Reminder of the edge-punched card). What does each column represent?(A character of information). Are all the codes represented on the card?(No, all the numeric and alphabetic characters are but what about special characters such as * / @ £ & ( ) ? etc.) How can we tell what is punched in each column?(By the fact that the character is also printed at the top of the column). Which code represents the letter H ? (A punch in the first row (the 12 row) and a punch in the eighth row). How are the holes put into the card?(By a special machine called a 'Card Punch" which looks very similar to a typewriter keyboard but instead punches holes in the card rather than characters on typing paper). A picture of the Card Punch machine will be shown in next week's lesson together with those of other machines and a question sheet.

Having seen the card and understood its significance as a holder of information, fill in the label No. 9 on the sheet 'Punched Card'. Show also the 96 column punched card to illustrate that all punched cards are not necessarily the same, but be careful to point out that both cards work on substantially the same principle ie holes in card.

10. Why holes in cards? Make the point that this too is a two-state system of working - either there is a hole there or there is not a hole. So that if we can build a device which can recognise this, column by column, look up the code and interpret what is contained in the card and then transfer the information to the storage of the Central Processing Unit, we have, in effect, a Card Reader (Fill in the label 'Card Reader'). If you have either or both of the following pieces of equipment, show the children how they work and fulfil the above purpose. Alternatively, show the slides.

Brush Block Assembly - which works by wiping the 80 brushes across the face of the card as it passes an electrified piece of metal. If there is a hole in the card contact is made between a brush and the metal.

Photo Electric Card Read Unit - which operates on much the same principle except that light does or does not pass through the card dependent on whether there is or is not a hole. Most

of the children will have come across the same theory when at the supermarket or wherever there are automatic doors.

11. It is not necessary to spend too much time on this since the principles involved are the same as in punched cards. Hand out a piece of paper tape to each child and ask them to look at it carefully and describe it. Establish the fact that, like the punched card it works on a system of holes and that one line of holes represents one character of information. How do we know what each line says? (We don't, unless we look up the code, - unlike the card the paper tape has no characters printed at the side). Why are there two different sizes of hole? (Point out the need for sprocket holes and explain why they are off centre). How many holes make a character? (Indicate that this is called eight channel tape since there is a capability to punch 8 holes side by side - can they remember from the discussion on storage how many combinations this gives?) Older types of equipment allow for 5 and 6 channel tape. Put in the label on your diagram - 'Paper Tape".

12. How is the paper tape read? Indicate that the machine which puts the information onto the tape and also reads it from the tape might look different from that which performs the same function on the punched card, but that the basic principle is the same ie there is or there is not a hole in a certain place on the tape. Make the further important point that one can program the computer to punch a new paper tape with new and updated information so that the machine is not only an input medium but also an out put device from the computer. This is why your label is 'Paper Tape Reader/Punch'. The same applies also to cards.

13. Now we come to devices which work on the principles of magnetism for the storage of information and have direct analogies to devices found in many homes. Ask the children what they have in many homes which stores information in magnetic form - if they do not get the point, the mention that music is also information may help. Establish that the tape recorder is therefore a device for storing information and for making it available to the listener when required. (Cassettes may be better known). Show the magnetic Tape Reel. Ask how it is different. Elicit that the reel is twice as

wide ($\frac{1}{2}$" compared with $\frac{1}{4}$"), that the reels are much longer (2400 ft) and that the point of the tape is not to store music or words but to store information broken down to a code which can be interpreted by the computer. This again uses the two-state theory of magnetised or not magnetised in particular places across the tape. Put in the label 'Magnetic Tape'. The tapes pack information at 2400 characters per inch. Get the children to work out its capacity.

14. As with all the other devices some means has to be found to put the information into the computer storage and there is obviously a device to do this. Show the Magnetic Tape Head Unit. Ask how the tape would be threaded through it and point out the positions of the erase and read/write heads - why the erase head? (Indicate that information can be overwritten and the tape used time and time again just like the domestic tape recorder.) - This of course leads to the problem of protecting valuable information from being lost - point out that the ridge in the back of the tape reel is for a piece of circular plastic which, when not inserted, will make sure that no information can be written on that tape, only read from it. Why this way round? ie when not inserted.)

To distinguish the method of storing information from the method of presenting it to the machine fill in the label 'Magnetic Tape Drive'. Point out that the children will be looking at pictures of some of these units in the next lesson. At the same time they will be finding out other details about them which will bring into focus how they fit into a complete computer system and how that system operates in terms of speed, capacity etc.

15. What else is there in the home which holds information in magnetic form? Elicit the idea of gramophone records performing the same task as the tape. Show the disk pack. Ask the children to describe it in terms of records and get the principle of a central spindle containing a number of records - one cannot record information on the top and bottom surfaces, so how many surfaces can information be put onto? Establish how information is put onto the disk. Ask how many grooves on the average 12" record, (2?)

Establish that on the disks shown there are in fact 200 concentric'grooves'holding information (+3 as alternate tracks in case one of the others goes wrong). These 'tracks' are so minute that they cannot be seen with the naked eye, and they hold information, as the magnetic tape does, by magnetic spots along the track. Each track can pack information at the rate of some 4000 characters per track - how much information does this give to the pack? Get the children to work this out. (4000 per track x 200 tracks per surface x number of recording surfaces). In fact this packing density is very low compared with the modern disk pack by a factor of 4 or more. Why should anyone want to have this much storage space? (To answer this one, ask the children to count the characters in their names and addresses(including blanks) add up for the class, multiply by the number of classes in the school, point out the number of schools in the county, and ask again why the County Council machine needs a high storage capacity). Make the point that disks (and tapes) can be stored away from the computer until needed for processing. Information is usually grouped into similar types (files) as has been discussed in previous lessons, so that for instance at the county council machine, the file containing the names and addresses of the children in the county's schools will be kept on a disk or a tape in a cupboard until the job of work done by the computer needs that file. Put in the label 'Magnetic Disk' on the diagram.

16. How is information put on the disk and retrieved from it? If you have a Disk Carriage show it to the children and point out how the arms fit in between the disks on the disk pack. If you have no Disk Carriage illustrate the same principle by reference to the Disk Head Unit and also show how the actual erase and read/write heads can be positioned over the tracks. Show how tiny the heads are, and explain that they never actually come into contact with the surface of the disk, but ride on a cushion of air some thousands of an inch above it. If you have the disk Motor show how the disk pack sits on it and this makes it possible to remove the plastic cover from the pack. Further points about the disk will be made later Meanwhile label 'Disk Drive Unit'.

17. Now we come to a number of input units into which we need not go into detail. This will be done in the question sheets next week. They are being mentioned here for the sake of completeness in the diagram. If you have a Data Cell show it to the children. Explain that it works on the principle of magnetic strips being taken from the cell by some device. These strips are then joggled to rid them of dust, put between a read/write head mechanism to obtain the information required and then replaced. Each cell holds 40,000,000 characters and there are 10 of them in a Data Cell Drive Unit.How many characters can the whole device store. Point out that, because of the rigmarole involved in reading the information, they work relatively slowly compared with other storage devices such as the disk but they can hold a great deal of information. Put in the label 'Data Cell".

18. Ask the children what information is usually held on. Try to elicit the fact that words are often written on pieces of paper so that, if a device could be invented to read paper, it would be very useful indeed. Point out that there are such devices but they are often rudimentary and depend on the writing being in a particular place on pre-prepared forms and very legible as well. There are in fact several types and the title 'Optical Reader' covers a wide range.

19. Another device reminiscent of the domestic scene is the Visual Display Unit. Point out that, if the computer is communicating with a person, it can either write a word at a time which is very slow even on keyboards that can type at 10 characters a second(Try writing at that speed - but average reading speed is well over 100 characters a second), or it can display them simultaneously on a visual Display screen very like a television set. This is much faster and also there are devices like light pens which can be used to put information into the computer. For example designing an aeroplane is often done in this way so that stresses can be tested and the design changed accordingly. Put in the label 'Visual Display Unit'.

20. Show the children your cheque book.(Don't give them a blank signed one each). Show them the characters on the bottom which are the numbers of your bank and account number. Ask if they know what the ink contains. Elicit or teach the information that these are written with a special ink containing magnetic material. Where are cheques sent? Try to follow the journey of a cheque after you have paid it to someone.(For personal interest pretend to make it out to one of the children.) Point out that some millions of cheques are released every day - how does the clearing house cope? The part played by the 'Magnetic Ink Character Reader' should be resonably obvious by now. Fill in the label.

21. There are devices which accept voice input based on a limited vocabulary,; teletype terminals which input to the computer via a typewriter keyboard; floppy disk units which encode directly from keyboard to disk; drums; mark sense card readers; and a whole host of various devices for inputting, storing and outputting information - rather than explain the lot the word 'etc' will have to suffice.

22. However, there is one last unit which is probably one of the most important. How does the computer mainly communicate with us? What do we want of it? If we give it facts and figures about what people have bought what do we expect to have the computer do? (Invoices, statistics etc. all written out). Thus the line printer is the most impoertant output unit in the computer system. Give out the Computer Paper- ask what the children notice about it. Three things are perhaps more noticeable than the rest ie the holes down the sides, the fact that there are printed characters on it which are legible to human beings, and the lines across it. Point out also the perforations on the bottom and top which indicate that it is continuous stationery.

If you have the print wheels or a single one of them, show them to the children as an illustration of the older method of printing, indicating

that many of these wheels were placed side by side thus forming a line of print - the information coming from the Central Processing Unit came via the relays which told the wheels how far they should move

Even at these speeds of decision line printers were turning out documents at the rate of 2-300 lines per minute. Lastly, if you have the print chain, show it to the children and ask if they can work out how it works. Fairly obviously the chain revolves in its bed and the character is printed on the paper as it flies past it - thus it is known as a 'hit on the fly' method of printing. Devices of this type can print up to 1100 lines per minute. It is noticeable that in many cases of printing on computer, it is the paper which is hit onto the character rather than the character which is tapped onto the paper. Fill in the label 'Printer'.

23. Finally to finish off this lesson, the arrows which indicate the flow of information. We have talked about input devices , output devices and input/output devices. Looking at the diagram and remembering the physical characteristics of the devices we have described, ask the children to put in the arrows in the direction they should go on the lines of input arrows toward the machine's control section, output arrows away from it and, for input/output devices arrows should travel both ways to show this. This completes the top half of the diagram. The rest is completed in lesson 3..

Now, to establish that the children know the difference between a computer and a Computer System give out the sheets entitled ' The Computer and its peripherals' (M/P/4). This is a missing word exercise the completed version of which is shown on page M/T/18. Some of the missing words are difficult but the majority are easy. Each dash repreents a missing letter and the first letter of each word is shown in some cases where difficulty may be found. Read through the introductory paragraph at the top first.

M/T/16

The last task is to consolidate this information so that the children obtain some idea not only of the units involved but also of the speeds and capacities of these units. We have so far built up a computer system - children should now have a clearer idea that a computer is not just a single box of magic. The sheets which now require them to discover for themselves more about the system (M/P/5 6 9) should now be made available to them. The pamphlets to which they refer should be put in an accessible position. The order of completion does not matter and this enables you to make maximun use of the pamphlets available to you.

(8) THE INPUT - PROCESSING - OUTPUT CYCLE

NAME

(5) CENTRAL PROCESSING UNIT

DATE

(1)
- (3) STORAGE
- (4) CONTROL
- (2) PROCESSING UNIT

(6) INPUT → (4) CONTROL

(4) CONTROL → (7) OUTPUT

(7) OUTPUT → (22) PRINTER

(23) →

(9) PUNCHED CARD

(11) PAPER TAPE

(13) MAGNETIC TAPE

(15) MAGNETIC DISK

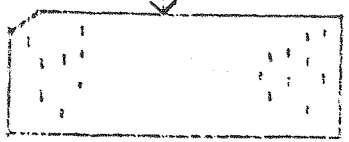
(17) DATA CELL

(18) OPTICAL READER

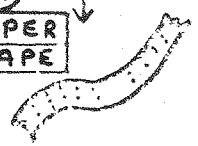
(19) VISUAL DISPLAY TERMINAL

(20) MAGNETIC INK CHARACTER READER

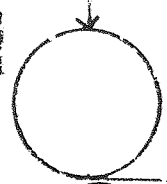
(21) ETC.



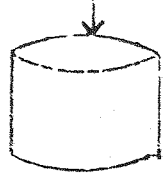
(10) CARD READER



(12) PAPER TAPE READER / PUNCH



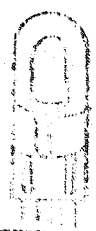
(14) MAGNETIC TAPE DRIVE



(16) MAGNETIC DISK DRIVE UNIT

(24) THREE GENERATIONS OF COMPUTER TECHNOLOGY

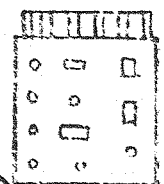
(25) VALVES



(26) 'TUBE' CARDS

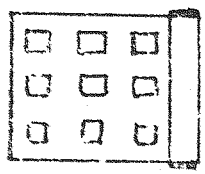
(29) × 10 →

(27) TRANSISTOR



(28) SMS CARDS

(32) × 10 →



(30) INTEGRATED CIRCUITS

(31) SLT CARDS

THE INFORMATION MACHINE AND ITS PERIPHERALS

The passage below explains what the next sheets are about. Some of the words are missing but the number of dashes tells you how many letters are in the missing word. See if you can deduce what the passage should read like by completing it.

++++++++++++++++++++++++++++++++++

So far, we have studied information, where we can find it, how much there is of it and when we might need it. We found that there is so much of it around us that discovering it only leads to our having to ask more and more questions about it. We also found that all of us need to be able to obtain information most of the time and the older we become, the more complicated things we do and the more information we need. In our school subjects we are using the old information we already have stored in our memories, learning new information about the world around us and the way people behave in it and so coming to understand the ways in which we can live a richer and more varied life. We have discovered that there is so much information in the world about us that we couldn't possibly remember it all, and that what we need is a machine which will store what we need to know and help us obtain it when we need it. This machine should also be used to take some pieces of information, put them together with other pieces and produce new information which has been processed to give us the answers to some of the questions we are always asking. For example, it should be able to examine our personal records, look at the parts of the records which give our medical history and produce a list of those of us who can be blood donors; or it should be able to examine the school records and make a list of everyone who lives in a certain village, or who is absent from school on certain days regularly, or who has not had a polio vaccination, or who has false teeth. We have thought that a machine which can do all of these things and more is the computer, and so we studied all the separate parts of this machine and looked at some bits and pieces from it. While we were doing this we decided that the computer itself (the part that does all the processing) needs to have information to enable it to do its job. This information, we found, is made available to it in many different ways. We call all those machines which help to give information to the computer, or get it from the computer, peripherals (if you are stuck with this one, look somewhere near the top of the paper.).

The next few sheets ask you some questions about these peripherals and about the computer they serve. You can obtain the information for the answers from some publicity leaflets which your teacher will give you. The questions can be answered in any order so that you do not need to wait for a particular leaflet, and in answering the questions you will find out more about the sizes and speeds of these remarkable machines. Go ahead and answer them now.

Lesson 2 - Computer People. This lesson comprises approximately one hour's work and deals with the different jobs one finds in computing, concentrates fairly closely on the job of the programmer, and looks at the type of qualities one needs to work with computers.

Refer back to the previous lesson. From what the children have learned about computer systems what is the point of contact with human beings? You may have to prompt a little to obtain the information you need, but it is obvious that computers do not run themselves and that human beings are needed somewhere along the line. You are after such items as:

. Someone to put the disk packs etc onto the drives
. Someone to punch the holes in the cards and paper tape
. Someone to build the computers
. Someone to mend them if they go wrong
. Someone to write the instructions which make the machine work
. Someone to plan and decide what the computer is to do
. Someone to read the information output by the computer

The children may think of others.....
Write these on the blackboard so that you can later deal with the job titles of the people who perform these various tasks. The notes which follow will take the above classifications and expand on them.

a) . Someone to punch the holes in the cards.

Give out the cards again (or, if the children have retained them in their folders, ask them to retrieve them). How did the holes get there? (they were punched by a special machine). Who punched them? (Usually a girl sitting at the machine - she is called a Card Punch Operator). What does this machine look like? Show the slide of the Card Punch and ask the children to describe it to you - basically it is a typewriter-like keyboard with special machinery at the top to feed cards in and then stack them. Point out the various parts of the Card Punch. So what is the job like? (It is very similar to the job of a typist - ask the children to spell out the differences). In a sense the job of the Card Punch Operator can be quite boring since she cannot necessarily read out what she has typed. Nevertheless, compared with typing it is a well-paid occupation and there is often a severe shortage of girls to do the job.

b) . Someone to put the disk-packs etc onto the drives. This is, in fact,the job of a Computer Operator (put this onto the blackboard by the description.), but this is not the only thing he does. Ask the children what other unitshe deals with. Show the four slides of the operator doing this - ask what he is doing in each case. The fifth slide shows him sitting at a computer console - what is he doing? Point out that one of the other jobs done by a computer operator is to communicate with the machine - to give it commands in a special language so that it performs the right tasks. Occasionally, too, the machine will communicate a message to him asking for further instructions or indicating that it has finished. In this case it is the Operators job to respond in the right way. Sheet M/T/23 can be shown as an OH Projector transparency as a summary.

c) . Someone to write the instructions.....

We shall spend some time on this since the Programmer's job is sometimes the most fascinating aspect of computing. Elicit first of all what we mean by instructions. Establish that these are written in a special language (and there are many of these) which the Programmer has to learn before he can write the program (or list of instructions for the computer). Establish also that the computer is nothing more than an uneducated moron which does exactly what it is told to do - so, if the programmer makes a mistake what does it do? Try to find out from the children what the computer might be required to do so that the Programmer knows what instructions to give it- establish a few common computer applications like working out pay, or writing Gas Bills and point out that this requires thousands of instructions to be written over many months. So, by now we have established that a programmer needs to be very accurate and work on his own for long periods of time. What sort of a brain would that need? Establish that he needs to be very logical and careful. In fact there is a special test which tests his aptitude for the job. Give out the question sheet 'Can you answer these?' (M/P/10). Point out that these are typical of the questions which require one to think logically and carefully. Give the children five minutes to complete the sheet and then discuss the answers. These follow here

1. Halfway (he would then be running out again
2. He would not be dead 3. Smoke from an electric locomotive?
4. All of them. 5.The match 6. One hour

M/T/21

7. 2 Apples 8. 2p and 10p (The other one was a 10p piece).
9. Not on this earth! 10. Noah sailed the Ark 11. 9 sheep
12. A Mama Bull? 13. Bury the survivors? 14. How did people know that Christ was coming 46 years hence?

The questions might be a little whimsical but the children enjoy doing them and they do indicate that the questions should be read carefully and worked out logically which corresponds to the job of the programmer. Indicate that another part of the course shows children what a computer program looks like (in module 6 Computer Contact sheet number C/P/10) - if you have access to this sheet show it to them now, and discuss with them what it means to them. Other aspects of the programmer's job occur in the sheet to be completed at the end of this lesson (M/P/11 and 12). Also sheet M/T/24 summarises the programmer's job. This can be better shown by O.H.Projector.

d) . Someone to plan and decide what the computer is to do

We are now discussing the job of the Systems Analyst (put this on the blackboard by his description). And since this is a complex occupation some of the detail may be left out. In general, the Systems Analyst is the person who liaises with all the departments of a company or organisation, discusses with them how the computer can help and then writes detailed specifications for the programmer. The programmer then converts these into a set of instructions for the computer. This concept can be brought home to children by asking them what their parents'occupations are, establishing the fact that, in many cases, they work for a part of an organisation, a department. Then ask whether these departments communicate with each other (they must) - the job of the Systems Analyst therefore is to establish how they communicate and how the computer can help in this. The diagram on sheet M/T/25 and the summary on sheet M/T/26 will help in this. Point out that the Systems Analyst is a fairly high-powered individual who has a wide experience of how organisations work and how computer systems work. In the 'information' context this person is the information man in that he studies how information flows between different parts of an organisation.

e) The rest of the occupations of Computer people are rather obvious - treat each one individually putting up the name of the person on the board by his occupational label

. Someone to build the computers

Fitters, Engineers, People to wire them, people to assemble them etc.

. Someone to mend them if they go wrong.
With electronics knowledge and special training in computers. Many different types of computers therefore a highly specialised knowledge. Point out that, in the next lesson, we will be learning something of the electronics of computers and how it has changed in the past 20 years.

. Someone to read the information output by the computer
These will be the users in the departments which the computer serves - refer back to the Systems Analyst and his liaison with these people.

f) Lastly, in this section on Computer People let's look some more at the job of the programmer. You will need the sheets of questions (M/P/11 and 12) and the pamphlet entitled 'The programmers' (M/V/5). Encourage the children to discover for themselves the answers by referring to the booklet.

You may find sheet no M/T/24 useful as a summary of the job of the programmer to set them off. This can be made into an overhead projector transparancy, as can the other two sheets dealt with in the Systems Analysis section (M/T/25 and M/T/26). and the one on the operator (M/T/23).

M/T/23

T H E O P E R A T O R

1. KNOWS ABOUT THE COMPUTER, ITS OPERATING SYSTEM AND THE PERIPHERAL DEVICES AROUND IT.

2. SETS UP THE RIGHI TAPES, DISKS, CARD DECKS ETC. FOR THE PARTICULAR PROGRAM TO BE RUN.

3. PRESSES THE SWITCHES, BUTTONS ETC. ON THE COMPUTER

4. ANALYSES SIMPLE FAULTS AND RECTIFIES THEM.

5. INTERPRETS MESSAGES FROM, AND TYPES MESSAGES (INSTRUCTIONS) INTO THE CENTRAL PROCESSING UNIT.

T H E P R O G R A M M E R

1. RECEIVES THE PROGRAM SPECIFICATIONS FROM THE SYSTEMS ANALYST.

2. BREAKS DOWN THE PROBLEM INTO SMALL MACHINE-SIZE STEPS., USES FLOW DIAGRAMS, LOGIC DECISION TABLES ETC. TO DO THIS.

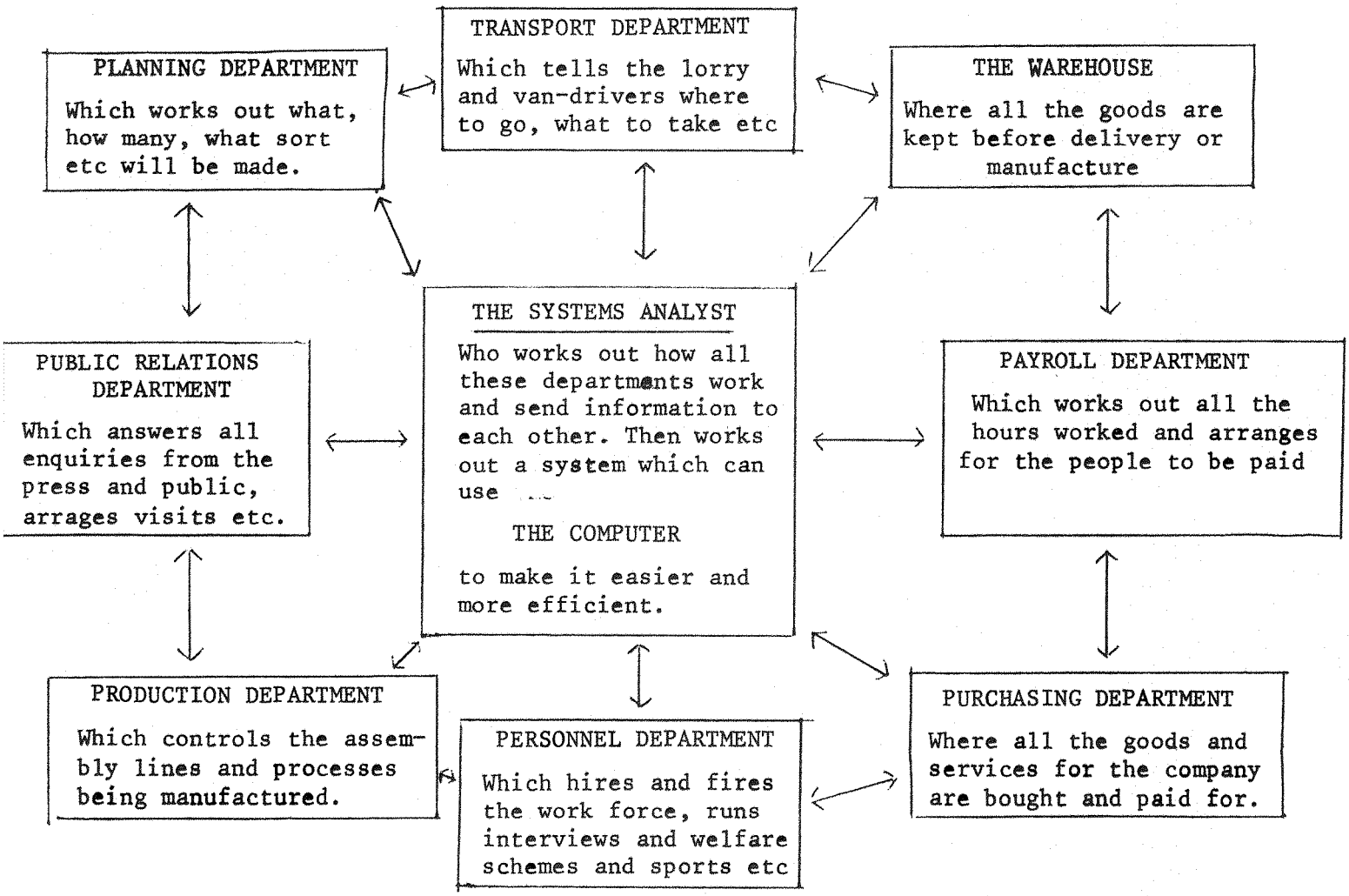
3. WRITES A PROGRAM IN A PARTICULAR PROGRAMMING LANGUAGE.

4. TESTS AND DEBUGS THE PROGRAM UNTIL IT IS WORKING PROPERLY.

5. AT A HIGHER LEVEL, WRITES AND TESTS THE PROGRAMS WHICH ACTUALLY MAKE THE COMPUTER WORK.

SOME OF THE DEPARTMENTS IN A TYPICAL BUSINESS ORGANISATION

HOW A SYSTEMS ANALYST WORKS



M/T/26

Figure 3

THE SYSTEMS ANALYST

1 KNOWS ABOUT COMPUTERS - THEIR CAPABILITIES, SIZE, APPLICATIONS, DIFFERENT SYSTEMS ETC.

2 ANALYSES INFORMATION FLOW

- A) WITHIN DEPARTMENTS
- B) BETWEEN DEPARTMENTS
- C) BETWEEN THE COMPANY AND ITS CUSTOMERS AND SUPPLIERS.

3 DESIGNS RECORDS AND FORMS.

4 TALKS TO PEOPLE WITH TACT AND DIPLOMACY

5 PERSUADES TOP MANAGEMENT TO ADOPT SYSTEMS.

6 DRAWS UP SPECIFICATIONS FOR COMPUTER PROGRAMS - SYSTEMS FLOWCHARTS ETC.

Lesson 3 - changes in computer technology over the last twenty years. This lesson would be more adequately given by someone with a knowledge of electronics, but the teaching notes are constructed in such a way that a teacher with no such knowledge may give the lesson. You will need the uncompleted Input-Processing-Output diagram (M/P/1) from lesson 1, the three bits and pieces which show the different generations of computers (M/V/6), the description of Eniac (M/P/13), the booklet 'More About Computers' (M/V/7) and the sheet of questions 'How things have changed ~~Where are we going?~~' (M/P/14). Again the paragraph numbers correspond to the numbers on the master sheet (M/T/17).

Teaching Notes

24. Title - try to set up an analogy between generations of people and 'generations' of machines. Ask how, in grandfather's day, people used to live - how were things different in terms of a) the entertainment amenities they had at their disposal and b) their lifestyle and c) the way they think about things now. Go through the same process with the parents of the children and then try to prognosticate the future and ask what they think they themselves might be doing for entertainment in ten years time which they cannot do now. Try to establish the following links

i) between the artifacts available to people and their lifestyle eg the way in which television has altered the way in which people live...

ii) the difference in appearance between people of different ages eg if grandfather, father and son stood together how would others tell the differences and the similarities.

Elicit the word 'generation' in this context and its meaning.

In the same way modern day computers look very different from the computer of only twenty years ago (Is this a long time? - how long did it take an early steam train such as 'Puffing Billy' to evolve into the modern diesel). The fact that they differ so and yet perform the same basic function has resulted in there being 'generations' of computers - and the difference

between the generations is the difference between the technological (in this case, electronic) possibilities which are available to the man designing the machines. This can be seen in the bits and pieces you are about to show. Put in the title on the diagram 'Three generations of Computer Technology'. (You may also need to spend some time defining the word 'technology', but it should become clear as you progress.)

25. Show the children the valves and ask what they remind them of.(Old radios, TV sets?). Explain that different valves do different jobs but that, in general, they are concerned with the transport of electrons (electricity?) in a particular way from one place to another, and with doing something to that electricity as it passes. Ask the children what happens when current is passed through a valve. Elicit that

it usually lights up

it gives off heat

What is it made of? (Glass). From the previous two answers what are the problems about using valves? Find out that

i)There is a heat problem.

Give out the descriptions ~~in Appendix C~~ on sheet M/P/13. Refer the children to the description of Eniac. Read through it and try to get the children to imagine what it looked like. Ask what the problems of such a beast might be. Establish:

i) The Heat problem. 80,000 valves glowing merrily away give off no little heat - and ways have to be found of cooling things down, thus using more precious electricity and creating a need for yet more valves. Show the children the fan and motor and ask what they think they would be for. Establish that, even in modern machines there is still a cooling problem.

ii) The size problem. 80,000 valves take up a lot of room together with all the other bits and pieces. As an illustration of this point out the difference between the old radio sets and the modern pocket transistor, or try calculating devices...

iii) The fragility problem. Glass is a fragile commodity - what happens if a valve bursts as frequently happened.

iv) The fault-finding problem. In a room of that size (cf Eniac),with circuitry of that complexity, where is the fault if the machine appears not to work satisfactorily? Perhaps it would need a detective-engineer to find it.

At this point it may be a good idea to find time to insert the word 'valves' on the diagram.

26. Show the tube cards to the children. Point out the valve seat and try to fit the small valve into it. (There are seven and nine pin seats, also with valves - you may be unfortunate). Try to get the children to imagine what 80,000 of these would look like all glowing at once. Indicate that valves are not the only components on the tube card. There are also resistors (components which regulate the flow of current) and capacitors. If you do not have the necessary knowledge of electronic components, it may be a good idea to ask the children to find out what resistors and capacitors are for next week. Lastly, indicate that the pins on the bottom which plug into the actual machine are gold plated since this metal ensures the best flow of current. Put in the title 'Tube Card'.

27. Hand round the SMS cards again. What can the children see on them which was also on the tube cards? (Resistors and Capacitors). Indicate the small circular shapes on the card and point out that these are transistors - where have they come across the word before? (Transistor Radios?) . The transistor was invented in the late fifties and was an immediate boon to the computer designer because of its power and compactness. Several valves could be replaced by one transistor, it is a far more durable piece of electronics and consequently breakages were reduced tenfold. Put in the title 'transistor' on your diagram.

28. Show the printed circuit on the back of the SMS card. This is a technique for joining up the different components by solder which can be done by machine - thus it is quicker than using wire. Point out also that one of the small components on the card is a diode. What is this? Also the gold contacts at the ends of the cards is the equivalent of the gold plated pins on the tube card.

The unit is called an SMS card. Explain that the word 'modular' means that a small part can be changed if it goes defective - so that, if a card starts to play up, it is a simple matter to replace it with another one since all the connections are standard. Put in the title 'SMS Cards'.

29. You have already mentioned that the speed of the computer plays a big part in its success. Why is the SMS card quicker than the valve? (Because the electric pulse does not have as far to travel). In fact such was the effect of this new technology at the end of the 1950's that probably one of the SMS cards could replace 10 or more of the valves and still be more efficient. Put in the label 'X 10' to illustrate this point and indicate that this also had the effect of making the machine far more compact.

30. Hand out the SLT Cards. Ask the children to describe them. The main answers you are looking for are the number of holes at the end which plugs into its mother board and the large number of components which look exactly the same ie the small grey squares. It is these latter which are the basis of the new technology being developed at the beginning of the 1960's. Either now or before the lesson take a pair of pliers and roll back the top of one of these canisters so that you reveal the tiny circuit inside. This tiny integrated circuit has been etched onto its substrate using special machines and it represents the eqivalent of transistors and resistors and capacitors and diodes which were previously much larger on the SMS Cards. Put in the label 'integrated circuits'. For a fuller description of the technology behind these circuits written in everyday, easy to understand language refer to

31. Point out that these are called SLT Cards (Solid Logic Technology). They are still based on the modular system of replacing cards if things go wrong - show the SLT Card Mother Board and illustrate how the card plugs into it. Again you have the gold plated pins on the board and in effect this board becomes the central unit from which the computer works. If there are wires on the back indicate that these, when they were in use, were modifications to the original circuit logic, and a means of putting in improvements without replacing expensive cards. Label 'SLT Cards'.

M/T/31

32. The implications of using this type of technology are as they were in the transition from valves to transistors. Because integrated circuits are so minute the pulse does not have to travel so far and the speed at which things are done is so much faster. The area taken up by the computer is so much reduced that the day may be coming when a store containing many million words can be fitted into a filling for a tooth. Indeed the integrated contains the equivalent of several transistors plus all their related circuitry in a small grey canister one centimetre square and this has been so since the middle 1960's. It is within the capability of electronics engineers to micro-minituarise to sizes much, much smaller than these, to pack more and more information into a smaller and smaller space. To make this point put in the label 'X 10' and also perhaps another arrow after the integrated circuits box to a ?

This completes the formal part of the lesson. The rest of the lesson comprises discovery work using the booklet 'More About Computers' (M/V/T) and the sheet '~~Where are we going?~~ How things have changed' (M/P/14). It is suggested that you hand out the latter sheet and give help as it is required. Read through the first part of the worksheet with the children.

If time is left at the end of the lesson the booklet 'More About Computers' offers the possibility of further reading and/or questions.

More creative work may revolve about the possibility of computers in a match box (refer to ~~the~~ pocket calculators) and its implications for the future. What, for instance, would the children do if they had a computer in their pocket?

Module 4 - The Computer - An Information Machine

Lesson 4 - What Computers are used for. This requires no special knowledge of the applications of computers since the approach concerns what we do in everyday terms and uses pamphlets and worksheets to put over the hard facts. In many ways this is an important lesson to teach to children, since the use of computers in today's world is prevalent in most organisations and businesses - and yet they work very much in the background; we don't see them, we don't have much contact with them, if we are aware of them (and not everyone is) they don't appear to have much relevance to us. And yet, in one way or another, they do have a profound effect upon the lives of us all today; tomorrow their effects will be even more marked. Because of this children should be made aware of those applications which computers have, especially those which can affect the way in which they live their lives. Perhaps these points should be made explicitly at the beginning of the lesson. The rest of the lesson goes on to prove it. It is written in two parts dealing with computer applications in the present day and the future uses of the machine.

Teaching Notes:

A) Present day applications. Ask how many children have ever seen a computer? What did they see?
Ask how many children have seen a computer printout. What was it? Ask what contact either they or their family have had with a computer. You may need to prompt, but write up a list on the blackboard of computer-produced output which might be found in any home. For example:

- The Gas Bill
- The Electricity Bill
- The Water Rates
- The General Rates
- Any invoice from a large company
- A pay chit
- An invitation from a Book Company to purchase
- An address label
- A hire purchase agreement or payment reminder
- A chequebook (Magnetic ink characters)
- A Bank statement
- A grocery label
- A supermarket chit
- Insurance Policies, Health Cards

etc.

Point out that all these are points of contact between ordinary people and the computer. Twenty years ago there were none such. These are some of the applications of computers which we know about: there are many more.
Ask the children to take a piece of paper and on it to write down 10 things which their parents did yesterday -

quite mundane things like, getting up in the morning, hoovering the house etc are what you are after. Give them a few minutes to write these down and spend a few follow-up minutes discussing them and asking what has been written. Show the transparency which asks 'what did your parents do yesterday?' (M/T/37), or write the first few on the blackboard. Point out that these are things which millions of people do every day.

Now ask the children to look at their lists and tick any item in which there is a computer involved. This should take only a few seconds since the connection is by no means obvious and there will be probably be few ticks - nevertheless ask around the class what ticks there are and why.

Let's take the first item on your list 'Heard the alarm'. Ask what is the connection between this activity and a computer.

Discuss Alarm clocks with the children - this may seem to be a strange thing to do, but the points you are trying to elicit are that they comprise many parts, not everyone uses them, they are purchased from shops, they have different sizes, colours and shapes, they cost money, and any other information you can obtain from the children. You may find it useful to write some of this down on the blackboard since the next step is to take some more detail by asking such questions as who, what, where and why. For example, why are there different colours? Who decides what the colours should be - This may be an exercise, which once you have started it off, the children would like to continue - as they did in the first module when asking similar detailed questions about one object on their walk.

The point of this exercise is that this sort of information can be reduced to figures and processed. Take the children to the place where the alarm clock is made(in imagination) and ask whether there is a computer there. (There will be). Ask what it would do. Show transparency No 2 headed 'Manufacturing Information held on Computer Files' (M/T/38) Go through this with the children pointing out that this is all information without which the alarm clock could not have been made or sold in the first place - it is, in fact the reason why there is an alarm clock in the house in the first place - and if any child's particular household has not got an alarm clock(as, no doubt, some member of the

class will protest) them is not this also useful information for a computer, so that possible future sales can be estimated? Now, ask the children, in the light of what they have learned, about the connection between the alarm clock in their own homes and the computer, to look at their lists and amend the number of ticks. - there should be a lot more.

Tell the children that, in a little while they will be learning more about the uses of computers. First of all, though, let's find out why computers are useful in these sorts of situations. Ask what the children know about the advantages and attributes of the computer. You are after the following facts - prompt if necessary:

- computers are fast
- they can perform boring tasks over and over again
- they don't make mistakes (unless they are told to)
- they don't complain or go on strike
- they can hold vast quantities of information
- they can retrieve this information without effort

To illustrate the speed of the machine show transparency No 3 which begins 'Work out...'. (M/T/39) To make the point more dramatically, knock something onto the floor and say that in the time taken for this to reach the floor computers can .....(show transparency and read it out).

The point that this may be making is that computers can potentially remove the drudgery and boring aspects of work thus leaving people free to be more creative.

Let's find out more about how computers are used in some everyday aspects of life. For this you will need the sheets entitled ' How computers are used in....' (M/P/15 to 18) and the pamphlets on computer Applications (M/V/8). The children use these to discover the answers to the questions - do not worry if these are not completed in the time available, they can be used to introduce the next lesson on future uses of computers.

M/T/35

B) Future Uses of Computers. We have not so far related the computer to its television image. Ask the children what television has to say about the computer and what it can do. No doubt the answers will refer mainly to such series as Dr Who in which the computer is a machine for taking people through time and space (shaped like a police box), and Startrek where they are also used for transporting human matter from one place to another and in answering in American voices questions put them orally.

Point out that in this lesson we are concerned with the art of the possible during this century.

Give out the picture of the ~~xxxxxx xxxxx xxxxxx~~ point-of-sale terminal (M/V/9) or show a transparency of this. This is hardly a system of the future since it is now being used in some of the larger stores in London. Ask the children what happens when they reach the checking out desk at a supermarket - in detail. What does the shopper get? Point out that looking at every separate item as the girl does:

- . is time-consuming
- . can be inaccurate if she punches the wrong keys
- . gives only the prices on the bill not what has been purchased
- . leaves the men behind the scenes to order on the basis of what they think has been sold or keep a constant count of the things in the warehouse.
- . means that someone has to keep an eye on the shelves to keep them filled
- . can be inaccurate if the price is wrongly read

Ask the children to describe the picture - in particular notice the wand on the side of the terminal. Point out too that this is connected to the store computer which has in it details of accounts and all the stock items in the store. Now ask why this machine might be a better proposition than existing machines and what they think it might do. Elicit or discuss or teach the following facts about the point-of-sale terminal (why is it so called?)

- . The wand is passed over a specially marked code on all purchases. From the code it is the following information obtained
  - i) The type of merchandise (eg Corn Flakes etc)
  - ii) The price
- . there is no keying in of figures - the code tells this

- the list of goods bought includes not only the price but also the name
- the list of stock in the computer is updated as an item is read by the wand - so that the people who order know right away when to order - in fact in some cases the computer automa-ically prints out an order form when the level of a particular item gets low.
- the people who stock up the shelves obtain a list from the computer of which items are low
- the code can be printed on any surface - on a cabbage if necessary - the wand will still read it.
- This means quicker service(no inspecting separate items), more accurate bills (no keying in), well-stocked shelves, and up to date automatic keeping of stock files.
- Also the total value of the day's transactions is kept so that it takes only a second to print after trading has finished.

Point out to the children that this is a type of equipment which is on the market now, and will soon be seen in many supermarkets.

What of the future? Give out the list of predictions(M/P/19) read through it with the children, discussing any points they may raise. Indicate that these are predictions - they may not happen, not because computers are unable to do these things but because it is not socially acceptable to allow them to do them. Ask for examples where this might be true.

Lastly, to encourage children to think about the implications of the growth of technology give out the statements about the world we might be living in (sheet M/P/20). Your opportunities for creative work from this are manifold. Use the sheet as you see fit either to initiategroup discussions, to set creative writing exercises, to draw imaginative pictures, to provide material for drama, or whatever.

This completes the sessions on applications and implications of computers and Module 4. It has covered some of the major topics of concern and many of these are social rather than technical. It is important that children see and know this.

WHAT DID YOUR PARENTS DO YESTERDAY

E

M/T/37

1 [illegible] THE ALARM

2 [illegible]

3 [illegible]

4 [illegible] THE BUS

OR

5 [illegible] THE CAR

6 [illegible] TO THE DOCTOR

7 [illegible]

8 [illegible] YOUR LETTERS

9 [illegible]

10 [illegible]

M/T/38

Manufacturing Information held ON Computer Files

Production Information

(How many parts in the warehouse?)
(cost of each part)
(Dimensions of each part)
(Names of Suppliers and prices)
(Assembly-line information)

SALES INFORMATION

LIST OF CUSTOMERS
. Market Research Information
(How many clocks in warehouse)

- PRICE OF EACH TYPE OF CLOCK
- COMMON FAULTS
- SALES BY COUNTRY AND TYPE

(Distance and location of Customers

COMPANY INFORMATION

- EMPLOYEES BY DEPARTMENT
- WAGES SALARIES OVERTIME RATES ETC
- HOURS WORKED EACH SHIFT
- MEDICAL INFORMATION

1. WORK OUT, FOR 50,000 PEOPLE, THE WAGES AND SALARIES, TAKING INTO ACCOUNT

   a) No. OF HOURS WORKED AT EACH BASIC RATE

   b) OVERTIME AT, SAY, TIME AND HALF

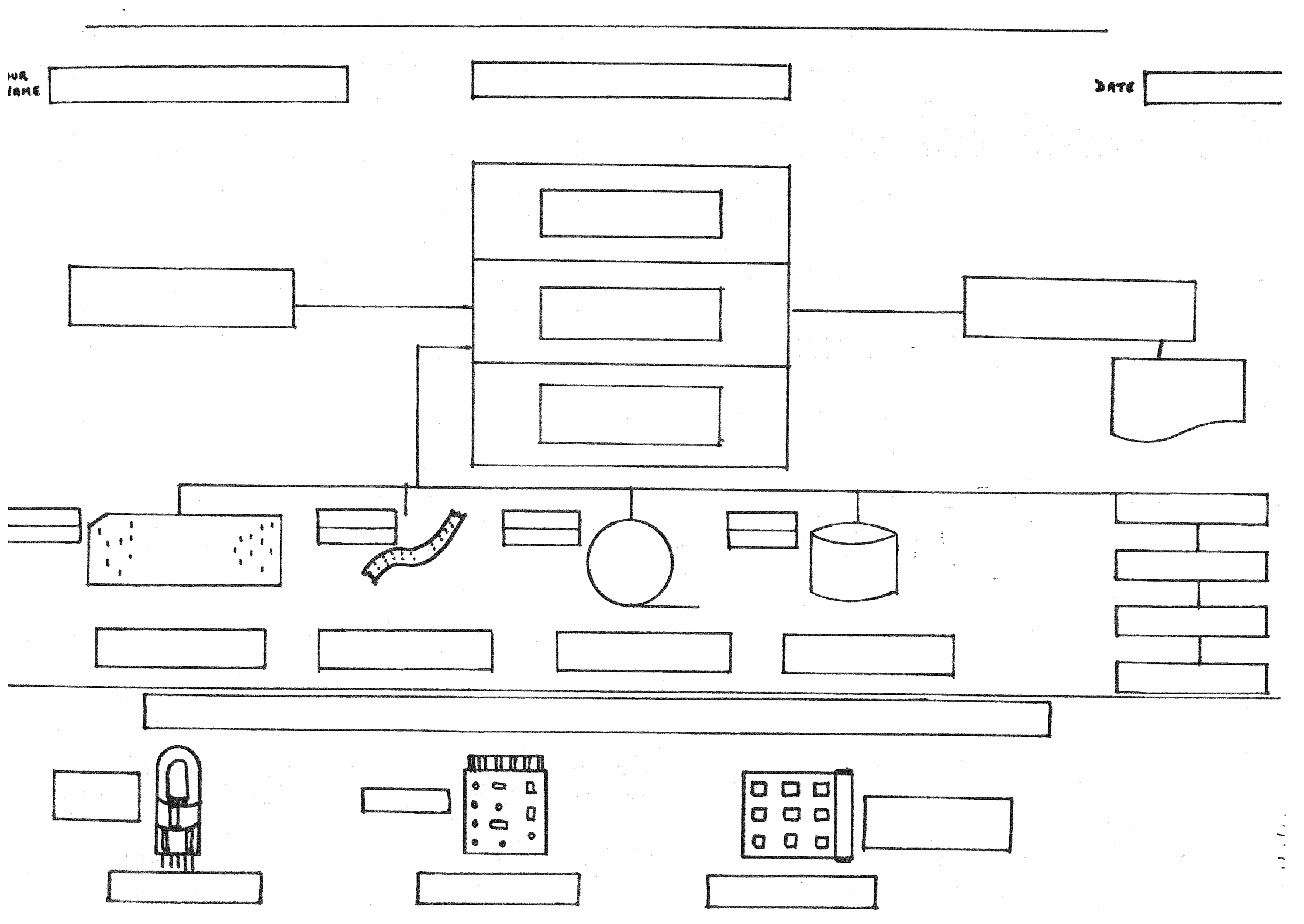
   c) DEDUCTIONS FOR
   NATIONAL INSURANCE
   PENSION SCHEMES
   P.A.Y.E TAX
   GRADUATED PENSION
   SUPERANNUATION
   HOLIDAY SCHEMES
   ETC ETC ETC

2. ADD UP THE TOTAL WAGE AND SALARY BILL FOR THE COMPANY, BY DEPARTMENT AND IN TOTAL.

3. WORK OUT AN ORDER FORECAST FOR THE NEXT MONTH FOR 20,000 ITEMS OF STOCK IN THE COMPANY WAREHOUSE, HAVING ALSO ANALYSED HOW EACH ITEM HAS BEEN USED IN EACH MONTH OVER THE PREVIOUS 24 MONTHS.

4. PRODUCE STATISTICS ON ALL THE ABOVE AS REQUIRED, TOGETHER WITH STATISTICS ON THE AVERAGE HEIGHT, AVERAGE WEIGHT, AVERAGE AGE ETC, ETC, FOR ALL CLASSES IN ALL SCHOOLS IN HAMPSHIRE, SOUTHAMPTON, DORSET AND WEST SUSSEX.

   ETC, ETC, ETC.


DATE

How does a computer store information?

You have learned that a ferrite ring is a two-state device. What do you think this means?

2. Describe in your own words the piece of ferrite core store you have just seen.

3. In the space below draw a small part of it magnified so that you show what it looks like.

4. Which of the following is not a two-state device? Tick or cross.

A light bulb____ A brick____

A television set____ A bicycle____

A door____ A mouth____.

5. Let us imagine that you wanted to tell your friend whether to come to your house tonight, using the kitchen light as a signal. What is probably the simplest way you could do it without switching it on more than once?

6. If, in the last question, you said that you could leave it on or off you would be right. This would mean that you could pass two messages - come if it is on, don't come if it is off. If you could use 2 lights, say the kitchen and the bedroom, how many messages can you give him? Write it as on or off in the box.

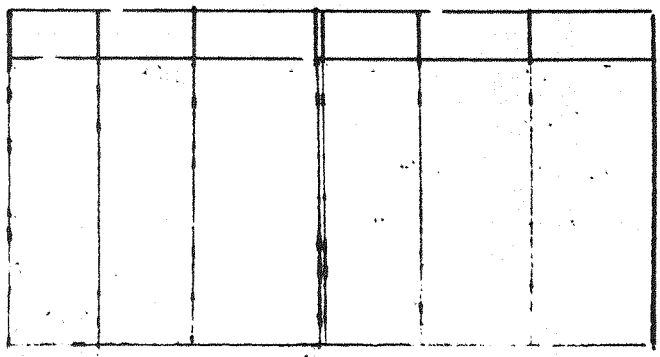
Kitchen light	Bedroom light

8. And if we can use 4 ferrite rings, how many messages can we send?

9. Write down on a piece of paper the number of messages you could send in answer to the last 4 questions. Do you notice anything about them?

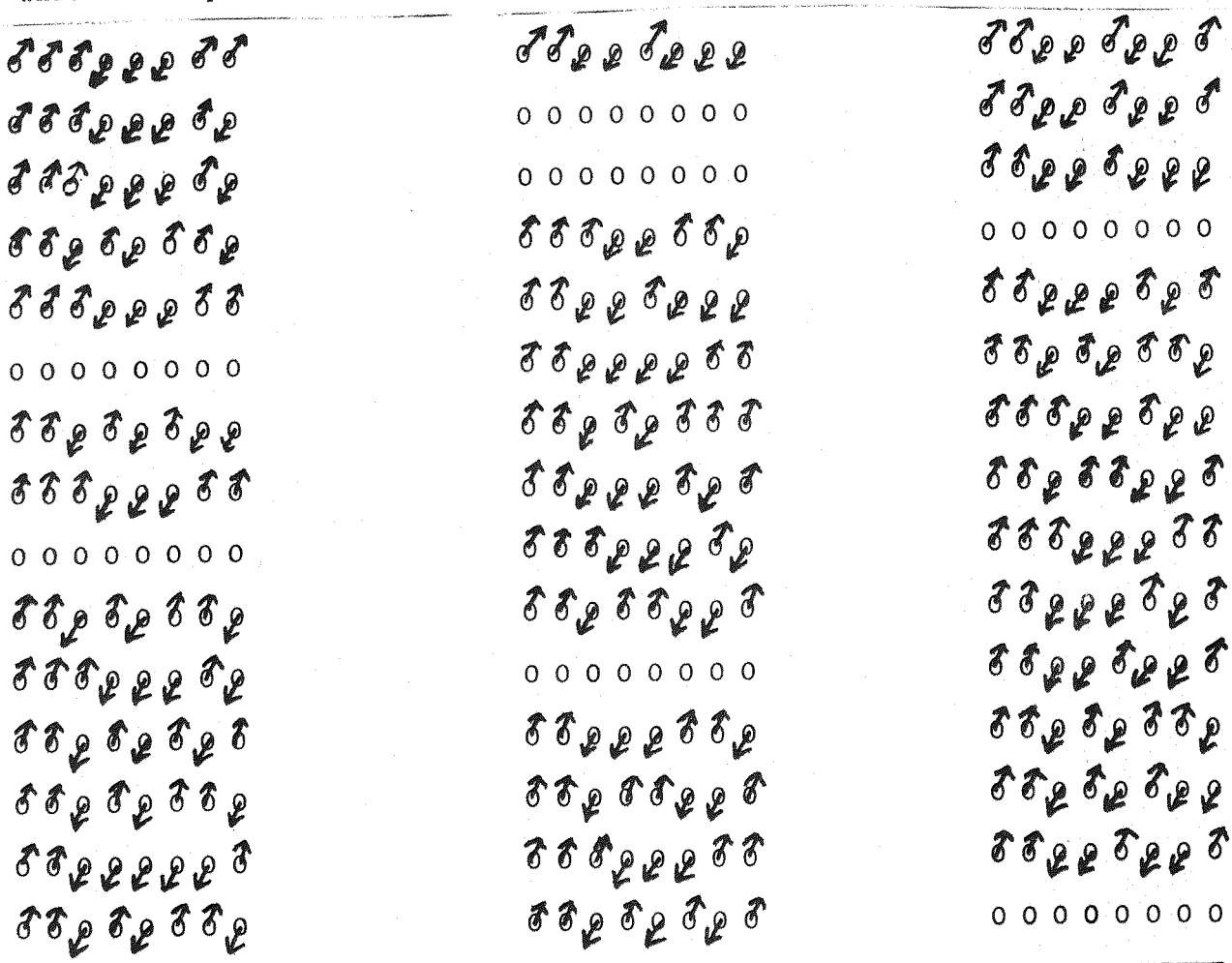
10. How many combinations of '1's and '0's can you make with 8 rings?

7. Now be careful. Instead of lights we will use ferrite rings which can be magnetised in one direction or the other. If we call this  a '1' and this  a '0' how many pieces of information can we store using 3 rings which we can magnetise one way or the other? Use the box to help you.



A MESSAGE IN COMPUTER CODE

The message below is written in computer code. The code is below. Can you crack the code and interpret the message. In doing this you are doing exactly what the computer would do to find out what is in its memory.



A = 11000001	B = 11000010	C = 11000011	D = 11000100
E = 11000101	F = 11000110	G = 11000111	H = 11001000
I = 11001001	J = 11010001	K = 11010010	L = 11010011
M = 11010100	N = 11010101	O = 11010110	P = 11010111
Q = 11011000	R = 11011001	S = 11100010	T = 11100011
U = 11100100	V = 11100101	W = 11100110	X = 11100111
Y = 11101000	Z = 11101001		

Remember the wires going through the tiny doughnuts? What do you think the arrows on the symbols on the message above refer to?

THE INFORMATION MACHINE AND ITS PERIPHERALS

The passage below explains what the next sheets are about. Some of the words are missing but the number of dashes tells you how many letters are in the missing word. See if you can deduce what the passage should read like by completing it.

++++++++++++++++++++++++++++++++++

So far, we have studied information, where we can ____ it, how much there is of it and when we might need it. We found that there is so ____ of it around us that discovering it only leads to our having to ask more and more _____ about it. We also found that all of us need to be able to obtain _____ most of the time and the older we become, the more complicated things we do and the ____ information we ____. In our school subjects we are using the ___ information we already have s_____ in our m_____, learning ___ information about the world around us and the way people behave in it and so coming to u_____ the ways in which we can live a richer and more varied life. We have discovered that there is so much information in the _____ about us that we couldn't possibly _____ it all, and that what we need is a m_____ which will store what we need to know and help us obtain it when we need it. This machine should also be ____ to take some pieces of information, put them t_____ with other pieces and produce new information which has been pro_____ to give us the answers to some of the _____ we are always asking. For example, it should be able to examine our personal records, look at the parts of the records which give our m_____ history and produce a list of those of us who can be b____ d_____; or it should be able to examine the s_____ records and make a list of everyone who lives in a certain village, or who is a_____ from school on certain days regularly, or who has not had a polio v_____, or who has false teeth. We have thought that a machine which can do all of these things and more is the _____, and so we studied all the separate parts of this machine and looked at some bits and p_____ from it. While we were doing this we decided that the _____ itself (the part that does all the processing) needs to have _____ to enable it to do its job. This _____, we found, is made available to it in many d_____ ways. We call all those machines which help to give _____ to the _____, or get it from the computer, p_____ (if you are stuck with this one, look somewhere near the top of the paper.).

The next few sheets ask you some questions about these p_____ and about the c_____ they serve. You can obtain the information for the answers from some publicity leaflets which your teacher will give you. The questions can be answered in any order so that you do not need to wait for a particular leaflet, and in answering the questions you will find out more about the sizes and speeds of these remarkable machines. Go ahead and answer them now.

Question Number 2 Reference Sheet :- 24 7241 System/370 Model 125

This question looks at a computer system - that is the central processor and all the peripheral units which can be put around it to feed information in and take it out. Make sure you have the reference sheet and answer the following questions from it in the spaces provided.

++++++++++++++++++++++++++++++

a) Let's look, first of all, at the processing unit. On the picture on the front of the leaflet describe where you think it is. _____

b) Look back at the diagram you have just completed. Which three parts make up the Central Processing Unit? Answer below.

c) Every computer has a storage capacity. It is one of the ways we can measure how big a computer is. Which word do you think describes a character of information? B___ .

d) In fact a byte is one of those 8 part codes you used when you were deciphering the secret message. What was the code for letter G? _____

e) What is the maximum and minimum size for this particular processing unit for the main store. Maximum = _____ Minimum = _____

f) A way of measuring the speed at which a computer works is by measuring the time it takes to read one or two characters of information from its store. What name is given to this time and how long is it in this machine? C _ _ _ _ T _ _ _ .

g) The last question mentioned a word beginning with n which is a measure of speed. Look it up and describe how fast it is. _____

h) What is the console file used for? _____

i) Look at the picture opposite. Describe what it shows. _____

j) Most Central Processors have a means of communicating with the computer so that the operators can put in extra instructions to tell it what to do, or so that the computer can tell the operator why it cannot do certain things. How do you think the computer knows what to write? _____

k) We shall be looking at peripheral units on other sheets. However, notice that the leaflet mentions which devices can be attached to the Model 125. Name four types of peripheral which can be attached to this machine. 1. _____ 2. _____ 3. _____ 4. _____

l) How can we tell one periphal from another if we didn't have pictures? _____

Question Number 3 Reference Sheets :- 24 7101 129 Card Data Recorder
24 6915 96 column Punched Card
24 7033 System/370 Facts

In this question we are going to look at the punched card, how the holes are put into it, how it is read and at the speeds of the various machines which deal with cards. You have already studied some aspects of the card so we will start by seeing what you can remember about them.

++++++++++++++++++++++++++++++++

a) You have looked at two sorts of card. How many columns are there on each?

_____ . b) How many characters does each card type hold?_____

c) Look at 24 6915. The first paragraph under the picture mentions two uses. What are they? 1._____ 2._____

d) Turn over. There are five specifications given (ie the size, type of material used etc which every card must keep to). What, in this case, is the standard for evry card measured by. 1._____ _____

2._____ 3._____ _____

4._____ 5._____ _____

e)Look at the Data Recorder Sheet. Look closely at the picture of the machine. You can see two cards on it. What is the difference between them?_____

_____

f) What is the purpose of this machine?

_____

_____

g) The word 'buffered' in this case means that the holes are not punched into the card immediately but are put into a small store inside.'The information is punched twice. Why, do you think?_____ ___

_____ _____

h) How is the information put into the card?(Look at the picture at the top.)

_____

_____ _____

p) At what speed dan cards be punched on instuctions from the machine? P1.....P2.....
P3.....q) Why do you think this is much slower than the reader?

_____

r) On the back of this sheet write in other things you find interesting or think important about cards.

j) Look at the Facts Booklet. Find the 3 pages about card readers and punches. Find the two words which refer to the following.1. The place where you put the cards into the Reader.....
2. The place where the cards finish up after being read.....

k) What are the capacities of each?

_____

1) What is the speed of the two models of the card reader. B1_____

B2_____

m) Let's get some idea of how fast this is. Take B2 as an example.How many cards per second is this? _____

n) 1000 cards is about a foot thick. At what speed do the cards travel per second?

_____

o)Work out how many characters are being transferred from the reader into storage per minute._____ _____

Question Number 4 Reference Sheets :- 510 0005 Direct Access Storage Devices
24 7019 3330 Disk Storage
24 6510 2314 Direct Access Storage
24 6425 2301 Drum Storage

In this question we are going to examine some Direct Access Storage Devices. These are peripheral units which store information in such a way that it can be retrieved by the read/write head without having to start at the beginning. In other words, you can obtain the information you want directly, just as in a library you don't start at the first shelf and read through all the titles to get the book you want, but look up the index and walk straight to it.

++++++++++++++++++++++++++++++++++++

a) Look at the red folder,'Direct Access Storage Devices'. Which four types of unit are described in this? Answer below.

b) We can measure the efficiency of these devices in three ways - by the amount of information they can hold (C_____), by the speed at which information can be put into storage from them (S____), and by the time it takes to get to the information (A_____). Fill in the brackets.

c) The 2311 disk pack can hold_____ bytes(or_____digits), while the 2321 Data Cell Drive can hold_____ bytes(_____digits). Complete. Which holds most information?_____

d) Which of the four devices on the card :-

i) Holds most information?_____

ii) transfers information quickest?_____

iii) gets to information quickest?_____

Give figures in your answer.

e) Look at 3330 Disk Storage. How many disk packs on the front picture?_____

f) Turn over. How much information does each disk pack hold?_____. How much do the four drives on the picture hold?

g) The 3330 is a much more recent type of disk. How long does it take at a minimum to get at the information?

_____. At a maximum?_____

Average?_____

h) Having arrived at the start of the information file, how quickly can it transfer it into the processor?

i) Look at '2314 DASF'. This gives some information about the disk pack. Fill in the boxes below as requested.

Weight of one disk pack	
No. of recording surfaces	
No. of tracks on each	
Bytes per track	
Capacity of one disk	
Average access time	
Time taken to write info	

j) How is information read from a disk pack?_____

k) How long does it take to change one disk pack with another?_____

l) In the picture on the top how many disk packs can be put on to the drives?

m) If all the drives are used how much information can be made available to the computer?_____

n) Look at the Drum Storage sheet.In which ways does it outperform the disks

M/P/8

Question Number 5 Reference Sheets :- 24 6903 1017/1018 Paper Tape Reader/Punch
24 6417 Paper Tape Reader
24 6506 2401 Magnetic Tape Unit
24 6810 50 Magnetic Tape Insciber

This question introduces you to Paper Tape and Magnetic Tape. In spite of their names they are very different from each other. They are not Direct Access Storage Devices - to arrive at the piece of information you want you would have to read through the tape from the beginning. They are therefore called 'sequential access' devices since you need to read through in sequence to find your information.

++++++++++++++++++++++++++++

a) Look at the Paper Tape Reader/Punch pamphlet. One can measure the effectiveness of paper tape in three ways.i) By the speed at which it can be read ii) By the number of holes across it (channels) so that a greater number of characters can be represented and iii) By the speed at which it can be punched.
Which types of paper tape can be read by the 1017 reader in terms of widths?_____ No. of channels_____

b) If you had 5 track tape would you be able to represent all the characters of the alphabet, all the digits and a full stop? ____ Why not?_____

c) What is the reading speed of this reader?_____ What is the reading speed of the other Paper Tape reader?_____

d) Why do you think there is such a difference?_____

e) Why is the checking of information as it goes into the machine so crucial? (Remember GIGO = Garbage in, _____)

f) How fast does the Paper Tape Punch work?_____

g) Paper Tape is quite thin. If you wanted to make sure that your records could not be destroyed by breakage what could you use in its place?_____

h) Look at the Magnetic Tape Unit sheet. What are the vertical containers which, on the picture, stretch down beneath the crosspiece?_____

i) We can measure magnetic tape in many ways. See if you can complete the boxes for the questions below.
No. of characters which can be packed into 1 inch of tape [ ] or [ ]
Fastest speed at which the tape can travel and be read [ ]
Fastest speed at which information can be transferred into the processor [ ]
Fastest length of time to read completely through a tape from one end to the other [ ]

j) Most tapes are 2400 feet long. Work out how much information the Model 5 could theoretically hold_____

k) How wide is computer magnetic tape?_____ and for your home tape recorder?_____

l)What is a magnetic Data Inscriber used for?(Continue on the back of the sheet if necessary.)_____

M/P/9

Question Number 6 Reference sheets :- 24 7021 3211 High Speed Printer
24 6612 1403 Printer
24 6426 1052 Printer-Keyboard

This question shows you what different printers can do. Printers are the way by which the computer can communicate with us in the language we understand and so they are very important in any computer system.

++++++++++++++++++++++++++++++

a) Look at the 1403 leaflet. Look at the picture of the printer. What do you notice about the stationery being used?_____

_____

b) Why are there holes down each side of the paper do you think?_____

_____

c) One way of measuring a computer is by its speed. For the next few questions refer to the leaflets for both 1403 and 3211. What is the highest printing speed for both these peripherals in lines per minute?
1403_____ 3211_____

d) The words 'character set' mean the number of different characters used on the printer at any one time. On the lines below write the characters you would expect to see in a 48 character set. (start with the letters of the alphabet.)_____

_____

_____

_____

e) The width of the line which can be written onto the paper is also important. How many characters can be put onto one line on the 1403?_____ On the 3211 you can expand this up to_____.

f) Another thing which affects the width of the line is the number of characters to the inch. On both machines this can vary between ____ and ____ inches.

g) How many lines to the inch on both models? 1403_____ 3211_____

Draw a high speed printer below.

h) Here is a small sum for you to do. If the High Speed Printer is printing 2000 lines a minute and each line is 132 print positions how many characters per second is it printing?._____

i) And just so that we can see just how fast this is, get your partner to time how fast you can write legibly over a minute, and then count the characters. How many?____ How much faster is the printer than you?_____

j) Look at the Printer-Keyboard leaflet. This has a different purpose. What is there on the picture which is not on the other two?

_____

k) What does the leaflet say that this machine is mainly for?_____

_____

l) What speed does it have?_____

_____

m) How does it print?_____

_____

n) What advantage does this method give?_____

_____

o) Why is there a keyboard on this machine?_____

_____

_____

M/P/10

Can you answer these?

The job of a programmer requires logical ability and a careful mind. Have you the aptitude to be a programmer? How many of these can you answer correctly?

****

1. How far can a dog run into the woods?

2. Why can a man living in England not be buried in Scotland?

3. An electric locomotive is heading north at the rate of 40 mph. It is being chased by a wind blowing at 80 mph. Will the smoke from the locomotive be blown ahead of the train at the rate of 40 mph?

4. Some months have 30 days. Some have 31. How many months have 28 days?

5. If you had only one match and entered a room in which there was a paraffin lamp, an oil-burning stove and a wood burning fire ready for lighting, which would you light first?

6. If a doctor gave you three pills and told you to take one every half-hour, how long would they last you?

7. Take two apples from three apples and what do you have?

8. I have two coins in my pocket and together they add up to 12 pence. But one is not a ten pence piece. What are the two coins?

9. Is it legal in this country for a man to marry his widow's sister?

10. How many animals of each species did Moses take on board the Ark with him?

11. A farmer had 17 sheep. All but 9 died. How many did he have left?

12. There is a solidly walled enclosure with a solid 8½ feet wall dividing it in half. In one half is the baby bull. In the other half are the papa bull and the mama bull. How can the mama bull feed the baby bull?

13. A small planeload of tourists from England was flying over the Channel Isles. It meets with a fatal accident and none of the remains can be identified. In which country, France or England, would the survivors be buried?

14. I recently found a coin with the date 46 BC. How do you know I lie?

M/P/11

Would you/could you be a Programmer?

We have spent some time looking at the jobs computer people do. The programmer's job is one of the best known since he or she is the person who makes the machine do its job of providing us with what we need from it. The programmer writes the instructions which tell the computer exactly what to do - so naturally, the computer being nothing more than an electronic idiot, these instructions have to be written in a very special way. Let's see if we can find out a little more about the job - by answering the questions below you are in a way solving problems - this is what the programmer is paid to do. The answers to your particular problems are in the booklet called ' The Programmers'. The answers to the programmer's problems are sometimes also found in books but often are locked up in other peoples' minds.

****

1. Look at the inside front cover. What is the picture?.....
What does it say about the picture?.....
.....
.....
Express this in your own words.....
,.....
.....
2. Who are the people mentioned do you think?.....
3. Remember the questions earlier in the lesson?(How far can a dog etc). What did these questions force you to do in order to get the right answer?.....
.....
4.Look at page 5 headed "The Programmers'. The titles to the second and third sections on this page sum up what a programmer has to do. What do they say?

1.	2.

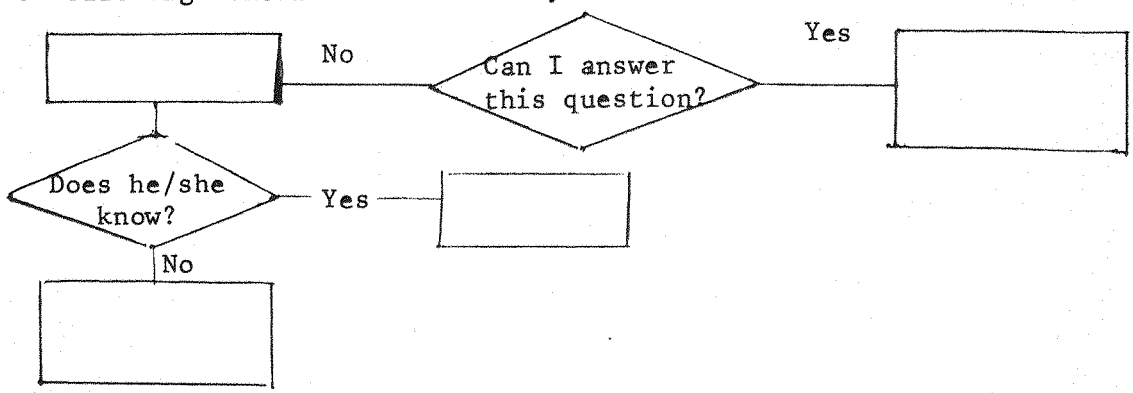
5. In the first section on page 5 it tells you what programmers are known for. These things are written out below. Say what you think they mean, in your own words.
a) Their analytical minds - .....
b) Their penchant for working on complex problems in closely-knit groups - .....
.....
c) Their ability to stay cool under deadline pressure - .....
.....
Which of the above do you have?.....
6. Read the first two sentences in the second section on page 5. In order to understand a problem he must be able to .....
7. Read the second paragraph in the second section. Let's imagine that you, at school, are in the same position as a progremmer. Can you think of a particular type of work you are often asked to do which requires you to do this? Describe how you tackle the problem.....
.....

Would you/could you be a Programmer? (2)

8. Read the first part of the third section on page 5. What does the programmer draw and why?.....

9. Turn over to the next pages (7 and 8). This is a picture of a flow chart. We don't have to know what it is for. The rectangles on a flow chart contain some action that has to be done; the diamond shapes contain a question to which there may be two answers. Look at the diamond shapes . What are the two answers coming out of each?.....
You draw flowcharts in your mind all the time whenever you make a decision. For example

Complete the following mental flowchart for yourself.



You see, whenever we have to take a course of action or make a decision we have to ask ourselves a question and know what the alternatives are. We do this all the time whether we realise it or not, and this process is called logical thinking - It is often what distinguishes man from the animals in his ability to do this. On the back of this sheet try to draw a simple flowchart of the thought processes you go through when you get up in the morning up until you sit down for breakfast. Think of all the questions you have to ask yourself (eg is it time to get up), draw diamonda with two outlets, and all the courses of action you take step by step - these will be in rectangles.

10. This is much the same sort of breaking down process of a problem that a programmer does, except that their problems are a little more complex than this. Turn back to page 5. R-ad the fourth section 'Translating by Machine'. What is a bug?..... Does a program always work the first time?..... How is the program entered into the computer?..... How many different types of programmer are there and what is the difference?.....
.....

11. Turn to page 12 headed 'Applications Programming'. What problems have the people pictured on that page solved?

a) Colin Blair - .....

b) Annette Morgan - .....

12. Look at the picture on page 17 . What connection has a programmer with getting people to the moon, do you think?.....

Would you be a programmer?..... Could you be a programmer?.....

Why or why not?.....

ENIAC (Electronic Numerical Integrator and Calculator)

A description of the first electronic computer using valves.

****

When the United States entered the war there was a need to find a machine which could calculate firing tables for artillery. In other words it had to take into account how far guns could shoot in different types of weather, wind direction, wind speed, air temperature etc and with different types of shell. A skilled operator could take up to twenty hours to work out the calculations needed to fire each shell accurately. ENIAC could work them out in half a minute. (A modern computer could do this in less than a second).

ENIAC was developed at the Moore School of Engineering at the University of Pennsylvania in the United States of America. It was a colossal machine compared with todays computer. It weighed almost 30 tons and needed 15,000 square feet of floor space - in fact it was so large that it occupied the entire vast basement of the School of Engineering building.

More than 19,000 vacuum tubes (valves) were used, and to make it work, many people had to wire it up correctly and check every valve. This had to be done between every calculation that was required from it. Each component had a limited life and every time a valve went wrong, the faulty one had to be found before being replaced - not an easy task among 19,000 of them.

ENIAC worked at a rate of 5,000 steps a second (this may sound rather fast but compare it with the 10,000,000 + steps of the modern computer) and on average produced one fault every half hour, (How many uninterrupted calculations did this give?) in spite of the fact that the valves made for it were specially strengthened to last longer than usual.

From its completion in 1945 it solved many ballistics problems for the US army until it was put into the Smithsonian Museum in Washington DC in 1955 where it can still be seen.

How things have changed....

You have just learned a little about how computers have changed over the past few years, and seen some of the bits and pieces which show it. Let's see how this process has come about and what it means to us and the world in which we live. You will need to work from the booklet ' More About Computers'.

****

1.Look at pages 2 and 3. How did primitive man record what his possessions were?

.....

2. The first machine used for counting was the abacus. In a sense this is perhaps the first computer. In the space on the left below draw an abacus. On the right describe how it works..

3. How long ago was the abacus first used?.....

How many years ago was this? .....

When did the first digital computer first appear? .....

How long ago was this?.....

It took man ..... to progress from the abacus to the computer and only ..... to improve the computer so that it can perform hundreds of times faster and be far more reliable. Why do you think this is? What does it mean?.....

.....

4. Look at page 5. Why did Herman Hollerith use electrical tabulating equipment?

.....

How did his pantograph work?.....

.....

.....

5. Read about the Mark 1. How heavy was it?..... How many devices?.....

How much wiring?..... How long did it take to add two twentythree digit numbers together?..... How long to multiply them?..... How long did it work ?.....

6. Now turn to page 14. Read the section on Core Storage. How fast do things happen in the Central Processing Unit?..... In the right hand box below draw a diagram to show a monolithic memory module; in the left draw a diagram to how core storage works. On the back of the sheet describe each.

M/P/15

HOW COMPUTERS ARE USED IN.....

You have just learned how computers may be used in an Alarm Clock Factory. Most of the other things in your house also have some connection with a computer back in the place where they were made. But it isn't only in manufacturing companies where computers are used. You should have a few pamphlets avilable to you from which you can discover the answers to the following questions. It Doesn't matter which order you answer the questions in ..... but the answers are all in the pamphlet named.

****

1.Question: What did you do today? Answer: Went to the doctor.(Millions of people do).
Pamphlet to be used: Medical Programs and Services for Improving Health Care (520 2214)

a) Look at the picture on the front and back pages of the pamphlet. What is it of?

.....

b) Inside the cover is the next stage of the story in a picture. What is happening?

.....

c) Look at page 4. What has the nurse in front of her? .....

d) Let's find out more about what she might use this machine for.Look at Page 6.
Six departments of a hospital are printed in thicker type. Put these in the boxes.

1.	2.	3.
4.	5.	6.

e) Five main uses of the computer in the Dietary department are listed in the writing.
What are they?

1.	2.	
3.	4.	5.

f) Most of this is written in medical language. Let's try to write it in our own words. If you were a patient in a hospital how would a computer help you to eat the right things? Answer in your own words. .....

.....

g) Let's imagine that someone you know has to go into hospital for a major operation. A computer can help here as well. Read what the pamphlet says about admissions(Page 6) - what does the computer do about your friend? In your own words.....

.....

h) Read through the rest of the pamphlet. Write in your own words three other uses of the computer in the hospital. i).....-.....

.....

.....

ii).....

.....

iii).....-.....

.....

j) On the back of this sheet draw a diagram which shows a box labelled'computer' in the middle with lines to other boxes which say what the computer can do.in the hospital.

Give it the title 'A HOSPITAL INFORMATION SYSTEM'.

HOW COMPUTERS ARE USED IN..... (2)

2. Question: What did you do today? Answer: Went to the Bank (millions of people do).
Pamphlet to be used: Lloyds Bank -AComputerised Accounting Service (24 6940)
It has been estimated that, in this country, the business of the banks has grown so much over the past twenty years that to keep to the old methods would mean employing every man, women and child to work in the banks. Let's find out how they solved their information problems.

a) Look at the machine on the front of the pamphlet. What do you think it does? (hint - the pieces of paper are cheques).....

b) Look at the map on the inside cover, What does it show?.....
.....

c) Look at page two - see if you can extract the following information from the description. i) In 1969 Lloyds Bank had ..... branch offices and ..... sub-branches.
ii) The Computers are kept in two cities - ..... and .....
iii) Up to ..... cheques are handled each day in the bank. They come in ..... order. The numbers are written in..... .... along the bottom of the cheque. The sorter can sort ..... cheques an hour.
iv) By 1969, a total of ..... accounts were being processed by computer.

d) If your parents have a bank account at any of the major banks they will probably have a cheque book. When they pay someone by cheque, they will eventually, after some weeks receive it back with a statement of their account. The cheque would go through many adventures in the meanwhile. Imagine you are a cheque. Write your life story, including all the processes you would go through and what you think of them.

(Continue on the back if you need to)

e) Look at the Bank account sheet on the inside back cover. How long would it have taken you to write this out?..... How long would it have taken you to work out the figures?..... How long would it have taken you to put 5000 like this into order?.....

The computer can do all these at the rate of hundreds per minute.

M/P/17

3. Question: What did you do today? Answer: Went to school (Many People do).

Pamphlet to be used: Computer Applications in Instruction.

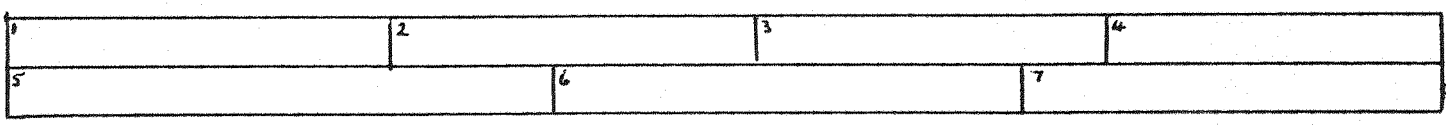
The use of computers in schools is not very far advanced, but it is growing. The schools of tomorrow will look very different from those of today - there will still be teachers and children and Headmasters and Caretakers etc. but the things they all do might be different and done in a very different way. Let's find out what computers can do for the school.

a) Look at the picture on the front cover. Describe what is happening.....

.....

.....

b) Look at the writing on page 2. In the fourth paragraph seven key areas in the use of computers to teach are mentioned. Put these in the boxes below.



c) Look at the picture on page 4. How is the student entering information?.....

.....What other way can you see available to him to enter information?..... How is the information made available from the computer to him?..... The picture also gives you a clue to where most of the computer information is stored. Where?.....

d) Look at page 5 - it will not be long before you are asked to choose a career for after you have left school. Read this page and then describe in your own words how you would go about it if this computer system were available to you.

.....

.....

.....

.....

e) Let's suppose that you have a weakness, say, tables. Look at the page headed 'Drill and Practice' . How do you think a computer might help you improve ?

.....

.....

How do you think this would be different from a human teacher? Would it be better or worse?. Give reasons.....

.....

f) Read through the rest of the booklet. In the space below, or on the back, describe or draw what you think schools may be like 20 years from now. You could do this by describing the school day of an average boy or girl, or by drawing a series of pictures with captions underneath to describe what is happening. Use your imagination.

M/P/18

4. Question: What did you do today? Answer: I did a lot of things

Pamphlets to be used: CALL Project Network Analysis (22 0034),Simulation:Modeling Reality (520 1542),PRINCE (22 6906), CALL Minimis (22 1003).

So far, we have studied three area in which Computers are used- there are many hundreds. Let's look at some more but not in any detail. You should have become used to reading the pamphlets by now.

a) Look at the CALL MInimis pamphlet. The Dark Green pages in the middle have questions on the top. In the boxes below put down three of these.

b) Below the questions is shown one way of finding the answers - what produced these reports?..... Who might want to ask these questions?.....

c) Look at the report below the question on the first dark green page. What does it tell us?..... What is the hold-up?..... ..... Which department would the questioner see to explain where things are going wrong?.....

d) The mis at the end of the word Minimis stands for 'Management Information System'. What do you think this booklet is about?.....

e) Look at 'Simulating Reality'. What does the word simulate mean? If you don't know ask your yeacher or look it up in the dictionary.....

f) Look at Page 3. The second sentence in the second column outlines a simulation problem - what does it say in your own words?..... ....

g) Is the answer to the problem to build the wing and test it for strength or to build up a model of the wing ? ..... h) In the same way you can build up a 'computer model' of the wing and test it for all sorts of stresses - bridge designers always do this - they make a mathematical model of a bridge using symbols to represent the various materials used and test the model by computer. Read the first three paragraphs of the 'Breakwater Project' (page 7) and describe how the computer is used in this problem..... .....

i) Describe in a few of your own words what the computer is used for in PRINCE. ....

j) On the back of this sheet describe what you understand by Project Network Analysis after looking through the pamphlet on the subject. Who would use it and what for?

PREDICTIONS - IS THIS WHAT THE COMPUTER WILL DO?

BY 1978 - Large Urban Traffic Flow will be directed by computer. All traffic lights will be computer-controlled so that as few hold-ups are made and traffic moves as quickly as possible.

- Patients in major hospitals will be controlled by computer.

BY 1982 - Computer-Assisted Instruction will be an accepted technique in some schools. Children will have their courses of study tailored to meet their own particular needs.

- Computers will be used in the courts as an aid to the members of the jury.

BY 1985 - Most doctors will have a computer terminal in the surgery to help diagnose illness, prescribe drugs etc.

- Individual vehicles will be policed by a combination of radar and computer.

BY 1990 - The cashless society. Credit cards etc will be used by most people. Money will not be used to make purchases. Most shops and supermarkets will have computer terminals.

- Some instruction will be at home, using an electronic wall.
- Book Libraries will be on th- way out. Microfiche and microfilm will be used both in the libraries and in the home.

BY 1995 - Aeroplanes will be flown by automatic computer pilots, trains will be driven by computerised guidance systems, and cars will be driven automatically.

BY 2000 - Computers will be as common as television sets in the home and as telephones.

- All major industrial assembly lines will be automatically controlled by computer.

These predictions are made from our knowledge of what computers will probably be capable of in those years - in some cases they are already able to do these things. Whether this will happen or not though does not only depend on the ability of the computer but also on whether it is a desirable thing to do. Many problems will arise - for example, if an assembly line with 2000 people working it were replaced by a computer, where would the 2000 people work? How much do you pay a person for not working? Are we ready for a one-day working week - what do we do the other six days? Who controls what the computer in the home does, or the lessons we learn? These are social problems,not technology problems,; the computer is capable, are the people ready?

What do you think of these????????

The following are some statements and predictions made by people about computers and the effect they can have on all our lives. What do you think? Do they lead to other problems? Can these be solved? Do you agree or disagree? Why?

****

1. The computer is the answer to all the evils of society. It will remove the drudgery from our work and free human beings to do the creative things in life such as paint, write, go to the opera and the ballet, learn about life's higher things and enable us to participate in those things which are worth doing, and which make human beings the unique creation on earth.

2. The computer has changed the way in which we live so quickly and so dramatically that people cannot adjust to the new society. Already we see the tensions that rapid change can bring; a huge increase in mental illhealth and nervous disorders, a deeply divided nation between those whose livelihood may be threatened and those who stand to gain, an enormous investment in violence. These and many others can be laid at the feet of the computer.

3. The computer has changed our priorities in the school. The information explosion means that we cannot hope to keep up with the changes that occur so frequently. The improvement in our capability to retrieve the information we need is our only hope. No longer do we need to learn long lists of facts in order to survive - rather do we need to use those brains that we have to store the sources of the information we will need and to practise the methods by which we can use them. To know that Columbus discovered America in 1492 is useless knowledge - much more useful is to know that, if we need that knowledge, we have the means and ability to find it out.

4. Unless human beings can come to terms with the increasingly rapid change which computers are creating in the way we live, we are doomed to a massive breakdown of society.

5. Computers create problems, but they can also be used to solve the problems they create. They offer mankind the best hope he has ever had of fulfilling his ultimate purpose - what this purpose is differs according to each individual.

6. Computers have not had the slightest effect on my life !

7. Computers are at the forefront of the second industrial revolution - but this time the revolution has such widespread effects because it is happening so fast that we don't have time to learn from the mistakes of the first.

8. The present time is one of the great divides of human history, comparable to the time the apes came from the trees and the time humanity moved from barbarism to [illegible] can only be attributed to the computer and its possibilities,.

IBM

Medical Programs and Services for Improving Health Care

Today the medical community is working industriously to improve the level of patient care while holding the line on costs.

It's an uphill battle. But many have found an effective problem-solving approach involves utilization of a data processing system coupled with specialized medical programs.

And that's true whether you treat fewer than 100 or more than 10,000 patients. Whether the basic problems are centered in administration, patient care, clinical, or education/research activities. Whether the institution has a computer of its own, or shares a central computer with others. Whatever the situation, IBM systems are being used to excellent advantage in hospitals, clinics, laboratories, nursing homes, blood banks and related facilities.

Administration

Rising costs, new reporting requirements and broader availabilities of third-party coverage are increasing the workload of most health care institutions. IBM offers systems designed to facilitate administrative recordkeeping and aid in management decision making.

Patient accounting programs provide for billing inpatients and outpatients, and processing accounts receivable. Inpatient billing programs record all transactions automatically priced with standard charges, prorate charges between patient and third parties, and prepare either detailed or summary patient bills as required. Third-party statements, including Medicare forms, are immediately available from the computer upon patient discharge. By-products of this processing are census reports, revenue analysis, and admitting and discharging statistics.

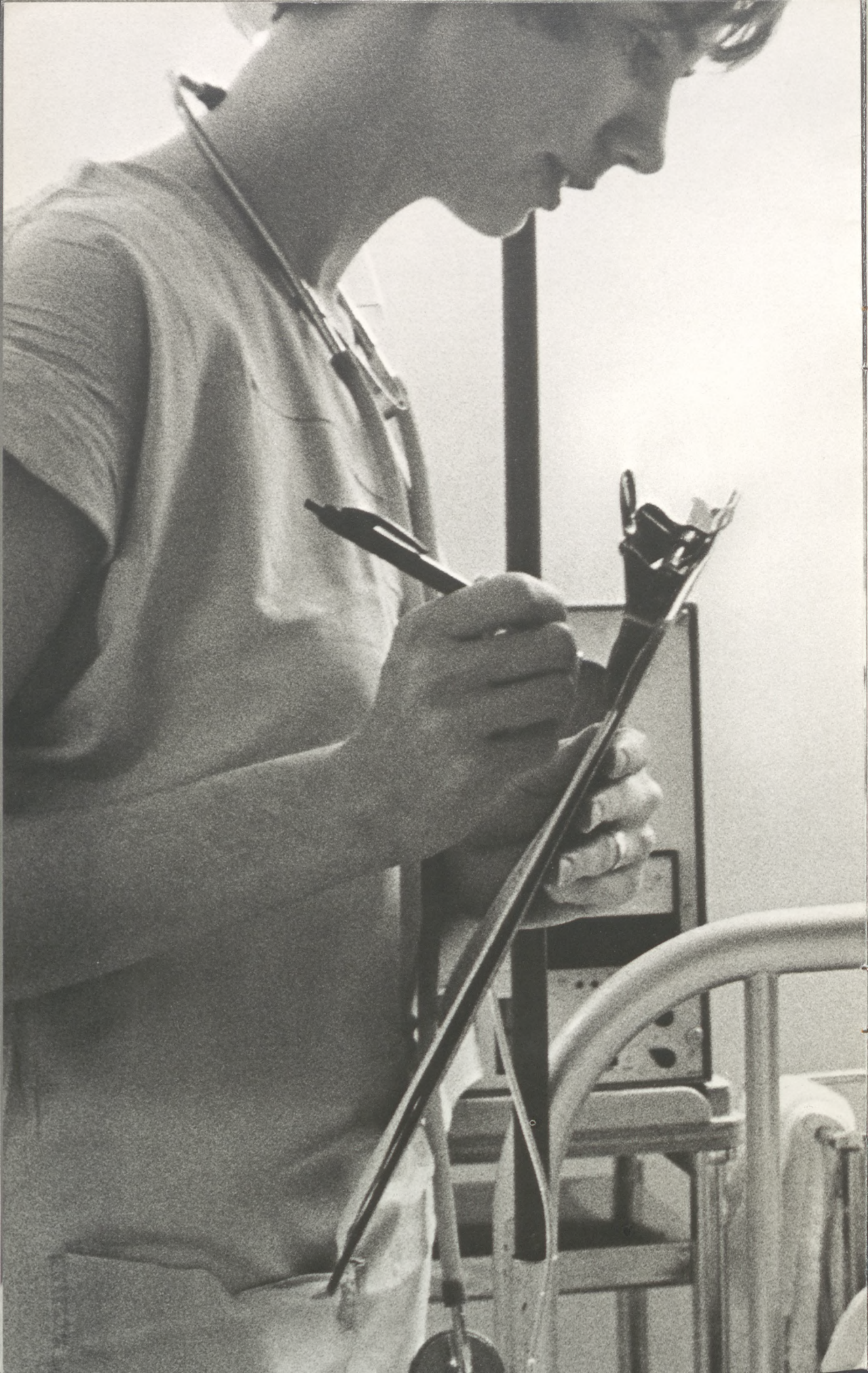
Cash control statements, aged accounts analysis and effective credit controls are provided by the accounts receivable program.

Financial accounting programs include personnel management and payroll, labor distribution, accounts payable, inventory control, purchasing, plant equipment inventories and general ledger applications from trial balance to comparative income and expense reports. These programs also include either step-down or double-apportionment cost application for Medicare.

Management control programs, including cost accounting and responsibility accounting, provide control down to the supervisory level. Utilization review and medical audit programs are also important computer applications in assisting the management control operation. A computerized hospital management simulation has been developed to assist in management training.

Other generalized programs are available for forecasting requirements of future facilities, comparing long-range plans via computer simulation, and monitoring expansion plans.


IBM



Patient care

Nurses, technologists and physicians spend a significant portion of their time performing clerical tasks in delivering patient care. Reducing these clerical burdens through data processing can assure a high degree of accuracy in executing physicians' orders in a timely manner. The by-product information generated permits rapid assessment of staff resources and their efficient application to the patient workload.

In **dietary,** complete food management systems using the computer have been developed for diet order processing, menu planning, food inventory control, purchasing, and special diet therapy planning.

In **medical records,** computer applications include patient indexing, generation of medical indices and statistics, computer cross-referencing for research, chart monitoring for completeness, and sophisticated approaches to the storage and retrieval of free-form text records.

In **radiology,** the scheduling, result reporting, cross-referencing and log maintenance functions are also performed on the computer.

In the **clinical laboratory,** the complete data flow from the physician's laboratory request through result reporting on the patient's chart has been automated. This includes on-line signal acquisition and control of test instruments.

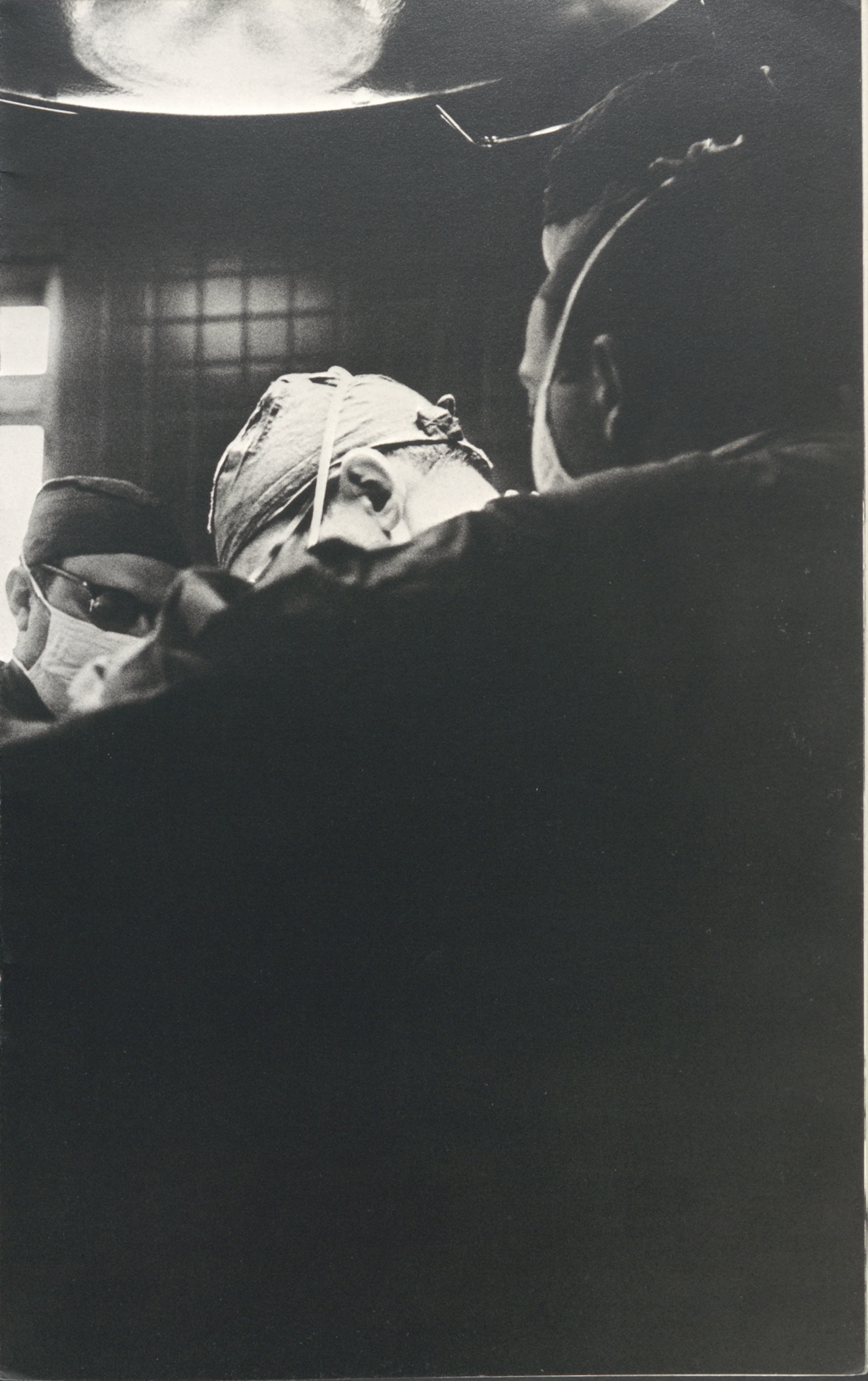
In **admissions,** the determination of bed availability for pre-admits and emergency admissions as well as the complete preparation of the necessary documents is handled automatically by the computer.

In **pharmacy,** following entry of the doctor's order, updating of medication schedules, drug inventories, and drug label preparation are performed by the computer.

In **surgery,** the maintenance of the surgery schedule and surgical preparation notices are under control of the computer.

Other computer functions include patient scheduling, nurse scheduling, and reporting of progress notes.

In a more extensive data processing system, the service areas are integrated into a functional care concept referred to as a **Hospital Information System.** Terminals located in the service departments and nursing stations transmit patient data directly to the computer, updating basic records and schedules. This permits optimum control of facilities and personnel resources for patient care requirements, and gives each physician immediate access to up-to-the-minute information about his patients.



Clinical

As the range of acceptance of the computer increases, clinical applications have broadened. In radiology, the radiation dosimetry application has led to the development of programs for high-energy beam planning, radioisotope scanning and the evaluation of interstitial implants.

Computer programs for both the Franck and classic analysis of the electrocardiogram are in use and a program for arrhythmia analysis is being clinically evaluated. The physician receives time interval measurements, narrative diagnostic statements and graphic plots of the ECG data.

On-line computers are being used in patient monitoring for data logging, identification of trend changes and automated control of blood infusions. Many sensors are computer-monitored. They range from strain gauges for measuring pressure in arterial catheters to chest drainage measuring devices. Related techniques are used in cardiac catheterization so that an immediate analysis is available.

Clinical systems have been developed for the comprehensive health examinations which include self-administered patient histories, acquisition and processing of multitest outputs and development of a comparative health screening report for the physician. These programs have also been developed for ECG analysis, pulmonary function tests, chromosome analysis and clinical decision systems.

Education and research

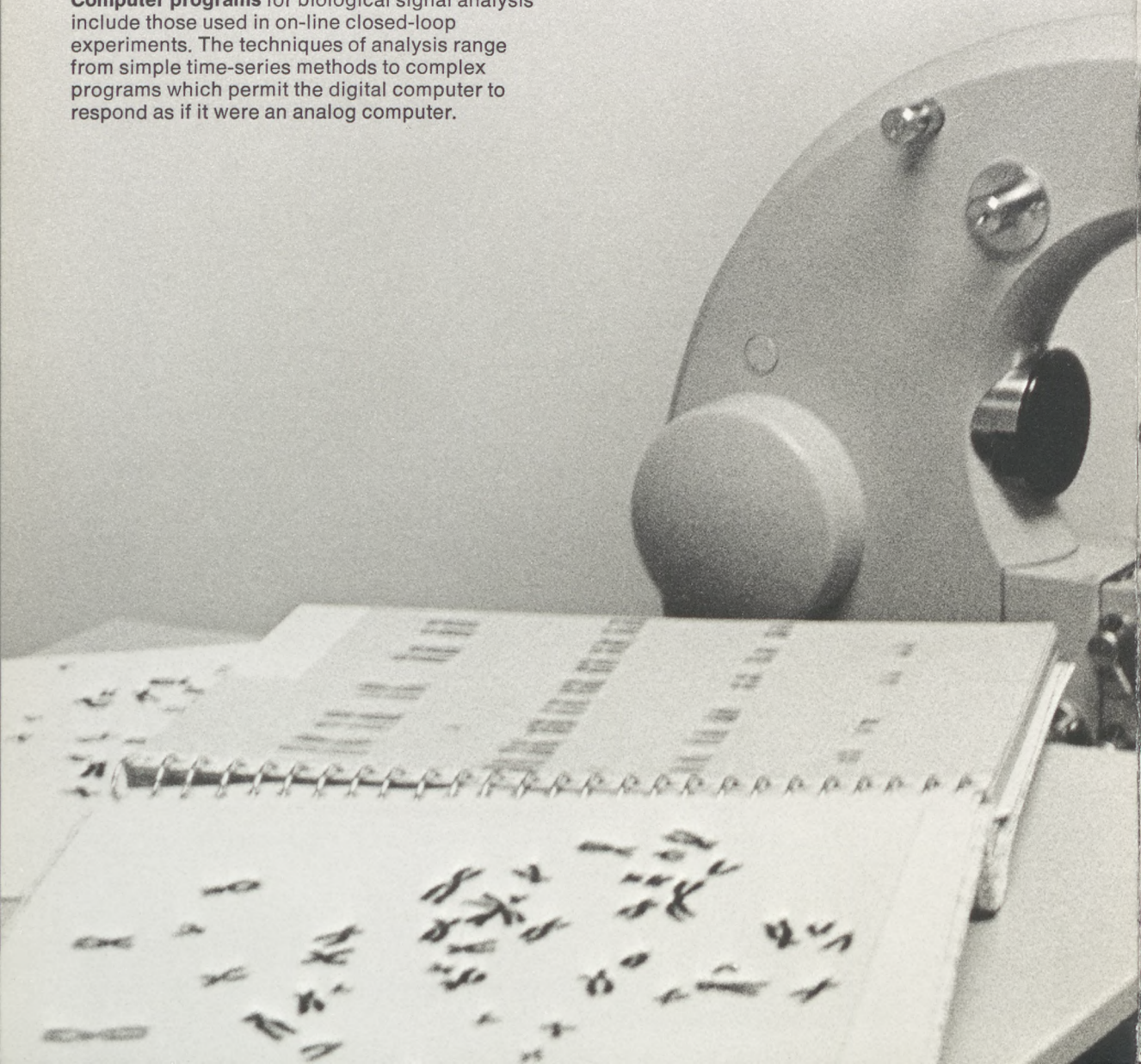
The earliest medical usage of the computer can be traced to this area. Generalized IBM programs support major application groupings such as computer-assisted instruction, statistical analysis, information retrieval, simulation, and biological signal analysis.

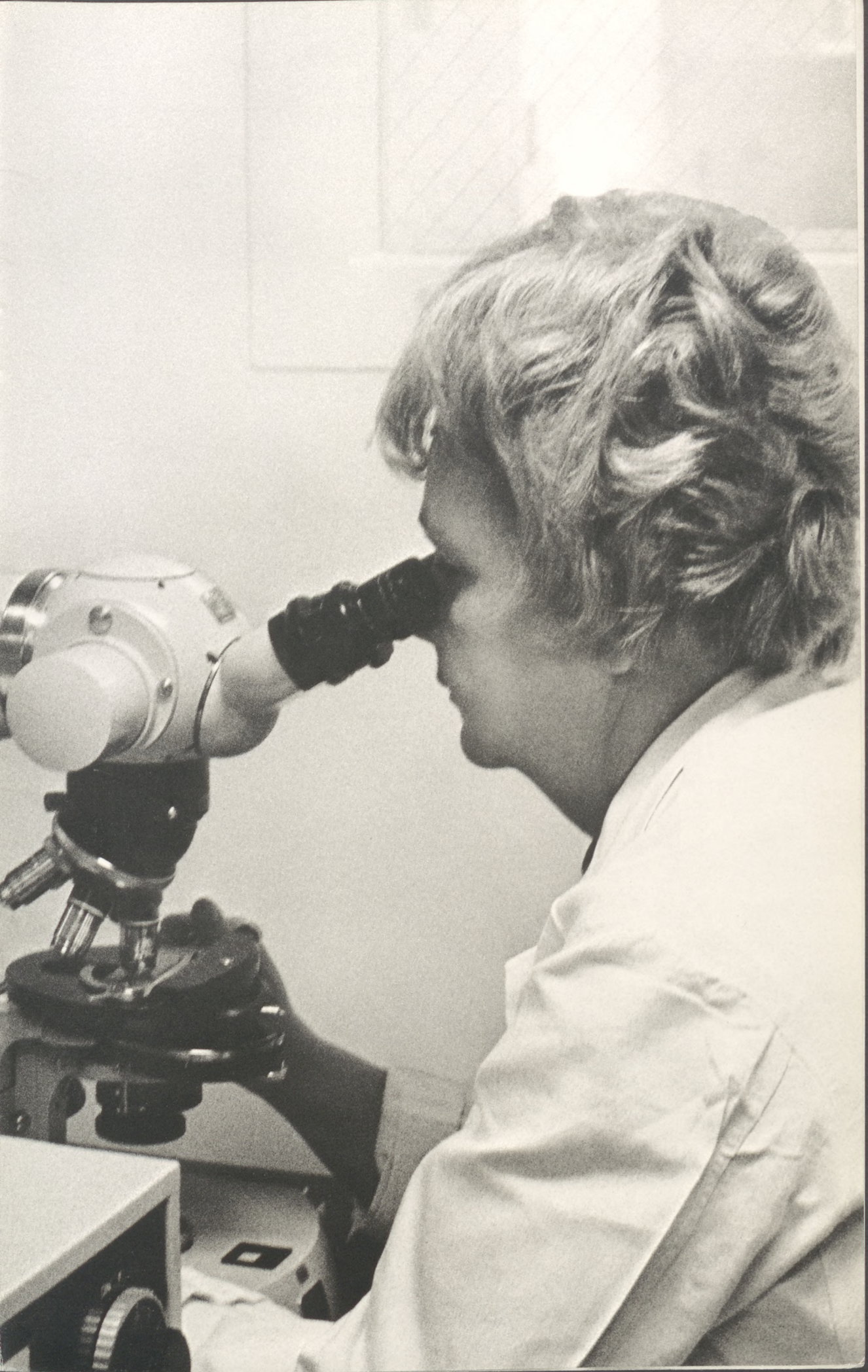
In education, the computer simulates patient responses, teaches psychiatric interviewing techniques and calculates answers to student problems in biometrics. It permits instruction and testing in a wide variety of subjects for full-time or continuing education and inservice training.

Information retrieval techniques are being utilized for the generation of bibliographic information and indexed lists of articles and papers. Related techniques are being applied to drug information and psychiatric records.

Mathematical modeling is used to study complex mechanisms of the body such as the blood chemistry at equilibrium, the electrophysiology of the heart, lung chemistry and neural networks. Clinically validated models may become future diagnostic tools of advanced systems.

Computer programs for biological signal analysis include those used in on-line closed-loop experiments. The techniques of analysis range from simple time-series methods to complex programs which permit the digital computer to respond as if it were an analog computer.





How IBM looks ahead

In support of its services to the medical community, IBM is continuously engaged in research and the exploration of advanced information processing systems for improving patient care and clinical procedures. Basic research activities carried out in medicine and biology range from experimentation with multi-lead ECG models and retrieval of tissue pathology reports without use of coding, to separators that fractionate fragile platelets from the blood in vivo.

Specially trained medical marketing representatives and systems engineers are available to assist you in obtaining a maximum degree of performance from your data processing installation. Qualified professional staffs respond to your medical data processing requirements, conduct medical customer executive classes and seminars, and produce medical support materials for your use.

Get the full story

IBM offers a number of tested and proven programs for meeting the challenges of modern medical management. There are also many programs that have been developed by users of IBM equipment to meet special needs. Some of these programs are available for your use. Ask your IBM representative for detailed information. Let him show you what IBM programs and services can do for you.

International Business Machines Corporation
Data Processing Division
112 East Post Road, White Plains, New York 10601
(USA only)

IBM World Trade Corporation
821 United Nations Plaza
New York, New York 10017
(International)

IBM

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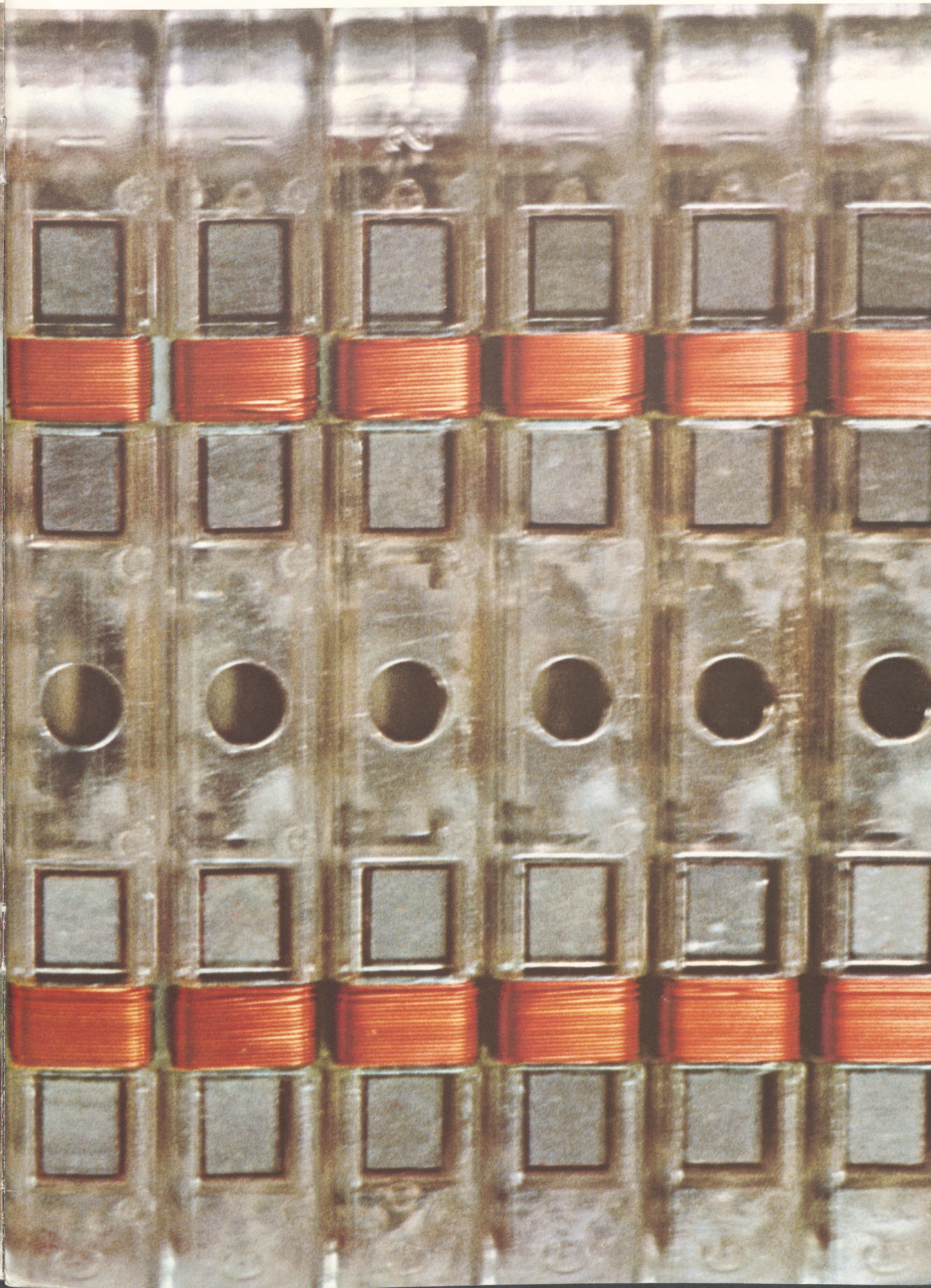
IBM

The Programmers

Computers are nothing more than beautiful pieces of hardware until people teach them how to solve complex problems.



Programmers are exceptional individuals, and the work they do is mind bending, exhilarating and exasperating –all at the same time. Something like writing music, or winning at chess.

Programmers are known for their analytical minds, their penchant for working on complex problems in closely-knit groups, and their ability to stay cool under deadline pressure.

They also have a sense of humor–an invaluable quality when you consider the intellectual effort that goes into writing a computer program which rarely works perfectly the first time around.

A computer program can be as simple as thinking through the few hundred instructions a data processing machine needs to design a new textile pattern, or as complicated as the millions of instructions required to regulate the internal operations of a large-scale computer.

Understanding the Problem

But no matter what the size or complexity of a problem happens to be, the programmer's method of solving it is almost always the same. First, he must understand the problem, and be able to break it down into its component parts. Second, he must know the capabilities and limitations of the hardware that's going to process the data. And finally, he must know precisely what results the computer program is expected to produce.

The programmer begins work on a new assignment by spending weeks, and sometimes months, studying the problem in depth. He may need to become knowledgeable about blood pressure, respiration and pulse rates in order to write the instructions needed to create a computer system for continuously monitoring vital life functions of the critically ill. Or he may need to study a chemical company's inventory procedures in order to write a computer program that can swiftly fill individual orders for hundreds of products ranging from paper boxes to radio-active isotopes.

Finding the Solution

Once the programmer thoroughly understands the problem, he starts drawing a step-by-step flow chart that contains the significant logical steps needed to solve it from beginning to end. In preparing the program he may use standard symbols such as a diamond which stands for "decision," or a rectangle which represents a "major processing function." He'll also use plain English words such as "set distance = rate x time" to describe the decision or operation the computer must perform at that particular point.

Translating by Machine

The programmer takes his flow chart and converts it into simplified instructions which are punched into cards for entry into a computer. The machine then translates the original shorthand statements into the far more numerous and explicit machine instructions which a data processing system uses to solve a problem.

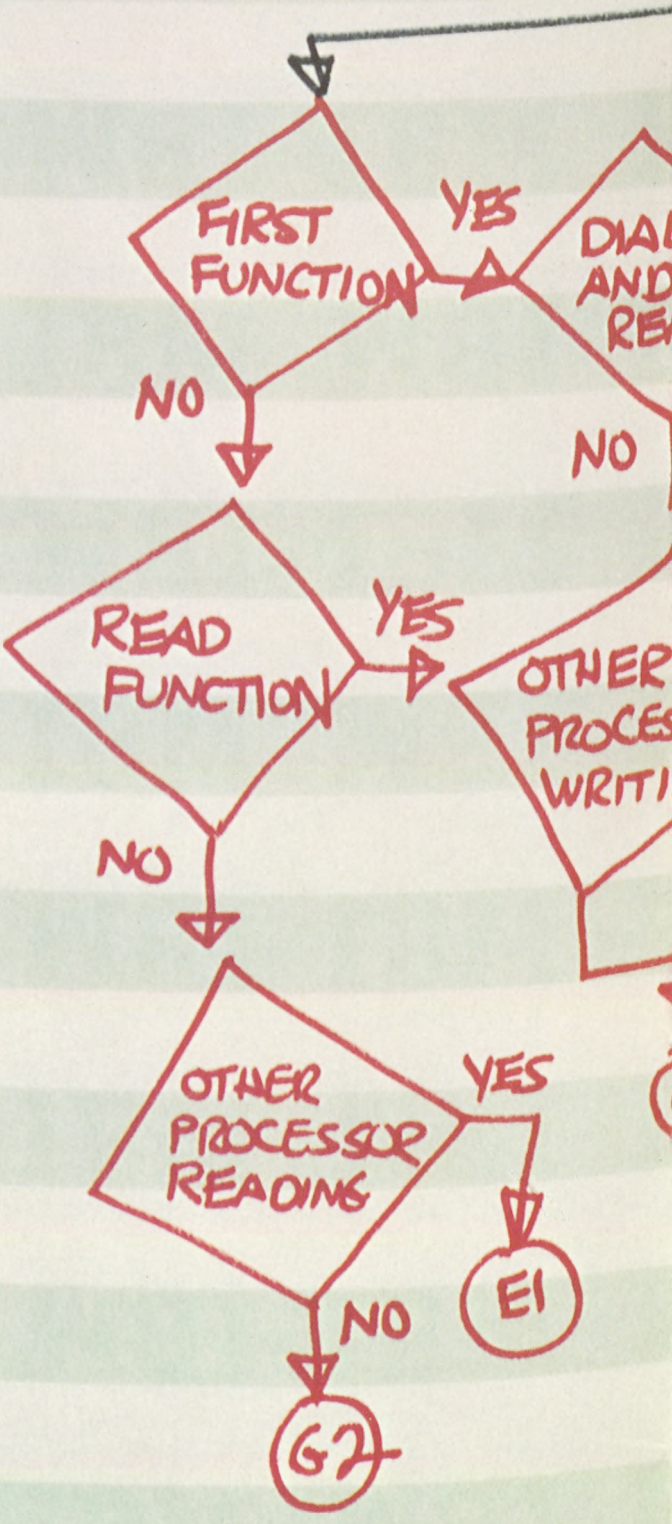
The next step consists of testing the program by actually running it on the computer to make sure there are no "bugs" or errors. Debugging is a time-consuming job, and programmers may have to test run their programs again and again before they run perfectly.

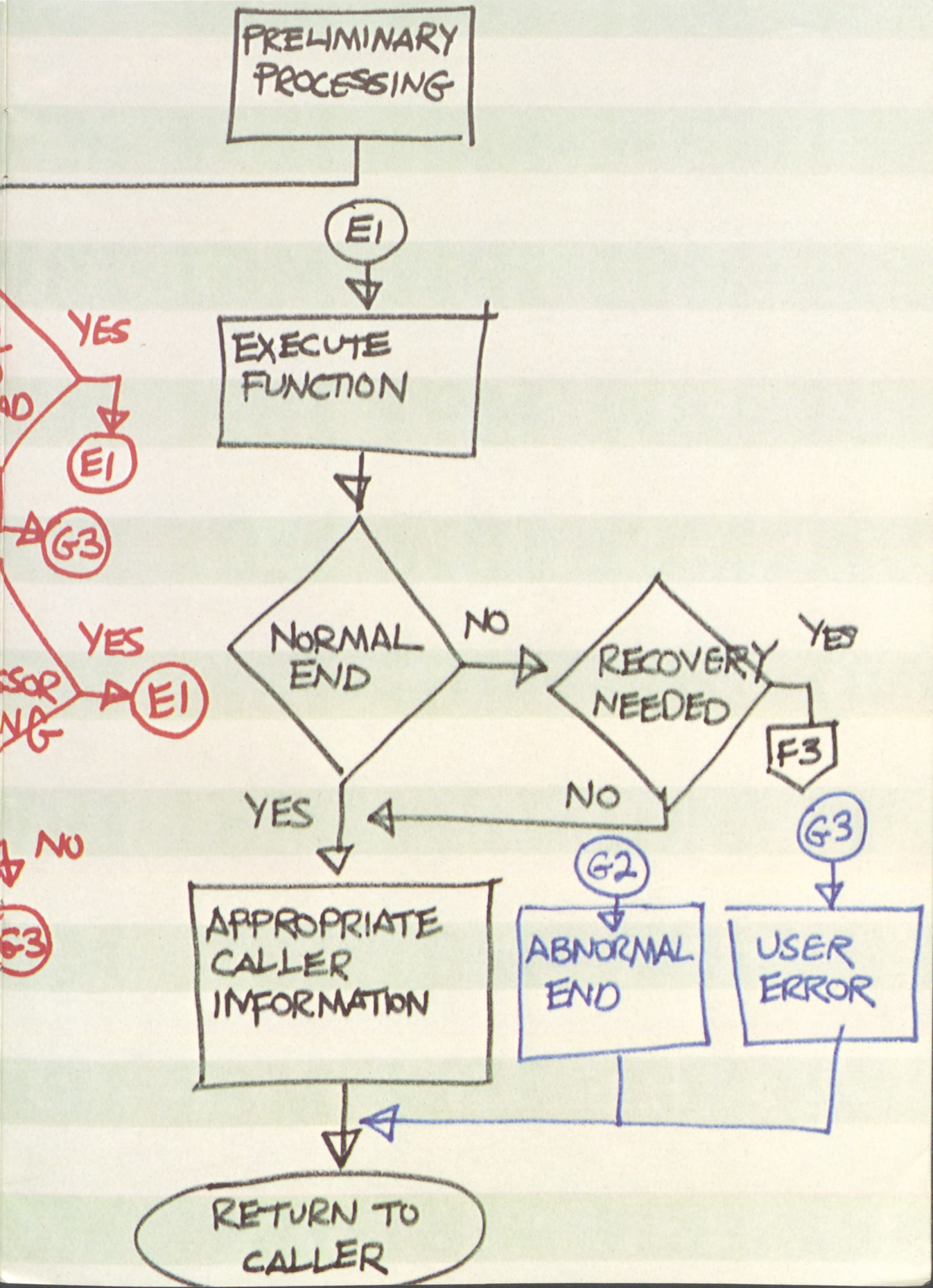
Men and women who write computer instructions to handle specific jobs such as controlling chemical production or fighting crime are called application programmers. Those who write the instructions which control aspects of the computer installation are called systems programmers.

Above:
Gerald Matasavage, B.S. Business Administration, Quinnipiac College, and Glenn Myers, B.S. E.E., Clarkson College, relax over a chess game during lunch.

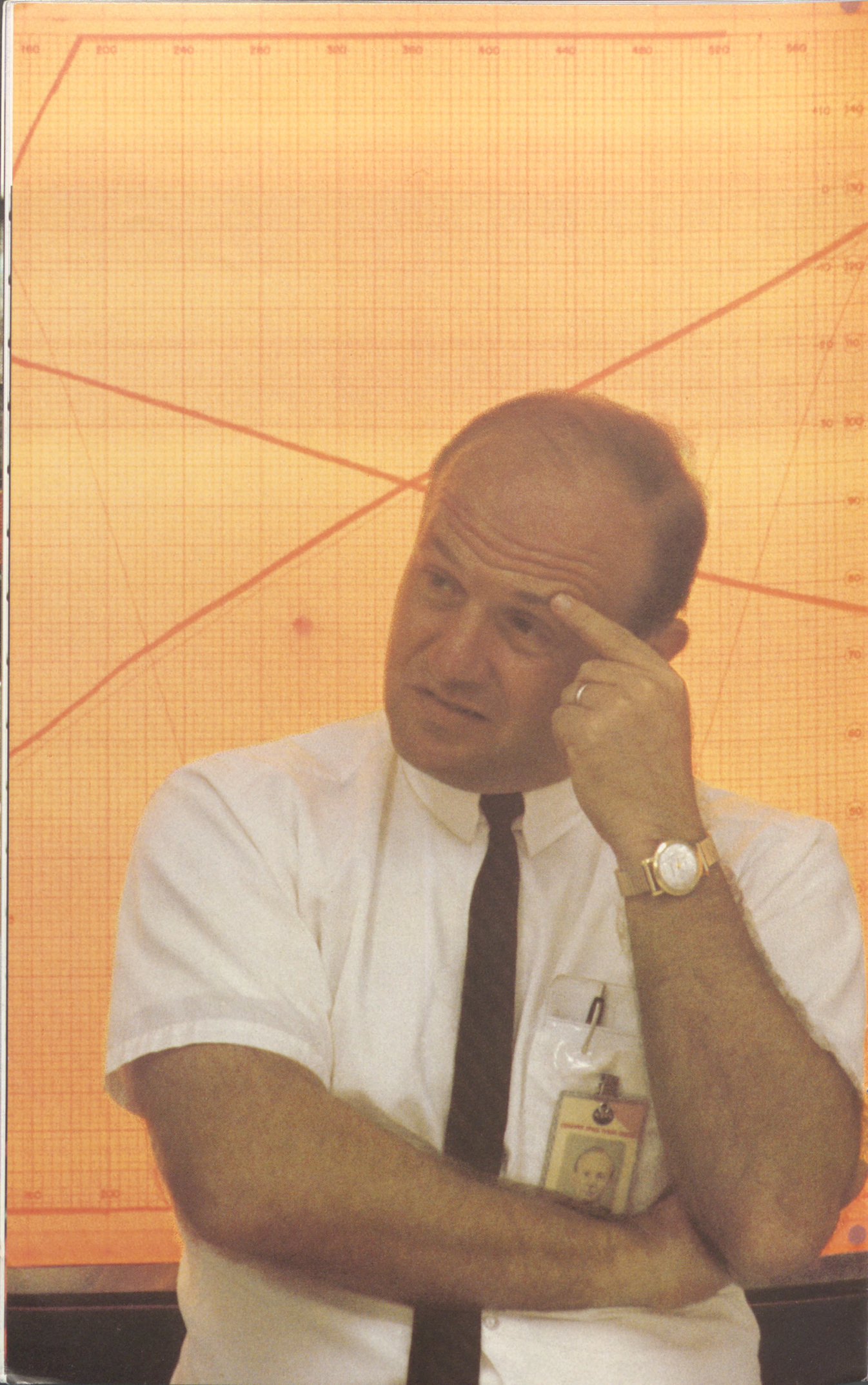
Facing page:
Jean Lentz, B.A. Chemistry, St. Joseph College, reading a computer printout indicating that part of a new programming system she's been working on for months has an error and needs to be "debugged."

Part of a programming flow chart which details how an IBM computer transmits data from one machine to another.




PRELIMINARY PROCESSING
E1
EXECUTE FUNCTION
NORMAL END
NO
RECOVERY NEEDED
YES
F3
YES
NO
G2
G3
APPROPRIATE CALLER INFORMATION
ABNORMAL END
USER ERROR
RETURN TO CALLER
YES
E1
G3
NO
G3

Applications programs help the customer select the best routes between pickup and delivery points and have made possible more profitable trucking schedules.



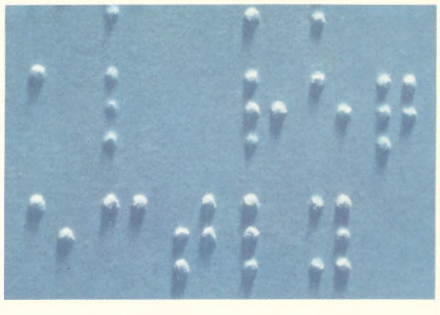
Applications programming is the writing of computer instructions to do specific jobs. As an IBM applications programmer, you'll create computer solutions to problems which run the gamut from stock market investing to ballistic missile re-entry. You may even be asked to write an applications program which will be used only once–to solve a particular equation in atomic physics, for example.

Writing an applications program requires a knowledge of both programming and the customer's business. You can't solve an insurance problem, for example, without understanding the insurance business; and you can't prepare this program for the IBM System/360 without knowing the capabilities of the machine.

You'll Get Around

As an applications programmer you'll get around. You'll talk to IBM customers, find out how things are done, what a customer's needs are, and how he can benefit from computer processing. Then you'll sit down and quietly begin thinking through a computer solution to his problems.

The applications programmer constantly moves through uncharted seas in business, government, science and education. You'll know what's happening in our society–and you'll know computers. It's a good combination. One that can help you make your contribution to those aspects of our national life which interest you the most.



Facing page:
Bruce Amrein, Manager, Site Equipment Maintenance, standing before a plot board at the National Aeronautics & Space Administration's Goddard Space Flight Center in Greenbelt, Maryland. This space travel display station is one of many which receive their processed data from computers built and programmed by people who work for IBM.

Above:
Colin Blair, B.A. American Studies, Amherst College, uses a computer generated television display in text-editing for Japanese newspapers.

Right:
Annette Morgan M.S. Mathematics, University of Michigan, headed up a team of eight new IBM programming school graduates who were asked to figure out a way to use computers in printing Braille. The team, which included Ruth Eisenbud (*Left*), B.A. French, Brooklyn College, completed the job in ten weeks.

Systems programmer, Patricia Henderson, runs tests on a program she is writing to improve the IBM System/360's ability to handle several data processing jobs simultaneously.

Systems Programming

Systems programming is the writing of instructions that make it easier to program computers and put them to work. A systems programmer, as a result, is often called a programmer's programmer.

As an IBM systems programmer, you'll write the routines which assign incoming data to storage, dispatch messages from one memory location to another, and control peripheral units such as magnetic tape drives, high-speed printers and graphic display devices which are used to get information in and out of computers.

You'll also write program routines which applications programmers use over and over again, but which only have to be written once such as:

Utility programs employed to handle commonplace chores like moving data from punched cards to magnetic tape.

Or Sort/Merge and file maintenance routines which are heavily used in business to rearrange old data, insert new data into old files, or purge old facts from the file so they can be replaced with fresh ones.

Developing Computer Languages

As a systems programmer you may even get a chance to work on the development of high-level compilers, or computer languages such as FORTRAN (FORmula TRANslation) which was developed at IBM and is used for solving mathematical and scientific problems, or COBOL (COmmon Business Oriented Language) used in commercial applications.

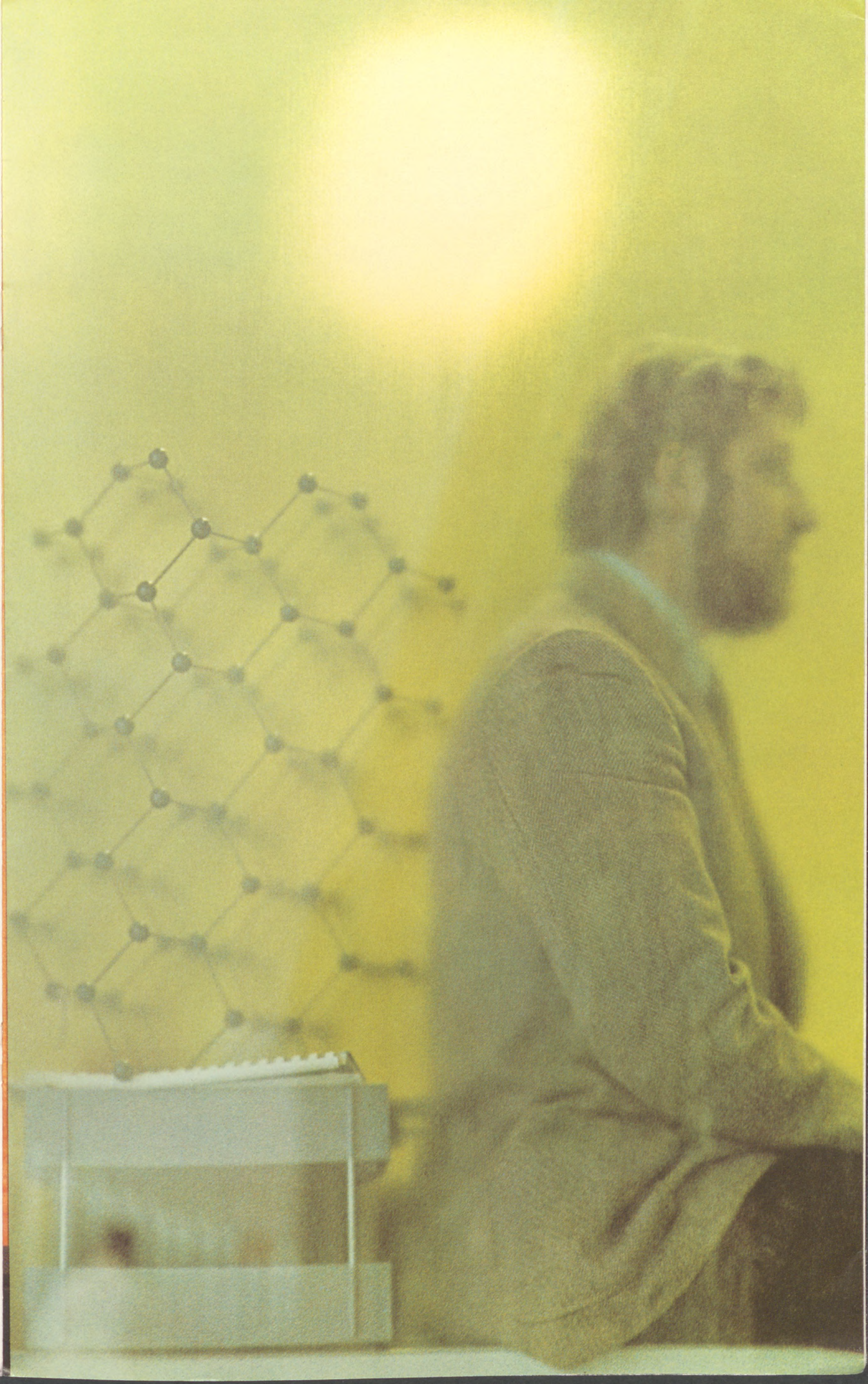
And beyond that there is programming research in which you can explore the unknown reaches of the computer universe as you delve into pattern recognition, computer learning techniques, artificial intelligence and other advanced development areas.

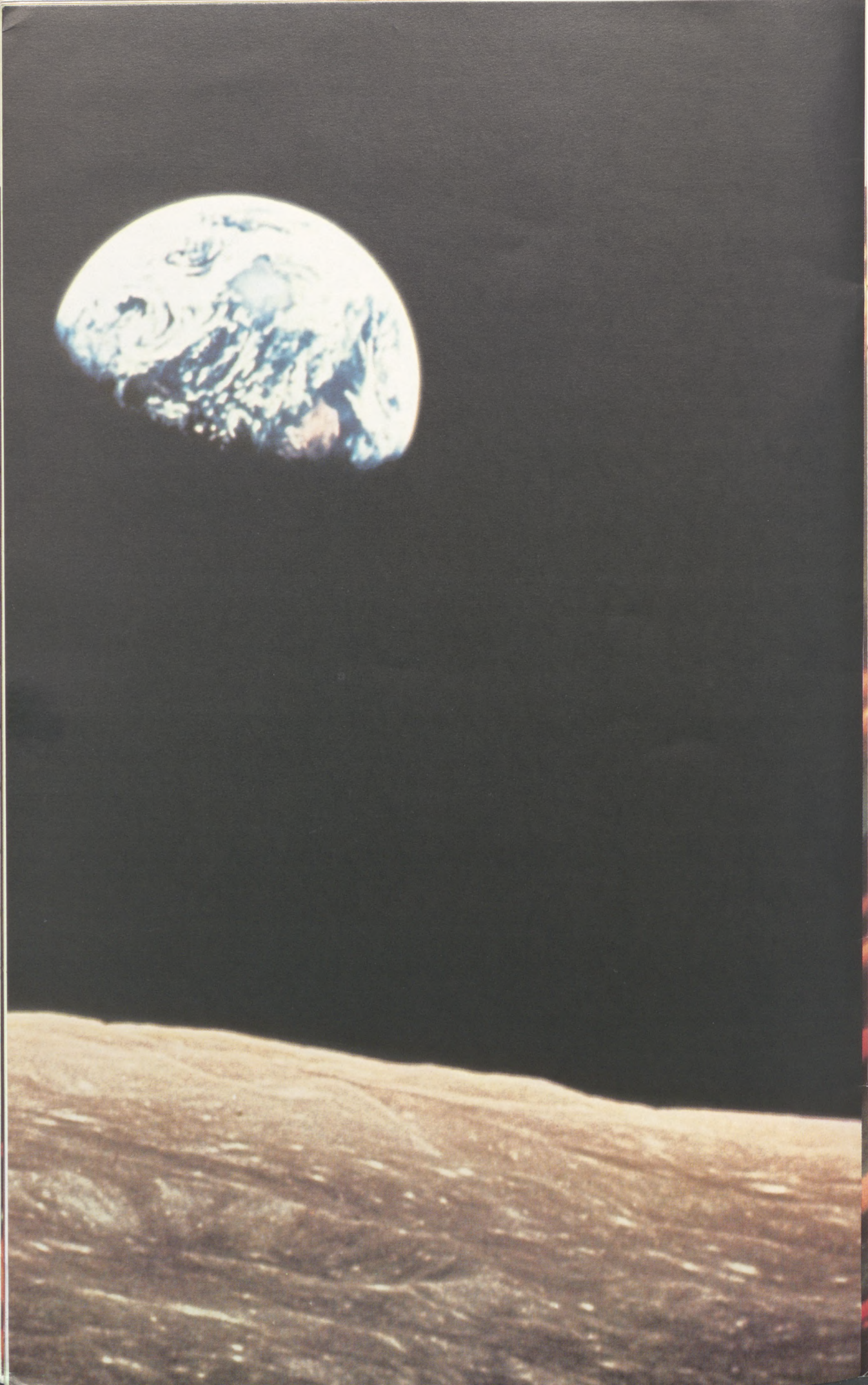
Left:
Walter Koeller, Jr., B.S. Education, Northern Illinois University, thinking through a new program to give the IBM System/360 console operator increased control over the computer's high-speed printer.

Above:
Marsha Hayes, B.A. Mathematics, Colorado College, talking with computer operator Alan Hunter about testing modifications to IBM System/360, which would increase performance.

Below:
David Reich, M.S. Communication Sciences, University of Michigan, consulting with another systems programmer who is working with PL/I—a high-level computer language developed at IBM, which can be used in solving both commercial and scientific problems.

Facing page:
Allan Weis, B.S., Electrical Engineering, University of Kansas, is doing research into advanced programming techniques for the sharing of computers among a number of different users.





IBM: Growing in a Dynamic Industry

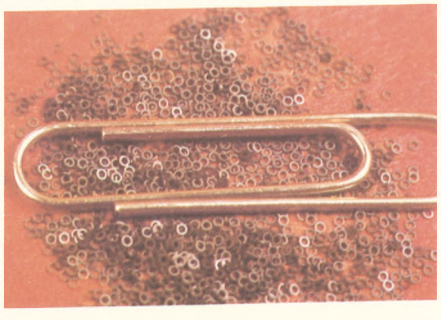
IBM understands the extraordinary power of today's computers, and how they can help solve problems as complex as guiding a spacecraft to the moon and back.

This knowledge of data processing, gained through more than half a century of experience, has enabled us to grow into an international manufacturing and marketing company whose computers, typewriters, dictation equipment and other information-handling products are at work in more than 100 countries all over the globe.

The demands for problem solving in business, science, education and government have already triggered explosive growth in the industry. So promising is the potential that one major company after another has come into the field. Hundreds of others have been formed to design and produce peripheral equipment and provide systems support. The industry has become a magnet for thousands of suppliers. It has grown into a community which year after year attracts the liveliest of the nation's young talents. In it, they find excitement, the opportunity for commitment, the chance to test themselves and discover their worth.

The Years Ahead

And what of the years ahead? More problems, certainly, of monumental proportions. But with these problems, unmatched opportunities to create and apply the technologies that may point the way to solution. In computers alone, the number of systems at work has tripled in just five years. Speeds are up, computing costs are down. As a result they can now be used more imaginatively and economically in almost every conceivable area of human experience. The opportunities to do a meaningful job, and work hard at building a rewarding career, have never been greater than they are right now at IBM.



Above:
Ring-shaped magnetic cores, compared here with a paper clip are as small as 0.02-inch in diameter and weigh a few millionths of a gram. When strung on wires finer than human hair, they form the most widely used main memories for computers.

Right:
Gas diffusion of SLT silicon wafers takes place in a high-temperature furnace which can process 300 wafers at a time. SLT logic circuit packages are the basic electronic building blocks in IBM System/360 computers.

Below:
A project in hologram laser technology to establish the feasibility of using three-dimensional display as an all-weather landing aid for aircraft pilots.

IBM Programming Education

Continuing education is a basic ingredient of any job in IBM, but it is particularly so in the case of programming.

As a newcomer to programming, you will begin with an eight to 26-week IBM instruction course which includes classroom lectures on information processing, symbolic machine language, and the use of operating systems.

This will be followed by more advanced instruction in which you will learn how actual IBM computer programs are designed to solve individual machine problems such as getting data in and out of secondary memory units, or handling practical jobs such as doing a department store's customer billing work.

When your classroom training is complete, you'll move ahead to on-the-job training in which you will work with a small group of experienced IBM programmers, and actually try your hand at writing part of an application or systems program.

In one to two years, you will have acquired the background and training of a professional IBM programmer with a wide-open career path ahead of you.

IBM's Education Programs

Job-Related Training: Instructions to help you increase your knowledge of your job, and how to do it better. These full, or part-time courses are taught on company time by IBM instructors supplemented by outside teachers. IBM provides all texts, material and supplies and also pays you for your travel and living expenses if the courses you need are taught only at distant IBM locations.

Tuition Refund: Voluntary after-work degree or non-degree courses that relate to your career, or will increase your potential for development within IBM. You may take these courses at any accredited institution, or at a non-accredited institution–including correspondence schools–with special approval. When you have completed a course satisfactorily, IBM will refund to you 75% of all your tuition and other school fees.

Graduate Work-Study Program: Part-time graduate study available to engineers and scientists at plant and laboratory locations leading to Masters or Doctoral degrees in specified fields at local institutions such as Stanford, Syracuse, the University of Minnesota, and the University of Alabama. IBM pays for the entire cost of this program, and in some cases allows you to attend classes on company time.

Resident Study Program: Up to two years of full-time, on-campus study and/or research at any approved university in fields of prime interest to IBM, usually at the graduate level. After you have worked for the company for one year, you may apply for competitive selection for this program. Selection is based on the relevance of the study program to IBM needs, your job performance, scholastic record, professional achievement and potential. IBM pays all tuition and fees, as well as a portion of your regular salary while you are in residence at the university.

Voluntary Education: After-work study program in both general and career-related subjects. This program includes a great variety of courses ranging from Effective Public Speaking to the Fundamentals of Data Processing. The courses are taught in major IBM facilities with the company providing all books and materials.

Above:
New programming students attending classroom lectures at the IBM school in Poughkeepsie, New York.

Below:
IBM instructor Jay Friedman, M.S. Physics, University of Illinois, using a closed-circuit TV hookup to teach programming classes in Poughkeepsie and Kingston, New York.

Facing page:
Benjamin Mayo, B.A. degree candidate at Marist College, gives student programmers "hands on" experience in operating computers and related equipment.

Where IBM Programmers Live and Work

Programmers work at most of IBM's nearly 50 plant, laboratory and headquarters locations, and in many of its more than 250 branch offices across the United States. Programmers are particularly needed at IBM facilities in:

Alabama

Huntsville: Space Center Operations carried out by IBM's Federal Systems Division which concentrates on advanced technology and systems for the ground-based, airborne and spaceborne information-handling and control needs of the U.S. Government.

California

Los Angeles: Operations of the Federal Systems Division.

San Jose/Los Gatos: IBM research, development, and manufacturing facilities are located at San Jose and Los Gatos about 50 miles south of San Francisco.

Colorado

Boulder: Major IBM development and manufacturing complex.

Minnesota

Rochester: IBM development and manufacturing facilities.

New York

Endicott/Owego: Several IBM plants and laboratories located in this region of rolling green hills close to the Pennsylvania border.

New York City and Westchester County: Location of nearly all of the headquarters offices of the IBM Corporation, its divisions and subsidiaries.

Poughkeepsie/Kingston/East Fishkill: A complex of IBM plants and laboratories are located here in the mid-Hudson Valley about a two hours drive from New York City.

Yorktown Heights: A major IBM research center is located in this town of Revolutionary War fame, and a development lab is situated in nearby Mohansic.

North Carolina

Raleigh: IBM development and manufacturing facilities are located in North Carolina's Research Triangle Park.

Texas

Houston: A Federal Systems Division facility is located near the NASA Manned Spacecraft Center just 22 miles away in the Galveston Bay area.

Vermont

Burlington: IBM development and manufacturing facility.

Washington D.C. Area

Various IBM Federal Systems Division facilities are located in suburban communities within easy driving distance of the downtown capitol.

Facing page:
IBM corporate headquarters building in Armonk, New York.

Above:
IBM education center at Poughkeepsie, New York and a development lab in East Fishkill, New York.

Right:
The Thomas J. Watson Research Center in Yorktown Heights, New York.

Come join the programmers at IBM. Study problems which interest you, and put the power of the computer to work solving them.

IBM

International Business Machines Corporation
Old Orchard Road
Armonk, New York 10504

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IBM United Kingdom Limited
Data Centre Services

IBM

CALL MINIMIS

Provides fast, economical answers to businessmen's questions

How many of the facts about your business are readily available to you?
All the facts that influence your company's performance, growth and profitability?

Is this information always in your hands for instant use at any given time?
Can you collect it, balance it and redeploy your resources to meet the ever changing requirements of your competitive marketplace?

Information carried in your managers' heads, in filing cabinets or computers is not always available in a suitable form for you to make your decisions in time.

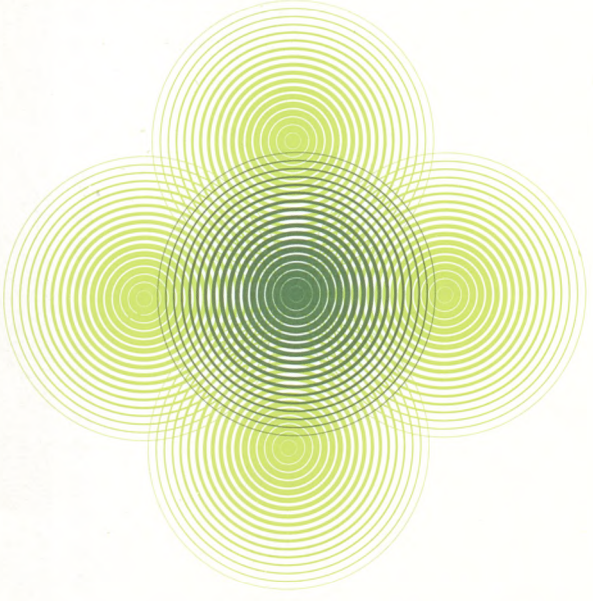
That is why CALL MINIMIS – MINI Management Information System – is an important new service for businessmen. MINIMIS enables you to create a management information system to fulfil the specific needs of your company.

You get a secretary to type your questions on the terminal in your office. Precise answers are printed out on the same terminal within minutes. An ordinary Post Office dial-up line gives you fast access to the information you have stored in IBM Data Centre Services' large computer.

Using CALL MINIMIS you can have answers to your questions in minutes – your personal or departmental management information system.

The questions you ask can range from unplanned enquiries into large files of information to regular requests for standard reports. MINIMIS gives you immediate access to all your data and rapid selection of the information you want, printed in the format you ask for.

Whatever the industry in which you operate, you can use MINIMIS to provide you with the answers you need. Here are some of the many possible applications. If you recognise a job with which CALL MINIMIS can help you or if you can think of one that isn't listed, please ring one of the telephone numbers on the inside back cover and ask for a demonstration.



Banking	Status of wills, foreign currency accounting.
Finance	Portfolio evaluation.
Insurance	Analysis of losses, actuarial program management, new policy record keeping.
Wholesale and Retail Distribution	Sales reporting and analysis, order entry control, distributor records, customer account history and stock inventories.
Promotional Agencies	Advertising effectiveness measurement, media booking schedules, market research analysis.
Transport	Preventive maintenance scheduling, expenditure recording and analysis, inventory of vehicle capacities.
Education	Student records, grant administration, timetables.
Medicine	Medical records, treatment analysis, bed occupancy schedules, stock recording.
Manufacturing	Production profit centre analysis, cost estimating, machine loadings and down time recording, order status, quality control for yield measurement.
Engineering	Document and engineering drawing control, project management.

Within all industries there is expert manpower devoted to:
Research
Forecasting
Planning
Recruiting
Financing

In all these areas results and historical records need to be stored in a way such that they can be retrieved rapidly and put to use.

Overleaf are some illustrations of the ways in which CALL MINIMIS can help to provide you with the answers you require.

SOUTHAMPTON UNIVERSITY LIBRARY

**'Will someone tell me how far we've got with order number A33/567?
Is it going to be out on time?'**

STATUS OF ORDER A33/567 ON FACTORY DATE 130

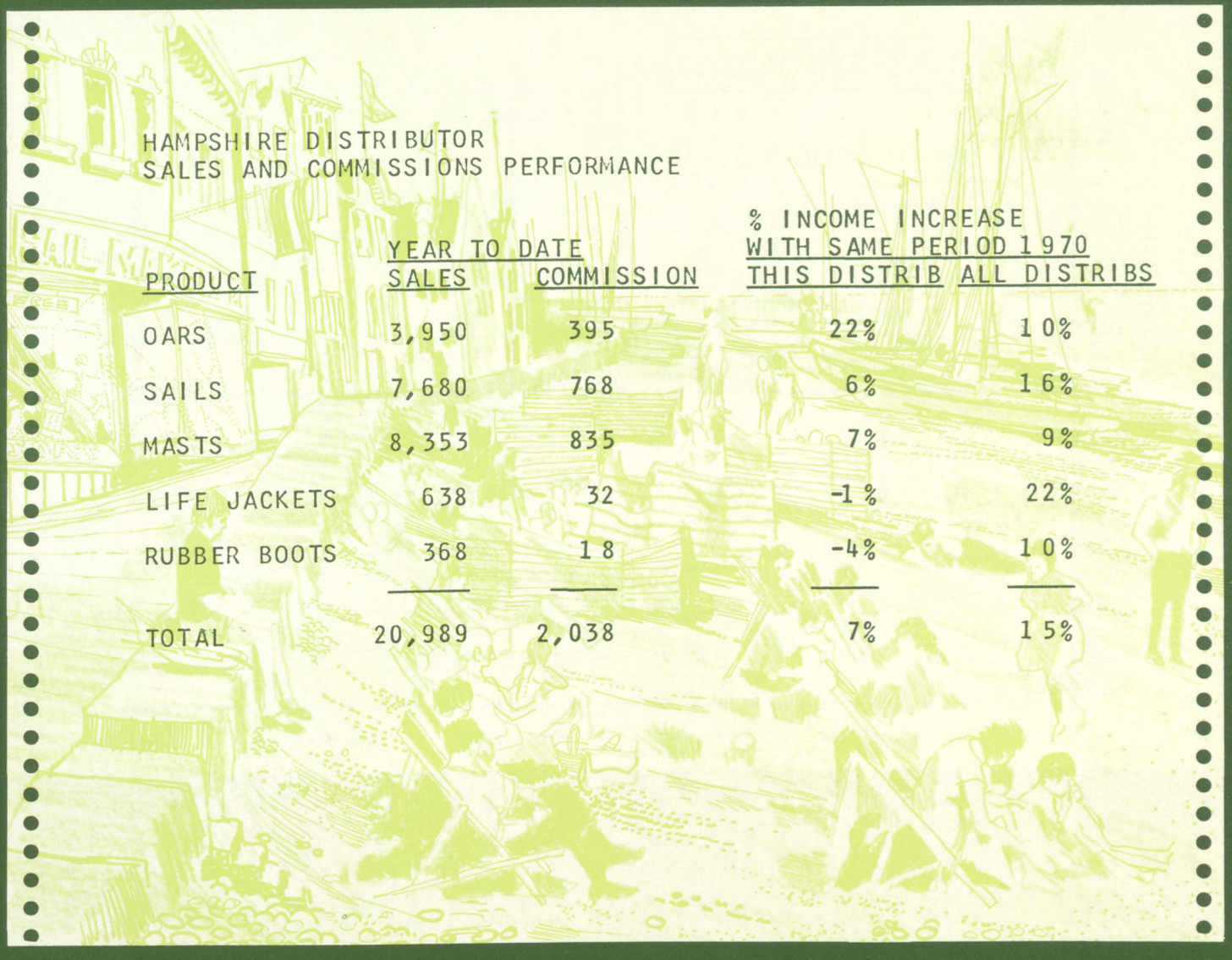
COMPONENT	DEPT	ORIGINAL SCHEDULE	NUMBER OF UNITS REQUIRED	NUMBER OF UNITS COMPLETED	COMPLETION STATUS
005396	335	130	500	500	100%
005400	335	128	1500	1500	100%
006888	335	128	1500	250	17%
993300	350	131	500	500	100%
771234	366	130	1000	850	85%
775500	366	132	250	250	100%
ASSEMBLY	566	133	250	0	0%
SHIPPING	613	138	250	0	0%

Within minutes you can identify that there is no immediate problem, but there is the possibility of a hold up in such and such a department. Having pinpointed the problem you can direct your resources to overcoming it without any further delay.

In addition to status enquiries about particular orders, you can print a list of orders which have fallen behind schedule.

At the end of each week you can analyse the work by department, by item, by size of order.

'We haven't had an order from our Hampshire distributor this month. Competition is getting well-established on the south coast, so I'd better go down there. How have their sales and commissions on each of our lines been going compared to last year and compared to our other distributors?'



HAMPSHIRE DISTRIBUTOR
SALES AND COMMISSIONS PERFORMANCE

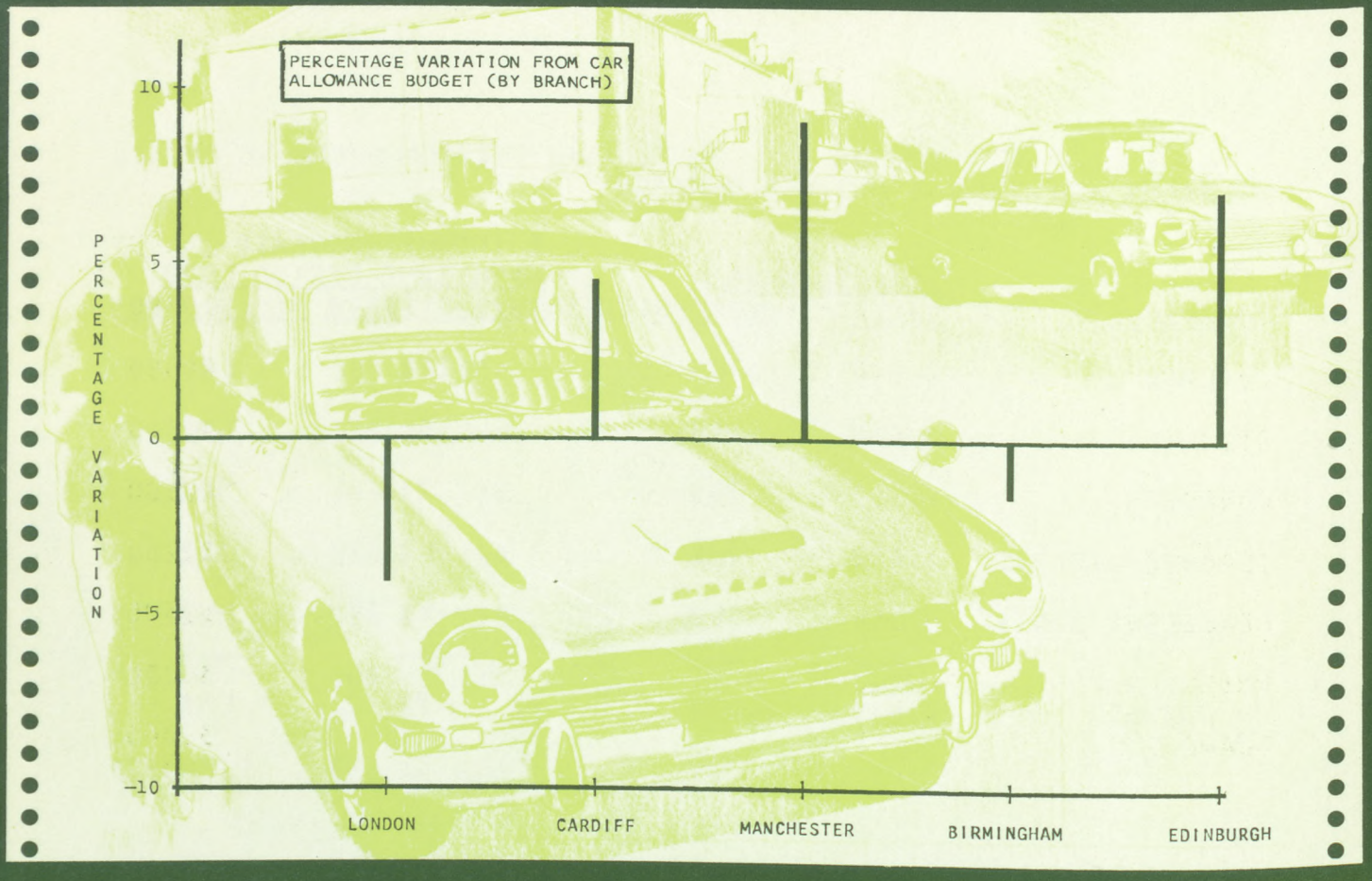
PRODUCT	YEAR TO DATE SALES	YEAR TO DATE COMMISSION	% INCOME INCREASE WITH SAME PERIOD 1970 THIS DISTRIB	% INCOME INCREASE WITH SAME PERIOD 1970 ALL DISTRIBS
OARS	3,950	395	22%	10%
SAILS	7,680	768	6%	16%
MASTS	8,353	835	7%	9%
LIFE JACKETS	638	32	-1%	22%
RUBBER BOOTS	368	18	-4%	10%
TOTAL	20,989	2,038	7%	15%

The Sales Manager receives this corroborative information minutes after the question has been asked. This distributor has been increasing his sales at a much slower rate than other distributors, and some products show an absolute drop compared with the position this time last year.

Armed with this report, the Sales Manager can get on to his sluggish distributor and sort out the reasons for the drop off in sales.

'We are over budget on mileage allowances; which branches have been most out of line?'

The expenses budgets are reviewed mid-way through the year. MINIMIS provides a graph plot of percentage deviations from budget by branch which clearly shows that the plan figure has been exceeded chiefly in the branches furthest from London.



'It's almost a year since I gave Bill Jenkins his last rise. What are his sales figures like this year?'

NAME	PERSONNEL NUMBER	BRANCH	YTD QUOTA	YTD SALES	YTD PERFORMANCE
JENKINS W A	41484	NOTTINGHAM	5,500	7,318	133%

Bill's boss just wants one line of information from the commissions records.

And he gets the latest position in seconds.

'The Production Director wants a bright, experienced assistant to work on a number of special assignments.'

CANDIDATES RESULTING FROM SEARCH

NAME	TITLE	DEPT	YRS W/CO	SALARY
JAMES F T	WORK STUDY MGR	703	10	3,750
TOMLINSON R T	ASSISTANT PLANT MGR	330	10	4,500
STEWART C J R	INDUST RELATIONS MGR	380	8	4,000
JONES P I	MARKET RESEARCH MGR	545	8	4,500
TURNBULL D	WORK STUDY SUPV	703	8	3,250
HENDERSON D A	PRODUCTION ASST	300	7	3,500
PHILLIPS G	PRODUCTION ASST	320	7	3,250
DEANE B M	PROJECT COORD	537	6	3,000

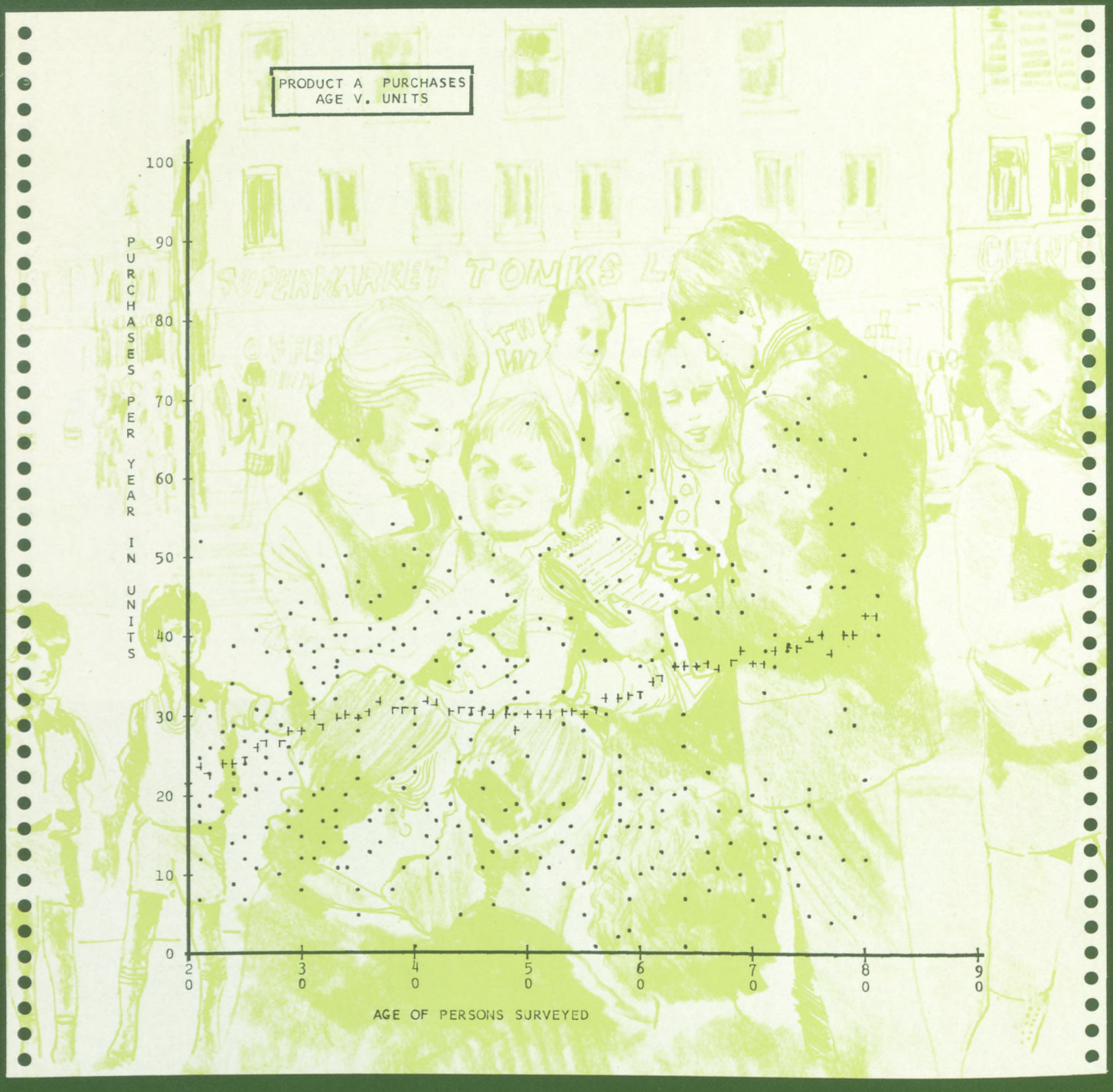
The Personnel Department uses MINIMIS for its employee records, so there is a complete manpower retrieval and job/skill matching capability.

From a study of the job specification, it appears that the man selected should have an engineering degree and be single preferably because high mobility is essential; he should have been in the company for at least five years; and his last two performance ratings should have been good.

His first report shows that fifteen employees fulfil these requirements, so it is possible to be more precise. An additional screening qualification is supplied: the man must be under 35 years of age.

Eight is a manageable number to interview, and the candidates are listed in order of experience. A personnel administrator would take about 20 minutes to produce this list. Not only does MINIMIS make the search quickly, it is also thorough and completely impartial.

'I'm surprised at these survey results.
I wonder if age is a significant factor?
Can you break it down by age?'



The actual words presented to the computer were as follows:

1.	Factories Narrow Streets	Office Blocks Slag Heaps.	Tenements	Chimneys	roofscape
2.	Smoky Dark	Grimy Sooty stone	Dirty Brick depressing	Grey	Gloomy
3.	straggling oozing	sprawling	creeping	crawling	flowing
4.	hills fields	valleys pastures	river banks green hillsides.	green fields	woods
5.	over	across	along	towards	
6.	people	workers	children	pensioners	groups of folk
7.	plodding	walking	straggling	wandering	scurrying
8.	homeward	home			

The machine is asked to print x Haiku choosing the words in a specified order - in this case 2 1 3 5 4 6 7 8. What it is then programmed to do is to select words at random from each line, make sure that the syllables add up to 17 (this information is also given to the computer on input) and print. The children will fill in the forms shown at the back of this section (C/P/11 and C/P/12), and receive back from the computer some time later a list of the haiku selected. Some will be meaningless, some will make sense but be poor haiku, a few will be good haiku. There is now the activity of making value judgements about words which again can be a useful spin-off from the program. It often takes 2 or three runs at different weeks before the children become really adept at using words sensibly, and so this lesson can take several weeks to teach.

Where the Haiku programs may be run:

Imperial College in London operate a National Scheme for the running of school programs. Programs are received from schools on coding sheets similar to that filled in by children at the end of this section (pages C/P/11 and C/P/12). The contents of the sheets are then punched into cards (as in section 1 of this module) and presented to the large computer there. The Haiku program is also made available to the computer and the childrens' haiku are printed out in a matter of seconds. The printouts and cards are then returned to the school with the original coding forms. If you wish to take advantage of this service in running your own childrens' haiku, you must simply collect up the sheets (C/P/11 and C/P/12) which the children produce and send them with the form which requests computer processing to Imperial College.The form number is C/T/B23 , can be found at the end of this section and contains the name and address of the schools contact at the college. In general, a five day turn-round is normal, but postal difficulties can occur.

Using other packages: Other teaching packages involving Geography, Mathematics, English, Biology, Business Studies etc are available. Details of these available for running on the Imperial College system can be obtained from the address given. You may also find that your local college, polytechnic or university has a range of suitable package programs which can be demonstrated on a terminal at the school as in the terminal session or which can be made available on a batch basis (eg in the same way that you sent your information to Imperial College to have the results returned at a later date).

From the point of view of this course it is obviously within the objectives that you make as much contact as you can in a practical way with the machine which handles and processes information. The Haiku is an example of what can be done - if you would like to follow up the other possibilities you are encouraged to do so. At the same time you may wish to involve other departments of the school in these and this too is an entirely desirable spin-off from the course angle. Information is not confined to a course on information - it is the commodity in which all subjects are interested and the computer could provide the necessary link which makes the parts of curriculum a) interact effectively and b) meaningful to children.

Teaching Notes - These will necessarily be short since the principles involved in the production of Haiku have already been enunciated.
First of all give out the examples of Haiku (page C/P/14) and ask the children to read them. Ask them to explain to you what they are all about. Explain that these are Haiku and what a haiku is.
Using the black board try to create a haiku which evokes a particular mood or scene chosen by the children. Ask the children to supply words redolent of that particular theme and get them also thinking of synonyms and antonyms which convey the same meaning - you may be able to write on the blackboard several at a time.

Now point out that the examples were computer-produced - ask the children what they think this means. Distinguish particularly between the program which produced the haiku and the words it acted upon. Make it clear that the latter were produced by children and not the computer, since the machine is not capable of original thought.
Ask what advantage the computer might have in this exercise. Elicit that it has infinite patience in making selections from many words and that it can continue to produce Haiku until told to stop. Give out the words from which the Haiku were selected (sheet C/P/13)
Where does the creative activity come in? Point out that it is human beings which must first of all produce the words and that these words must be structured so that they make sense when they are sorted. Give out the further examples on Page C/P/15.
Let the children make up another Haiku of their own working individually., preferably all on the same theme. Allow five minutes or so for this and then take examples and discuss them. From the efforts of the children make up a composite list of words on the blackboard, and point out that if these were presented to the computer it could make up lots of Haiku (it might even reproduce the same one produced by an individual in the class).

Now show the forms (C/P/11 and C/P/12) to the children. Ask them to explain to you how they should be filled in.
Indicate that when completed these forms will in fact be sent away for processing and how this will take place. Emphasise what will be returned as a result of this process, probably next week.
The children now complete the forms either working in groups or singly depending on your assessment of the capabilities and disposition of your class. Specify that not more than 40 Haiku should be printed, and that the children should not forget to complete the details at the end of the form.

C/T/B23

To: The Schools Consultant
Imperial College Schools Computing Service
Exhibition Road
Kensington
London

Date.....

Running of Haiku Computer Teaching Package Program

I am teaching the information course and would like the enclosed Haiku data to be run on the Imperial College Computer.

Name of Teacher.....

Name of School.....

Address of School.....

.....

.....

.....

Number of pairs of Haiku Data Sheets.....

If you would like details of further package programs tick here .....

If you would like details of the Imperial College Computing Service tick here .....

To: The Schools Consultant
Imperial College Schools Computing Service
Exhibition Road
South Kensington
London

Date.....

Running of Haiku Computer Teaching Package Program

I am teaching the information course and would like the enclosed Haiku data to be run on the Imperial College Computer.

Name of Teacher.....

Name of School.....

Address of School.....

.....

.....

.....

Number of pairs of Haiku Data Sheets.....

If you would like details of further package programs tick here .....

If you would like details of the Imperial College Schools Computing Service tick here .....

HAIKU DATA FORM - EXAMPLE

Name: N. LONGWORTH

School: SOTON UNIVERSITY

Enter the words or phrases one to each line, with one letter to each box.
Leave a blank box between words.
In the columns on the right of each group enter the number of syllables in the word or phrase.

Group 1

F	A	C	T	O	R	I	E	S									3
O	F	F	I	C	E		B	L	O	C	K	S					3
T	E	N	E	M	E	N	T	S									3
C	H	I	M	N	E	Y	S										2
R	O	O	F	S	C	A	P	E									2
N	A	R	R	O	W		S	T	R	E	E	T	S				3
S	L	A	G		H	E	A	P	S								2
*																	
1															16		17

Group 2

S	M	O	K	Y													2
G	R	I	M	Y													2
D	I	R	T	Y		B	R	I	C	K							3
G	R	E	Y														1
G	L	O	O	M	Y												2
D	A	R	K														1
S	O	O	T	Y		S	T	O	N	E							3
D	E	P	R	E	S	S	I	N	G								3
*																	
1															16		17

Group 3

S	T	R	A	G	G	L	I	N	G								2
S	P	R	A	W	L	I	N	G									2
C	R	E	E	P	I	N	G										2
C	R	A	W	L	I	N	G										2
F	L	O	W	I	N	G											2
O	O	Z	I	N	G												2
*																	
1															16		17

Group 4

H	I	L	L	S													1
V	A	L	L	E	Y	S											2
R	I	V	E	R		B	A	N	K	S							3
G	R	E	E	N		F	I	E	L	D	S						2
W	O	O	D	S													1
F	I	E	L	D	S												1
P	A	S	T	U	R	E	S										2
G	R	E	E	N		H	I	L	L	S	I	D	E	S			3
*																	
1															16		17

Group 5

O	V	E	R														2
A	C	R	O	S	S												2
A	L	O	N	G													2
T	O	W	A	R	D	S											2
*																	
1															16		17

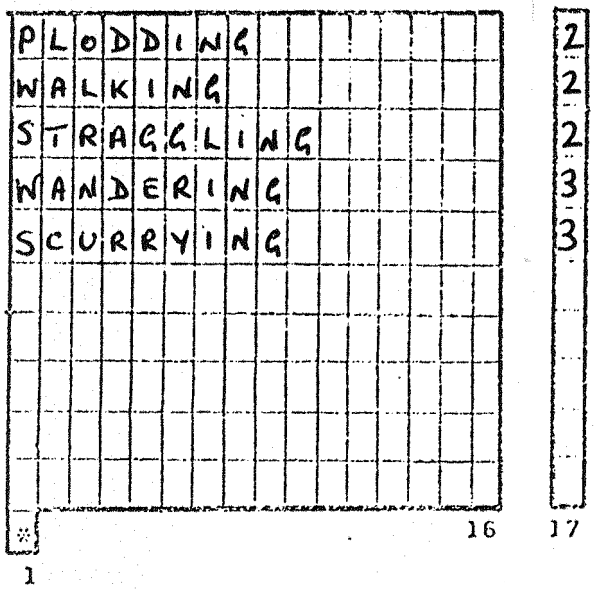
Group 6

P	E	O	P	L	E												2
W	O	R	K	E	R	S											2
C	H	I	L	D	R	E	N										2
P	E	N	S	I	O	N	E	R	S								3
G	R	O	U	P	S		O	F		F	O	L	K				3
*																	
1															16		17

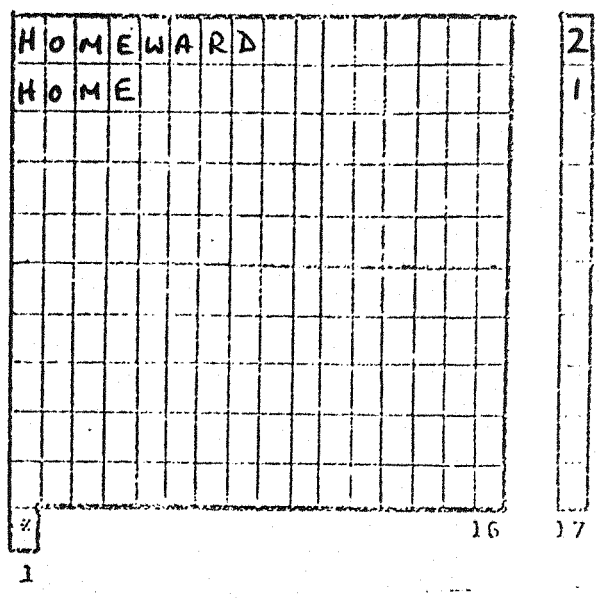
EXAMPLE

C/T/[redacted]25

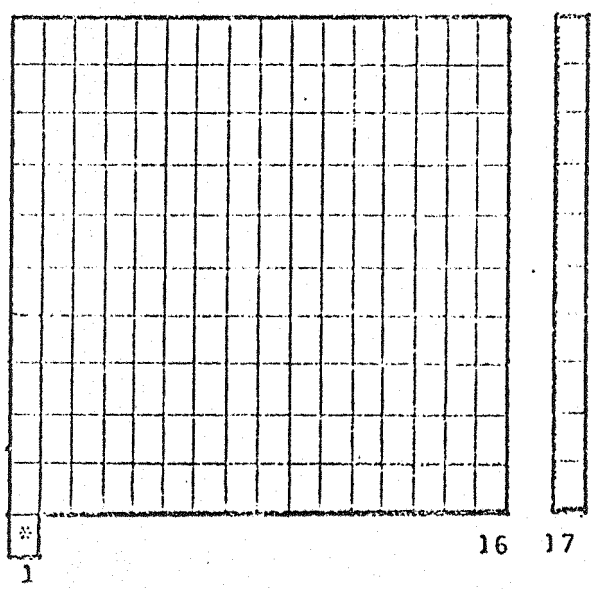
Group 7



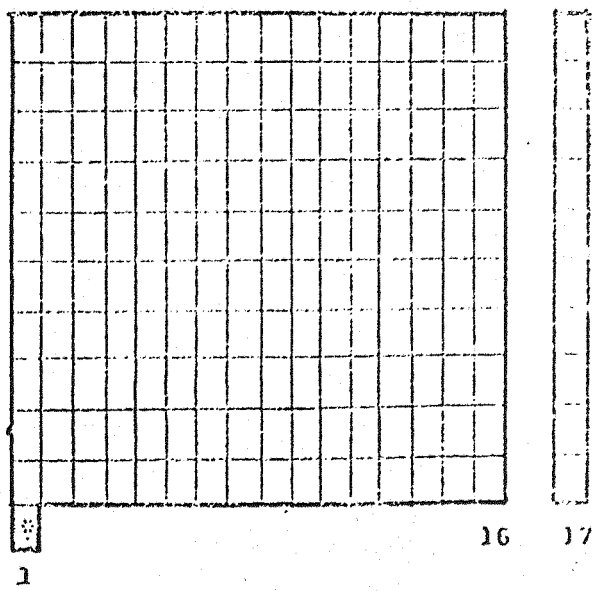
Group 8



Group 9



Group 10



Word Group Sequence

Enter your sequence of group numbers in the boxes below, writing them like this:-

| 7 | 4 | 10 | 2 | 5 |

| 2 | 1 | 3 | 5 | 4 | 6 | 7 | 8 |

51

Random Number Starter

Enter an odd whole number not bigger than 32767 in the boxes below. Make sure that the last figure is in the right-hand box.

| | | | | |

1 5

Number of Haiku to be printed

Enter the number in the same way as before with the last figure in the right-hand box.

| 4 | 0 |

6 8

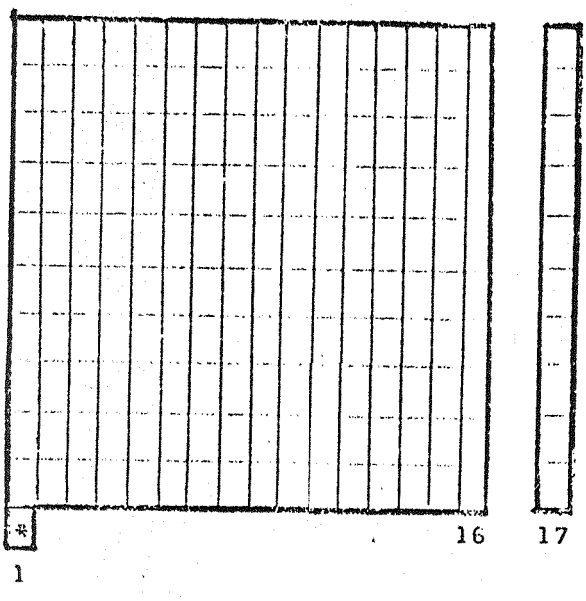
HAIKU DATA FORM

C/P/11

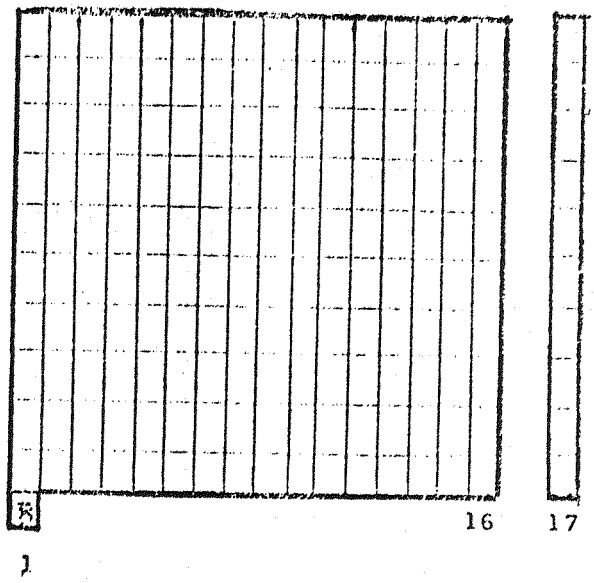
Name: _____ School: _____

Enter the words or phrases one to each line, with one letter to each box.
Leave a blank box between words.
In the columns on the right of each group enter the number of syllables in the word or phrase.

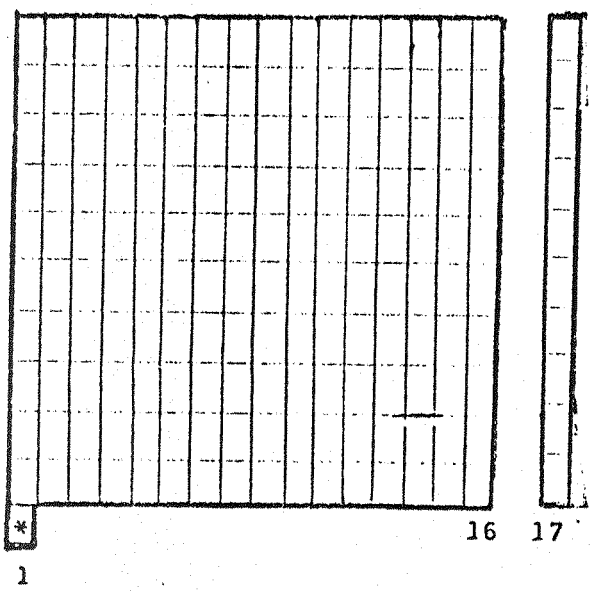
Group 1



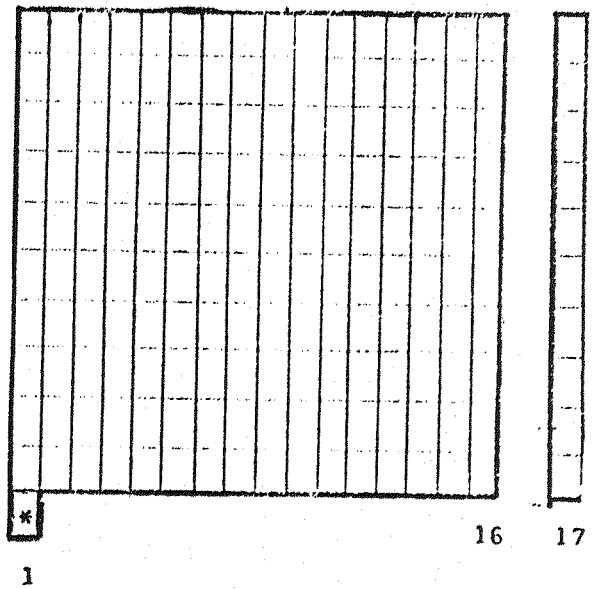
Group 2



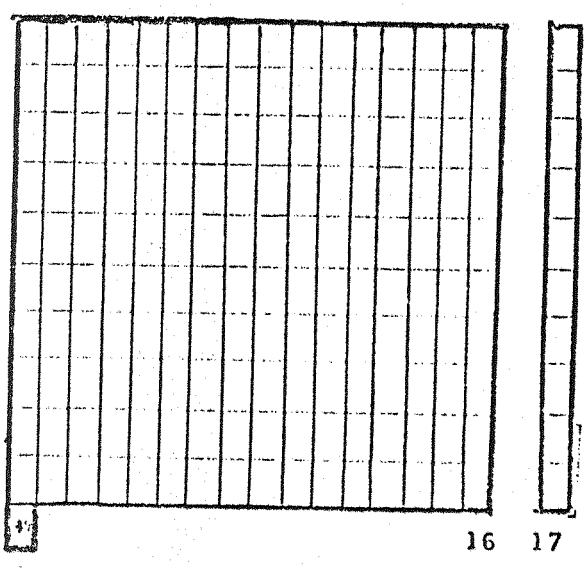
Group 3



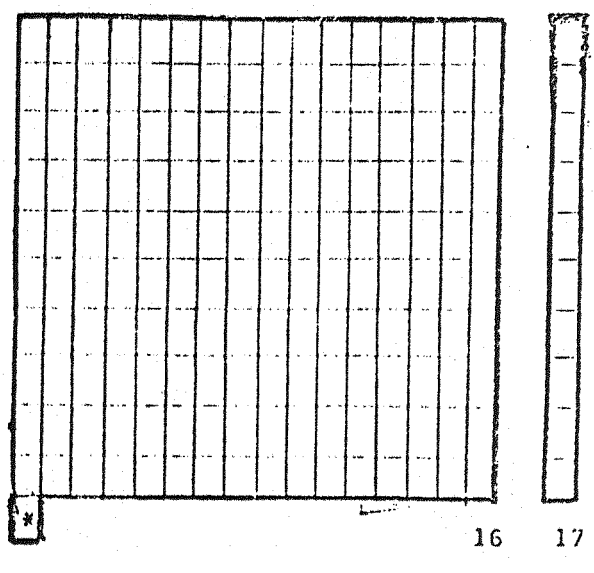
Group 4



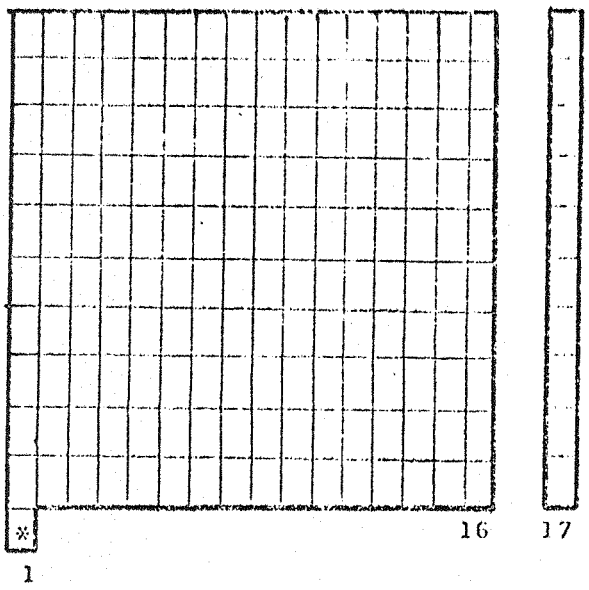
Group 5



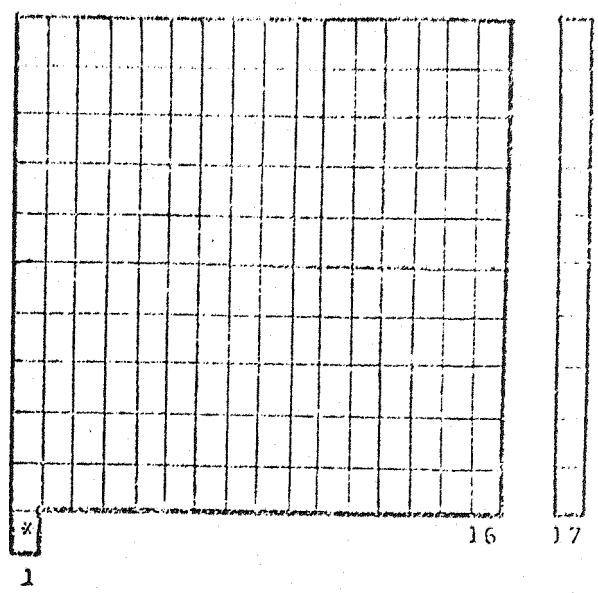
Group 6



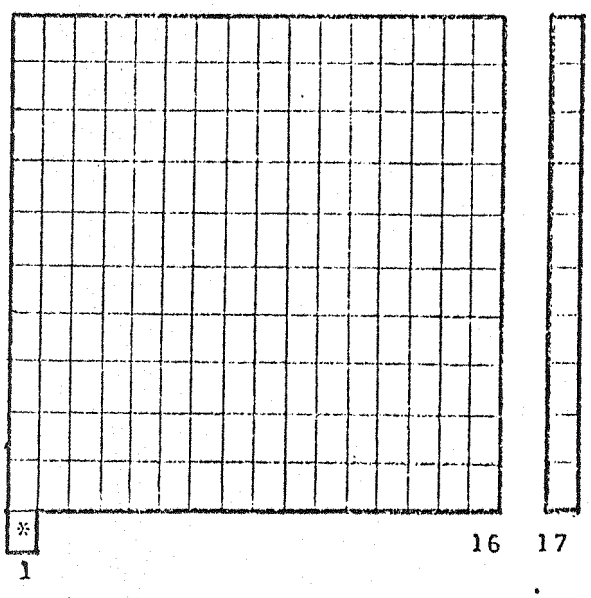
Group 7



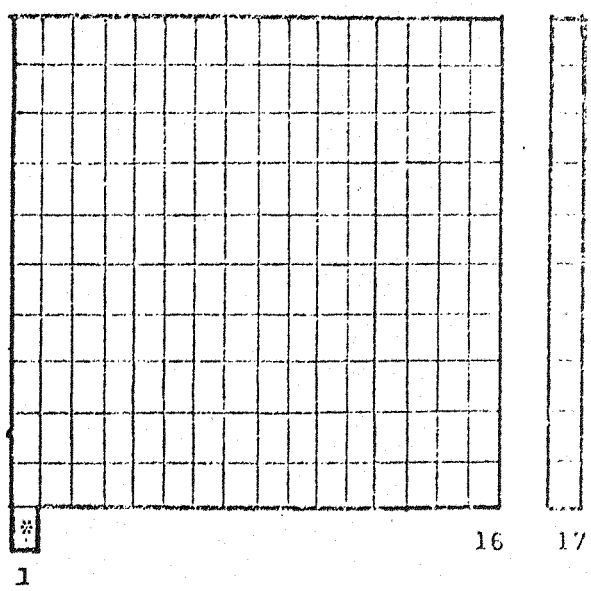
Group 8



Group 9

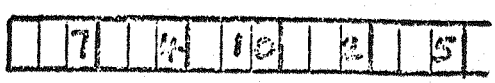


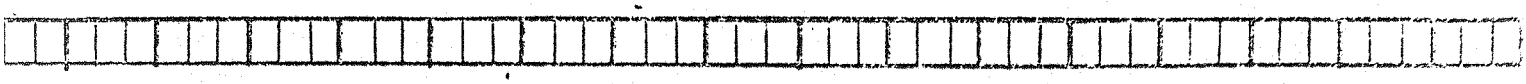
Group 10



Word Group Sequence

Enter your sequence of group numbers in the boxes below, writing them like this:-

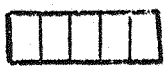




51

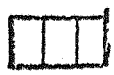
Random Number Starter

Enter an odd whole number not bigger than 32767 in the boxes below. Make sure that the last figure is in the right-hand box.



Number of Haiku to be printed

Enter the number in the same way as before with the last figure in the right-hand box.



c/p/43

GROUPS FROM WHICH WORDS WILL BE SELECTED

1	CHILDREN VISITORS	TEACHERS	STAFF	KIDS
2	STRAGGLING TOOTHPASTING	AMBLING BUSSING	PERAMBULATING	EXTRUDING
3	HOMEWARDS MUMWARDS	SCHOOLWARDS BEDWARDS	PUBWARDS	SUPPERWARDS
4	EAGERLY RAPIDLY	SLOWLY SADLY	UNWILLINGLY TEARFULLY	NOISILY
5	FROM			
6	YATELEY			
7	SCHOOL	PRISON	ACADEMY	PARADISE.
8	PEACE! THANK GOODNESS	PEACE AT LAST UGH!	BEDLAM DESPAIR!	POETRY! LITTLE DE
9				
10				

GROUP SELECTION 1 2 3 4 5 6 7 8

CHILDREN
SPILLING OUT
PUBWARDS
SADLY
FROM
YATELEY
PALACE
LITTLE DEVILS!

STAFF
EXTRUDING
SUPPERWARDS
NOISILY
FROM
YATELEY
PRISON
DESPAIR!

YOUNG PEOPLE
SPILLING OUT
PUBWARDS
PENSIVELY
FROM
YATELEY
PRISON
POETRY!

TEACHERS
EXTRUDING
TELEWARDS
PENSIVELY
FROM
YATELEY
ACADEMY
AH!

YOUNG PEOPLE
SPILLING OUT
BEDWARDS
UNWILLINGLY
FROM
YATELEY
PARADISE.
AH!

CHILDREN
STRAGGLING
HOMEWARDS
RAPIDLY
FROM
YATELEY
PRISON
LITTLE DEVILS!

STAFF
STRAGGLING
SUPPERWARDS
RAPIDLY
FROM
YATELEY
PRISON
THANK GOODNESS

TEACHERS
EXTRUDING
TELEWARDS
UNWILLINGLY
FROM
YATELEY
SCHOOL
DESPAIR!

TEACHERS
TOOTHPASTING
TELEWARDS
TEARFULLY
FROM
YATELEY
SCHOOL
POETRY!

TEACHERS
SPILLING OUT
PUBWARDS
PENSIVELY
FROM
YATELEY
PALACE
THANK GOODNESS

VISITORS
AMBLING
SUPPERWARDS
PENSIVELY
FROM
YATELEY
SCHOOL
THANK GOODNESS

TEACHERS
EXTRUDING
BEDWARDS
EAGERLY
FROM
YATELEY
ACADEMY
UGH!

YOUNG PEOPLE
TOOTHPASTING
SUPPERWARDS
NOISILY
FROM
YATELEY
PALACE
UGH!

CHILDREN
PERAMBULATING
TELEWARDS
TEARFULLY
FROM
YATELEY
PALACE
UGH!

TEACHERS
TOOTHPASTING
PUBWARDS
TEARFULLY
FROM
YATELEY
PALACE
THANK GOODNESS

VISITORS
AMBLING
HOMEWARDS
TEARFULLY
FROM
YATELEY
ACADEMY
BEDLAM

c/p/15

GROUPS FROM WHICH WORDS WILL BE SELECTED

1	FACTORIES NARROW STREETS	OFFICE BLOCKS SLAG HEAPS	TENEMENTS	CHIMNEYS	ROOFSCAPE
2	SMOKY DARK	GRIMY SOOTY STONE	DIRTY BRICK DEPRESSING	GREY	GLOOMY
3	STRAGGLING OOZING	SPRAWLING	CREEPING	CRAWLING	FLOWING
4	HILLS FIELDS	VALLEYS PASTURES	RIVER BANKS GREEN HILLSIDES	GREENFIELDS	WOODS
5	OVER	ACROSS	ALONG	TOWARDS	
6	PEOPLE	WORKERS	CHILDREN	PENSIONERS	GROUPS OF FOLK
7	PLODDING	WALKING	STRAGGLING	WANDERING	SCURRYING
8	HOMEWARD	HOME			
9					
10					

GROUP SELECTION 2 1 3 5 4 6 7 8

DIRTY BRICK
TENEMENTS
OOZING
OVER
GREEN FIELDS
CHILDREN
PLODDING
HOME

DEPRESSING
NARROW STREETS
STRAGGLING
ACROSS
HILLS
PEOPLE
SCURRYING
HOME

GRIMY
SLAG HEAPS
SPRAWLING
ACROSS
PASTURES
CHILDREN
WANDERING
HOMEWARD

DIRTY BRICK
FACTORIES
STRAGGLING
ALONG
HILLS
PENSIONERS
WALKING
HOME

GREY
TENEMENTS
CREEPING
ACROSS
GREEN HILLSIDES
PENSIONERS
PLODDING
HOME

SMOKY
OFFICE BLOCKS
SPRAWLING
TOWARDS
PASTURES
WORKERS
SCURRYING
HOME

COMPUTER PACKAGES.

The following "packages" have been developed by the Schools Computing Centres in Scotland. These are:-

(i)	Aberdeen College of Education	-	Mr. N. Smart
(ii)	Dundee College of Education	-	Mr. A. MacMeekin
(iii)	Glasgow - Computing Centre 1	-	Mr. C. Tomasso
(iv)	Glasgow - Computing Centre 2	-	Mr. H. Ashford
(v)	Jordanhill College of Education	-	Mr. J. Hawthorn
(vi)	Moray House College of Education	-	Mr. P. Barker

and enquiries regarding there use should be directed to the centre in your area.

These packages it is hoped will be of use in the teaching of various subjects and not in regard principally to Computer Appreciation courses.
Notes are available on all packages.

1. The I.B.M. Business Decision Making Exercise.

This is an elementary Business Decision Making Exercise in which participants form a Board of Directors of a particular company selling a product in four different areas. It has been used by the Scottish Computer Education Group for their competition in 1973 and by a number of schools as a Class V and VI Project for Business Studies and Economics Students.

2. Investment Portfolio Package.

The object of this exercise is to study the effects of market forces on share prices. For each participant a file is set up containing details of their investments in stocks and shares. A competitive element may be introduced by giving each participant the same sum to invest and seeing whose holdings are worth most at the end of a fixed period.

3. Scoring and Item Analysis of Objective Test Results.

The analysis of the items in an Objective Test (Multiple Choice).

4. Accounting Demonstration.

A useful demonstration of what happens with purchase and sales accounts in a sales organisation.

5. Geography - Choromap.

This package can be used to produce choropleth maps.

6. Geography - Isomap.

This package can be used to produce isopleth maps.

7. Resistance Networks/ —

7. Physics - Resistance Networks.

The program reads electrical resistance values from punched cards and outputs the diagrammatic resistance network on the line printer, together with the calculated resultant resistance of the network.

8. English - HAIKU.

A program providing facilities for experimenting with this Japanese verse form. Has been found of interest by a number of English Teachers.

9. Languages - Text Analysis.

The program provides various analysis of a passage of text which uses the standard A - Z, 0 - 9 alphabet.

10. Football Forecasting Game.

Each week pupils forecast the results of any 12 football matches from a given list. The computer corrects the pupils results and adds their totals to running totals from previous weeks.

11. A Football Results File.

This program illustrates the use of a Data Processing File. The file contains results of Scottish Divisions 1 and 2 games for seasons 1961 - 62 onwards. The file can be accessed by several programs and various sets of results obtained.

12. Chemistry - Reaction Kinetics.

This is a simulation of chemical reactions permitting the user to investigate the Rate constant and its variation with temperature. The user can select one of twenty reactions, the number and interval between readings and the initial concentration. A list of the simulated experimental results is then printed.

13. Biology - Simple Food Chain Simulation.

Simulates a simple linear food chain. Shows the interdependence of species, 'The pyramid of numbers' and that species higher up the food chain are more vulnerable in that they are affected directly or indirectly by all changes lower in the chain.

14. SO-EZY MAIL ORDER.

Simulates the dealings of a mail order company. Pupil's make purchases on behalf of customers. 9 - month credit, Hire purchase and an 'ACCESS' - type credit system are considered.

15. Fashion Game.

This game simulates the buying and selling of fashion goods in a store and illustrates the point that business men need good up to date information.

16. Supermarket Game/ —

C/T/28

16. Supermarket Game.

This represents the operation of competing supermarkets. Up to five teams compete through varying strategies e.g. lower margins, "specials" "stamps" etc.

17. Geography - Relief Indices.

Relief indices appear as a topic in the 'O' Grade Geography course but have the obvious drawback of being both tedious and difficult to calculate. This program enables the geographer to obtain relief indices very easily together with a histogram of their distribution and a rough map of deviations from the mean.

18. Biology - Simulation of Influence of Selection of Gene Frequency.

An initial population of pure bred red-bodied insected and pure bred yellow-bodied insects are allowed to breed. The red ones have a selective advantage. The genotype and phenotype frequencies are plotted for a number of generations. The user controls the selective advantage, and number of generations to be simulated.

19. Queue.

This program permits the investigation of simple queueing situations. In particular it simulates the formation of a single queue which may be served by a number of service points.

20. Physics - Elastic Collisions
21. Physics - Inelastic Collisions.

These packages are intended as extensions of Laboratory work. Since the computer simulation is less expensive in pupils time than practical work in the Lab, this creates an opportunity for pupils to set up their own hypotheses and test them with less need for "stage management" by the teacher.

Inelastic Collisions deals with the well known experiment of trolleys of varying masses colliding at varying speeds and moving off together after impact. The loss of Kinetic Energy as a result of each collision is calculated.

Elastic Collisions deals with the situation in which the bodies may separate after collision and takes coefficients of elasticity into account. The loss of Kinetic Energy as a result of each collision is calculated.

22. Property.

This package illustrates several important features regarding house purchase. The package produces advertisements for houses. Pupils bid for the house of their choice. Each house goes to the highest bidder provided he can afford it. A competitive element is introduced by awarding points for successful offers. Solicitors fees etc. are taken into account.

23. Biology - Heredity (Genet)/ --

23. Biology - Heredity (Genet).

This program calculates the probability of a set of phenotype traits (e.g. Hair Colour, Eye Colour, Shape of Nose etc.) being transmitted from parents to their children.

24. Linear Programming.

This package illustrates graphing by shading of complements and thus allows solution of simple linear programme problems. The optimum solution is given.

25. Statistics.

This package consists of a suite of programs. They will enable a pupil to count and classify data and carryout certain statistical tests. There are also certain demonstration programs which simulate coin tossing, the effect of accuracy on classification of data and other statistical relations.

26. Electrical Billing.

This package simulates closely the actual procedure of the S.S.E.B. As part of a class project each pupil completes and returns a meter reading sheet for 9 customers issued by the computer. Facimilies of actual Electricity Bills are then issued.

27. Esso Business Game.

This is a simulation of a business environment which enables up to 5 teams to set up companies producing a single product and market this product. The game is biased towards the accounting aspects of running a business.

28. Graph Plot - Plot P.

This program will plot the values of any algebraic or trig. function using real variables for any given domain and range. Scale limits can be varied at will till a suitable form is obtained.

29. Music.

This package is designed to produce music on the I.B.M. 1130 computing system with the aid of an ordinary transistor radio.

30. Geography - Profiles.

This package calculates the profiles of vertical sections of a geographical area, and prints the profiles as they would appear from various positions which can be selected by the user.

31. 3-D Graph Plot.

This package produces a 3-D graphic display of any function of two variables. It has the added facility of being able to rotate the function through 360° in varying stepped degree intervals.

32. Mail Order./ —

32. Mail Order.

A project based on catalogue purchasing - using 9 - MONTH CREDIT, HIRE PURCHASE and/or "ACCESS" type credit. The computer simulates some activities of a mail order firm and provides records of all transactions. The pupils act as agents for customers and keep appropriate transaction files.

The following are available only as 'ON-LINE' packages.
(Developed at Chelsea College of Science and Technology).

33. Biology - CMPETE - Competitive interference in Plants.

This enables students to perform simulated experiments on competitive plant growth between barley, oats, short peas and long peas, allowing students to develop their knowledge about:

i) the effect of plant density on yield

ii) inter-relations between yield and time in monoculture and in a mixed stand of two different species.

34. Biology - COXIST - The Co-existence of animal populations.

The student can investigate the importance of initial population, frequency of offspring and number of offspring, during the growth of a species to reach saturation population. If two species are present in the same habitat each may inhibit the growth of the other population and the student can quantify this inhibition and investigate the conditions when one species dies out or both species co-exist.

35. Physics - ALPHA - Alpha particle scattering.

This simulation provides an experimental situation which can be used when the structure of the atom is being considered. The user chooses the law of force radiating from the massive nucleus and then fires particles into this radial force field. The path of each particle is printed by the computer. The user can investigate the effect of varying the input values and can see which inverse power law gives a best fit with Geiger and Marsden's experimental results.

36. Physics - NEWTON - The paths of a projectile in the earth's gravitational field.

Newton suggested that a particle would hit you on the back of your head if you threw it forwards very fast from the top of a mountain. Using a simplified round world this program allows the student to investigate the path taken by a projectile when projected at speed, and angle, from the top of a hypothetical mountain and also gives the order of magnitude of speed needed for splash down.

C/T/35 29
31

Part 3 - A visit to a computer installation

During your information course you should try to arrange a visit to a computer installation. There are many companies in all areas of the country willing to show parties of children their computer system, and also Local Government and Education Establishments are often open to suggestions from schools. Quite often, Data Processing Managers need help in talking to children - these notes and suggestions are written to help both them and the teacher in resolving this problem.

Firstly, where shall you go? The 'Computer Users Year Book' which can be found in most Public Libraries, gives you all the information you need about which company or other establishment has a computer. Indeed your children themselves may be able to establish a contact for you through their parents. Try to choose, if you have a choice, a company which has its own computer on site rather than a link to a machine many miles away, and also one which has a variety of applications to offer.

Having established your contact, give him some idea of what you want him to talk to the children about. To help you and him with this the question sheet ' A visit to a computer installation' should give all the information needed. It is, of course, also designed so that, when the children make the actual visit, they too have something concrete to do, and they least of all will let him get away without having answered all the questions.

Preparation for the visit should take place during the week before. The children should be told where they are going, what the purpose of the establishment is and the background to its situation near your school. This can be a straight geography lesson from which you may obtain your raw material from the geography department or from the information you have gathered in your conversations with people from the place to be visited. Indeed this visit could be part of a module which you have designed yourself in accordance with the guidelines set out in the introduction to the course.

You may have to make special arrangements in the school administratively to accommodate the visit. The same sheet of questions can also be discussed in the preparation lesson so that it is not new to the children when they have other things on their mind such as making the actual visit. (C/P/16)

During the actual visit, try to get your host to give a little talk about the firm and its requirements of information. Why does it need a computer? What was the system before the computer came? What differencees had to be made when it was installed? How does the rest of the work force view the computer? Which departments use it? What is it used for? In the computer room your host can tell the children all about the boxes they can see, but try also to get him to have a short session after the visit so that all questions can be cleared up. If there are visual aids such as films or slides available so much the better.

The visit should also be followed up in the following lesson by asking the children what their impressions were. And getting them to try to piece together the information story of the installation they have visited. Written work on the visit may follow this.

A visit to a computer installation

C/P/16

You are about to make a visit to a computer installation. During this you will see many new things and learn many new facts. The computer is the central part of the information story in the place you are visiting. Your host is there to give you the information you need in understanding the plot of the story. Ask questions, make comments (intelligent ones) and show your interest. The information story can be fascinating if you take the trouble to try and understand it. That's what you, and your host, are here for. To help you, here are a few of the questions which can be asked about computers with spaces for the answers.

****

1. Name of the company or establishment whose computer you are seeing.

2. What sort of things is it in business for?

3. Manufacturer of the computer? Model or type?

4. Is it rented or bought? Cost? (This may not be available)

5. The Computer has a Central Processing Unit and you may have already learned that this can be divided into three sections - Storage, Control and Arithmetic/Logical Unit. Here is one question about each How much storage or memory is there?

What is the name of the Control Program used (sometimes known as the operating system)?

What is the cycle time ?

Ask your host to explain what the answers to these questions mean.

6. The CPU has lots of peripherals around it. these are the units which supply the information to the computer and get information from it. In the boxes below list the types by number and name and also say what speeds they operate at.

7. Now a question about people who work with the computer. There are several types of job. Find out what these are and also write down what qualifications they need to do the job.

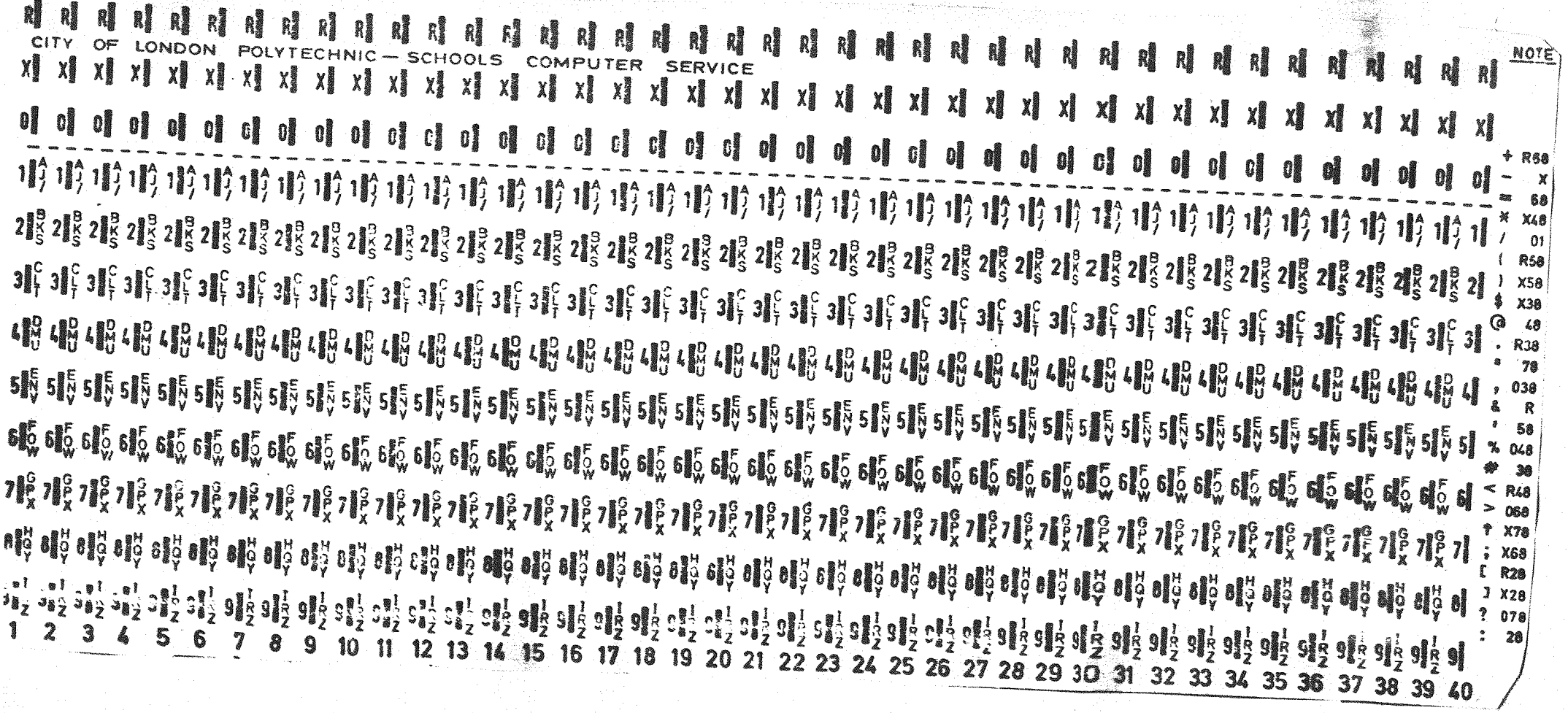
8. On the lines below take two of these jobs and give a brief description of what they entail. What do they do?

9. The installation has obtained the computer to do several jobs. In the boxes below make a list of what it does (its applications) for the establishment.

10. In the boxes below name some of sources of information which the establishment uses in running its programs. Where does the info come from?

11. Which departments use the computer?

On the space which is left write down any other interesting facts you have learned from your visit to a computer installation. Use the back of the sheet as well.


CITY OF LONDON POLYTECHNIC — SCHOOLS COMPUTER SERVICE
NOTE
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= 58
* X48
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) X58
$ X38
@ 49
. R38
78
, 039
& R
' 58
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↑ X78
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C/T/32

S. U. Theses Loughborough
M. Phil 1976

9/T/1

MODULE 7

INFORMATION ON (GAS) TAP

SOUTHAMPTON UNIVERSITY LIBRARY

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Module 7 Information on (Gas) Tap

Introduction: This module takes a large public utility organisation familiar to most children and examines its need for information in a wide variety of applications. It treats the subject at two main levels_

1. The history and development of the Gas Industry, particularly over the last 10 years, incorporating the search for North Sea Gas and the repercussions this has had on the organisation and development of the Industry. It examines in more detail the conversion procedure and the role of information in completing such an enormous task, but does not omit to deal with the human side of the Industry and how the information which human beings receive, analyse and process in a wide spectrum of different functions is essential to the effective running of a large organisation.

2. The acquisition and processing of information by computer within the organisation so that gas accounts may be made correctly, appliances installed in the right places and changes recorded accurately. The computer is put into its place as an important interface between the Gas Corporation and its Regional Boards and the customers which give the Industry its raison d'etre, and its problems.

The approach is from what the children are already familiar with - gas accounts - and these are looked at very closely in terms of their actual informational content before dealing with the processes by which that information is obtained. The use of the computer as a tool for monitoring and regulating information is heavily emphasised, and it is hoped that its essential role in this organisation, and by implication in any large organisation,will be underlined thus.

A peripheral topic also dealt with in this module is an introduction to flowcharting since systems flowcharts are used comprehensively in the treatment of gas accounts and facilitate the understanding of 'what happens if...'.

In terms of the information processing section this module takes as its model the problems of one of the Gas Corporation Regions - while other regions may have different problems of population type, usage type etc, the methods of overcoming them are broadly similar and revolve around the use of the computer as an information processing tool.

Sources of information: The Teachers Notes for this module, for which this page is an introduction, make reference to several publications and visual aids produced by and made available by the Gas Corporation through its educational services department. The address for this is as follows

Education Liaison Officer
British Gas Corporation
326 High Holborn
London WC1V 7PT

Page G/T/ gives a list of those people in the various regions who are able to offer help to teachers undertaking projects on the Gas Industry. In general this help is concentrated mainly in the Home Economics department, but the literature available is of help also to teachers of Geography and to those teaching this module. Indeed, later parts of this module use several pamphlets produced by the Britiah Gas Corporation as sources of reference for work sheets (these are detailed in the 'materials needed' section on the next page). The pamphlets are inexpensive, well-illustrated, and easy to obtain, and the full list of educational aids is also given on pages G/T/23 to 27.

In addition, two films are used. The address of the Film Library is:

British Gas Film Library
16 Paxton Place
London SE27 9SS

You are, of course, recommended to give at least one month's notice of films required, so that you will have to plan ahead when these are needed.

The other sources of information for teaching this module are supplied with the module, and a schedule of these is contained in the 'materials needed' section.

Resume of Module: The sections detailed below are split into teaching units lasting approximately one hour. The order is not crucial, although it has been successfully tested in this format. It is recommended that you look carefully at what it is you want to teach and then to put it into the order which you think is best, trying to retain an acceptable mix of impact at the beginning, and working from the known to the unknown as far as the children are concerned. You may wish to leave out some sections and this perfectly acceptable in the context of what you want to put over to the children - if you also feel that you would like to add more to it, by concentrating upon your own strengths, and the resources you have available (for example, a visit to the local Gas Board computer or a talk by an employee of the local regional office) this, too is an added dimension to your own treatment of the subject.

a) A Gas Account - the impact of numbers and the use of the machine. The meaning of the figures etc on the account - making your own account from information given - information needed to produce the account.

b) Natural Gas for Britain - (film) - the development of the Gas Industry. formation of gas, drilling, rigs - organisation of the Gas Industry - conversion to Natural Gas - information needed for the organisation.

c) The Gas Industry in Britain - Looking a little deeper. A series of assignment sheets to show the different levels at which information may be given or received. Makes use of the film shown in previous week and some of the pamphlets available from the Gas Corporation.

d) Introduction to Flowcharting - a general lesson on the concepts of flow-charting and the elementary sorting out of logical steps. Various exercises on the organisation of logic in our everyday experience and its flow are included.

e) Information in Gas - What's it all About? Some exercises on the classification of information in the Gas Industry and the way by which it is organised on the computer. The types of information which is the concern of the National Authority and that which is locally based.

f) The use of the computer to control the reading of meters, fitting of appliances and production of Accounts, and the way these activities interact. A Gas Game played by groups of children according to written instructions in which they simulate these activities.

g) The what if... situations. Credit and Prepayment Gas. Non-payment of accounts. Keeping track of customers. Systems flowcharting for the computer - an amalgamation of the lessons on flowcharting and computer and extension of these.

h) The Gas Industry of the future - a tidying up, revision and overview of information in the Gas Industry and a look into the future. Film - Flame of the Future helps with this followed by worksheet exercises.

Materials required: The following teaching materials are required apart from the teaching notes, as backup items in the lessons. The paragraph letters correspond with those in the resume above.

Lesson a) Gas Account for Mr JC Bloggins (G/P/1) (for each pupil)
Blank Gas Account (for each pupil) (G/P/3)
Worksheet ' The Impact of Numbers' (G/P/2) (for each pupil or one between two)
Write your Own Gas Account (G/P/4) (for each pupil or one between two)
Notes on writing your own Account (G/P/6) (One between two)
Solution to Gas Account Exercise (G/P/5)
Pamphlet 'How to Read Your Meter' (G/V/1) (From local Gas Advisor)

Lesson b) Film - Natural Gas for Britain (G/V/) (From Film Library)
Natural Gas for Britain - Synopsis (G/T/11) (Teacher's reference)

Lesson c) Information Pamphlets (G/V/3) (Several for each class)
comprising: How Gas reaches your home
Gas in Focus No 1; Natural Gas
Up to Date with High Speed Gas
The Natural Gas Country

Worksheets 'Looking a little deeper' (G/P/7 to G/P/9) (for each child)

Lesson d) Director's Letter - Flow of Information (G/P/10) (for each child or as OHP transparency)

Post Office pamphlets detailing benefits and means of obtaining them (optional)

Lesson e) Worksheet -Information in Gas -What's it all about? (G/P/11) (for each child)

Information and reference material (4 sheets) (G/P/12 to 15)

Lesson f) Gas Game (G/V/4) Individual items according to list in game

Lesson g) Worksheets 'Leavers - what happens if you move (G/P/18) (for each child)
'What happens if you don't pay' (G/P/16) (for each child)
'New Customers' (G/P/17) (for each child)
'A'computer Information System for Gas' (G/P/19) (for each)

Lesson h) Worksheets 'Flame of the Future - What did we learn from the film?' (G/P/20 and G/P/21) (for each child)

Film 'Flame of the Future' (G/V/5)

Flame of the Future - Some Discussion Notes (G/T/22) (Teachers reference)

a) A gas account - This first section looks closely at a gas account with three purposes in mind. One is to enable children to find their way around a typical form and to study it in terms of its informational content. The second is to illustrate how codes, numbers and ciphers are an increasingly important facet of modern life and how their interrelationships on a typical form such as this enable essential information to be conveyed, checked and stored. The third is to enable children to distinguish between the information which has to be supplied by a third person (the hazards of so doing are dealt with by a later part of this module) and that which is the result of computer calculation.

For this part of the module you will need those documents outlined in part a) of the materials required section (page 3).

Introduction. Firstly, as with all new modules, you will need to relate the new topic to that which has gone before. Either by questions or by a quick potted explanation of the course so far, indicate that each module brings out a different aspect of information, but that it is information and the need of organisations for this very essential commodity which binds together the course.

What information, for example, do the children have about the Gas Industry - obviously some will know more than others, but concentrate on the points of contact between the family and the Gas Industry. How many of the children have gas supplied at home? For which appliances? How is it supplied and what evidence is there of this around the home and the town? Encourage the children to speak freely about Gas and its applications as they are aware of them.

Bring the subject around to communication between the home and the people who supply gas - what is the most formal way of this communication? Bring the subject around to the Gas Account. (G/P/1) Hand out the account and payment stub as an example and indicate that you are going to look at it in some detail. Allow the children a minute or so to find their way around the form and then ask what it is that strikes them most about it - try to elicit from them that, for the most part it is composed of numbers which mean something to somebody. Take a few of these at random and ask what they mean?

Give out the question sheets on the impact of numbers (G/P/2) and allow the children a few minutes to complete the form - most of the questions are easily answered, but help may be needed with others. The sheet of notes on writing your own gas account (G/P/6) will assist in this for your own information, although this is used in a later exercise.

When this has been completed refer back to the account and indicate that there is now a need to take a less superficial look, since the numbers have meaning and perhaps we ought to discover what those meanings are. Some are obvious, but there are three main points to be made in this part of the lesson.

1. The first is to distinguish between those numbers supplied as information by a third party, those which are the result of computer calculation, and those which are fixed and do not change from one account to the next. Ask the children to give you examples of each, and make a list of each under 3 headings on the board. Ask too what the numbers mean as far as the children are capable of knowing - those which are not so obvious leave until later.

2. The second point to be made is that numbers, even reference numbers, are not just picked at random out of a hat. Take as an example the reference number, top right. Explain that :

1 = the number of tenants in the house since gas was installed
ie Mr Bloggins is the first tenancy

017/066 is divided into two for ease of reference - the gas board keeps a list of all roads in its region (in the computer and referable to a map) numbered. Mr Bloggins lives in the 17,066th road on the map.

151 means that Mr Bloggins was the 151st person to be read on the meter reader's round during this quarter.

Calorific Value is explained on the pamphlet 'How to read your meter'.

3. The third point concerns the relationships of numbers on the form. Where, for instance, do you find the reference number repeated? (albeit in a slightly different form). Now look for examples of other numbers which refer to each other? Ask the children for examples - make sure that they notice the connection between the bottom line (second number)and the reference and the bottom line (fourth number)and the account value. Now deal with the bottom line in some detail since it demonstrates an important principle in the processing of accounts by computer. Indicate that this is a document which will be read into a computer by a document reading machine and that the purpose of the large L bottom left is to enable the document reader to line up correctly. Why is this necessary? How might it do this? The meaning of the figures on the bottom line is explained on the notes on writing your own Gas Account (the figures in circles refer to the answer to the exercise). Explain 'modulus 11' get the children to check this figure. Explain the way in which modulus 97 works with the account amount (4th figure on bottom line) - get the children to check this is correct.

By now the children should have gained a great deal of information from the account and it is time to have them writing their own from information given.

Module 7 Information on (Gas) Tap

Give out the sheets 'Write your own Gas Account' (G/P/4) and a blank account form. (G/P/3) Go through the passage at the top of the former, and leave them to do the exercise. If you have time at the end of the lesson give out the answers (G/P/5) and the notes (G/P/6) or check the answers in any other way you wish.

By the end of this lesson the children should realise that there is more to a gas account than first meets the eye, and that the impact of numbers (or symbols) is directly due to the way in which the computer is involved in processing the information contained therein. This point can be made explicitly if wished.

b) This second part of the lesson 'Natural Gas for Britain' explores some of the wider information about gas and attempts to put the whole Industry into perspective. It forms a contrast to the previous lesson in which a closely detailed look was taken at a Gas Account. This is a much more generalised approach and you may wish to explain at the beginning of the lesson the difference between general and specific information, and ask in what category the majority of the information received at school comes. For this part of the lesson there is a synopsis of the film which will enable you to initiate a discussion and act as a reminder of what happens in it and what information is presented. (G/T/2). The film (G/V/2) is obtainable from the British Gas Film Library and full instructions on how and where to order it are given at the beginning of the module (Sheet G/T/3). Suggestions for lesson timing are given at the bottom of the synopsis.

c) Gas in Britain - looking a little deeper. We now recommence the process of looking in a little more detail at the information available to us on Gas. From the general impression given by the film last week, we now use information pamphlets (G/V/3) to study how the information may be organised into different slots. The effect of this should also be to illustrate how there are different levels of information, depending on its complexity and its detail, and how people interract in providing it and using it. Three assignment sheets are provided for the childrens' work. (G/P/7 to G/P/9) It is up to the teacher how these are used. You may wish to give the lesson orally and to ask the questions yourself, bringing in points as you go along. You may wish to do this and to have the children keep a record by completing the

answers afterwards. You may wish to deal with the subject assignment by assignment, or you may wish everything to be completed at once after an oral beginning.

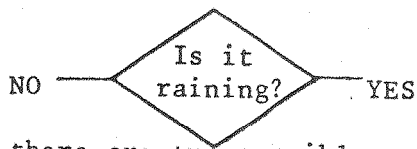
It is important however you decide to treat this to let the children know its purpose, and to make the salient points about the categorisation process of information, and the different levels at which it is needed. The Assignment sheets are numbered G/P/7 to G/P/9 and the pamphlets needed are given at the top of each assignment. These pamphlets (G/V/3) are obtainable from your local Gas Region Advisor - full instructions are given in the introduction to this module.

Introduction to flowcharting

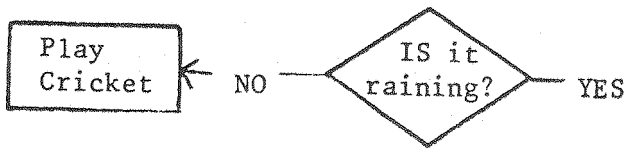
d) Section 9 deals with the way in which Gas Accounts are prepared and approaches the subject from the point of view of a systems flowchart. Hence this preparatory lesson on the basics of flowcharting.

A flowchart is an attempt to set down in diagrammatic form the logical steps and decisions which have to be considered in any course of action. It is best approached by showing an example piece by piece until the complete picture is apparent - in this way the logical process explains itself.

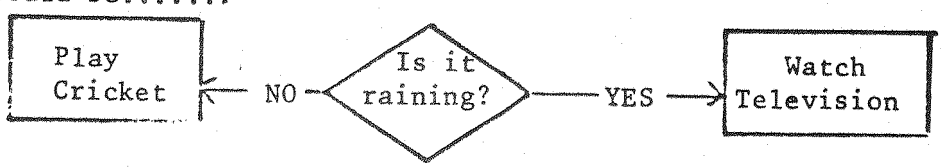
Point out to the children how everything they do is based on decisions taken at the time. For example they may want to play cricket - if it is raining this is not always possible so that they have a simple question to ask themselves before making the decision. In flowcharting a question or decision box is usually a diamond shape as follows.



Notice that there are two possible answers to the question and therefore two exits from the box. Explain this on the blackboard. Presumably, the resolving of a decision will involve a course of action - in this case the answer NO to the question is it raining? would mean that cricket is on and the next step would be an action box (a rectangle) something like this.....

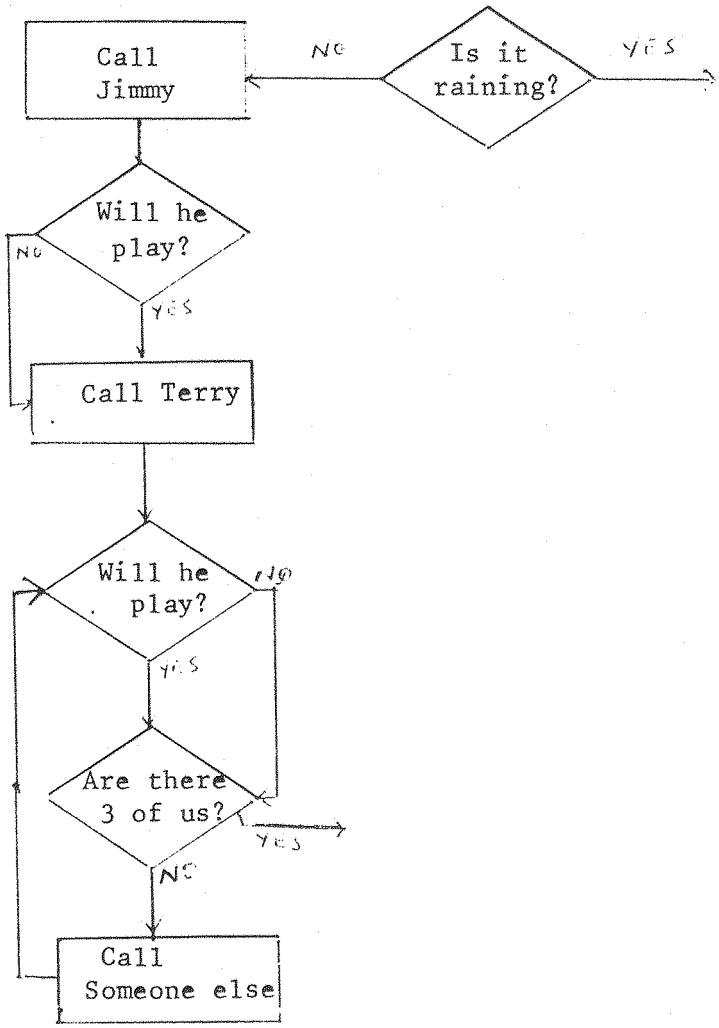


and, since children hate to do nothing a more complete picture would be.....

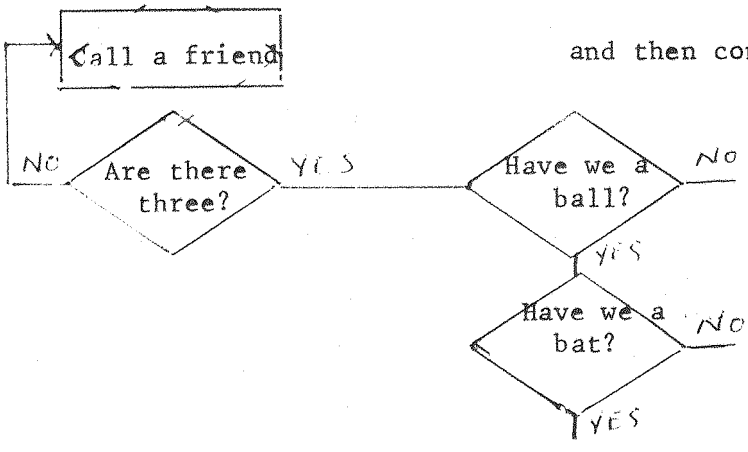


but, of course, it isn't as simple as this - the problem has not been broken down very far, since the decision to play cricket involves other actions and other questions - ask the children what these might be. For example, to play cricket requires other people and other equipment which may or may not be available. What do the children consider to be the minimum number to play a game of cricket? What kit is required? - list these on the blackboard (don't forget that a minimum requirement might be a ball..)

Rub out the left hand box and ask the children what needs to be done to reduce the size of the logical step further. They may decide that if it is not raining and they want to play cricket, they need to obtain some support for the idea by calling on friends, and perhaps the flowchart needs to be expanded as follows. Let's assume that three people are needed to make a viable game.

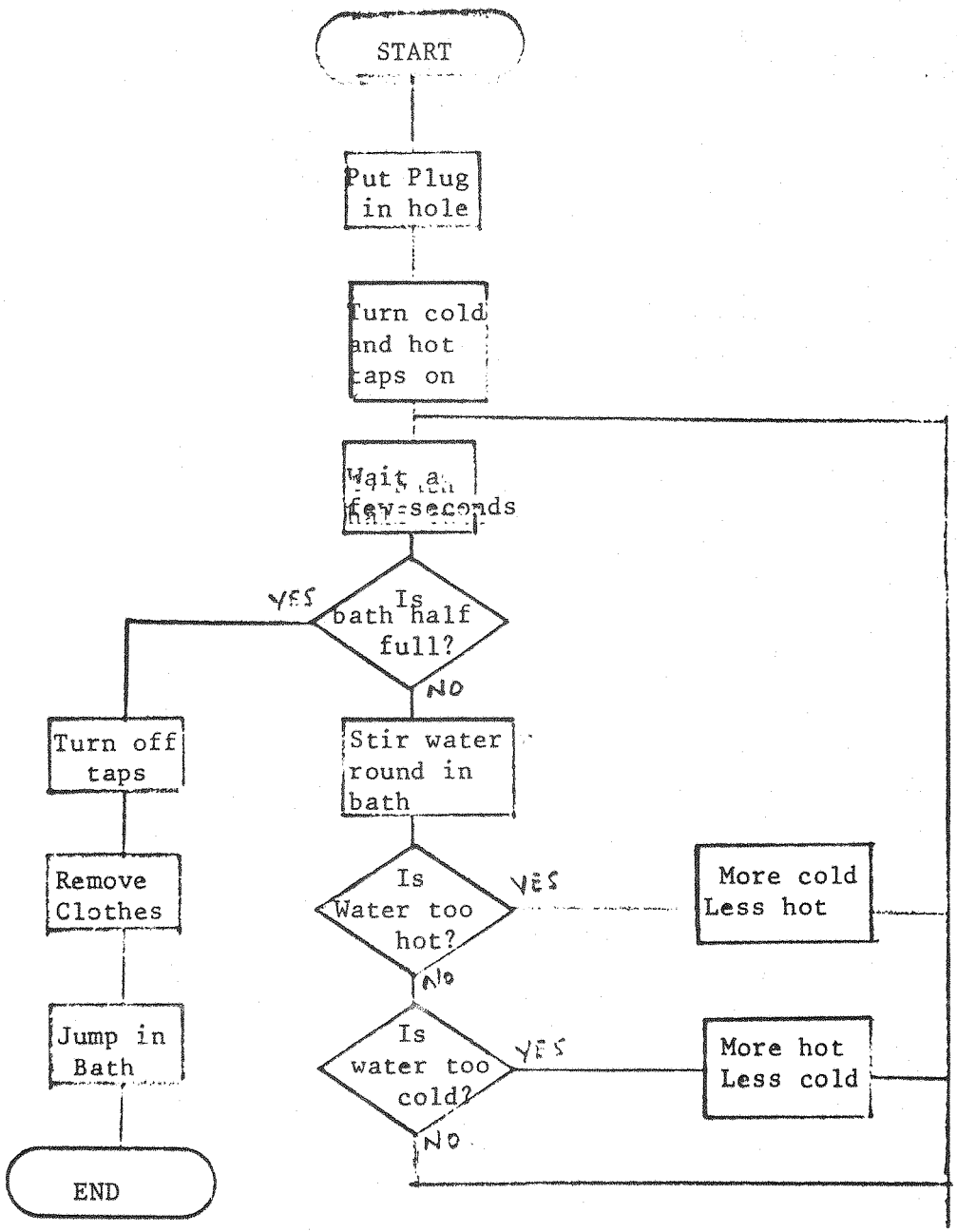


At this point you might ask the children if they can see some similarity between two of the decision boxes. Explain how one can 'loop' round by, instead of calling people by name, generalising. Rub out the boxes on the left hand side and replace by:



and then continue the flowchart with:

Ask the children to copy the flowchart so far and to carry on with it for at least ten more steps. When they have done this emphasise how the problem has been broken down into many small steps, and this is what our brains are doing most of the time even though we do not consciously realise it. For example any question asked of the brain like 'Do you understand this lesson?' or 'Do I eat school lunch?' involves decision and action in the way the flowchart describes.
As an exercise for the children to do on their own, ask them to prepare a flowchart which depicts 'preparing for a bath'. If you feel that help is needed beforehand give a few hints, but try to get them to sort out the problem on their own. The complete flowchart is given below. (First, teach the start and end symbol).



When the children have completed their own version, ask for one example to go on the board for the others to study and amend as necessary. This can be the cause of a great deal of fun, since many children often forget to take off their clothes before jumping in, or are willing to get into scalding hot or freezing cold water.

There may, of course, be other possible versions of the bath flowchart which are equally valid.

As a last exercise, hand out the more complex flowchart entitled Director'sLetter - Flow of Information (G/P/10) (It may alternatively be shown as an OHP Transparency).
Ask what it is meant to depict - What was the problem in the first place?. Point out that the simple problem is to send a letter from the Director of Education to parents via the schoolchildren - it is not complete (this may be a further exercise for the children).
The flowchart shows the following things:

a) How an easy and straightforward task takes in quite a lot of logic.

b) How the flowchart can show up the possible breakpoints (ie - where the system can break down) - the 'letter lost' box shows this. Ask the children to look at the many ways of entering this box.

c) The people involved in a fairly straightforward logical system and how they, rather than the system, are the cause of its breakdown.

d) How it may be possible to work out the probability of the letter getting to its destination.

Go through the flowchart asking 'what would happen if...' type questions. See if they can finish it if there is time at the end of the lesson.
Point out that part of the importance of flowcharts is that they are becoming increasingly used for informing people about what to do in the adult world. For example, Car Manuals are being written in flowchart form. A worthwhile activity as a follow up is to obtain from the Post Office a form which tells people what their rights are. eg whether they may claim benefit for something. This is a ripe candidate for flowcharting treatment rather than the often incomprehensible legal phrases they use now. Try it as an exercise.

e) Information in Gas – what it's all about . This session uses the sheet with the above title and is an attempt to collate all the topics one could find information about concerning gas and which the computer would be a useful tool in processing this information. In one sense therefore this is a round-up of computer applications in the Gas Corporation at both Headquarters and regional levels, and the chart (G/T/16) provides a means of summarising these.

It is recommended that the children should try, in conjunction with the teacher, to think through the categorisation process – by this point in the course they should have had some practise in doing this – and the forms (G/P/11) should be handed out to the children blank, to be filled in during the course of the discussion. Completed forms are given at the back of these notes (G/T/16) which enable the teacher to structure the discussion and questions around that which it is required to elicit from the children.

Revise, firstly, the topics which you have dealt with so far. Explain how the process of getting gas from its source to the homes of the children involves several problems and ask what these may be – point out that each problem is basically an information problem answering the questions, where, how, why, what or when. Indicate also that problems occur at two levels – the Gas Corporation, involved in the structure of the industry and the source of supply, and at regional level, where the contact with the customer occurs without which there would be no industry.

By structuring your questions according to the information required deal first with the Gas Corporation and its information problems filling in the first six boxes as you do so.

Similarly treat the second half of the chart – a good way of presenting a slightly different approach is to ask the children about the different people involved. Structure your questions so that the children are put into real life situations eg buying a gas cooker (the sales staff and showroom) and the problems which need to be overcome before the cooker is put into their homes (the fitter to provide a gas supply and the warehouseman). Allow the children to complete the boxes on the chart as you go – when complete point out that this is not the total picture necessarily – for example – what about people who do not pay their bills?

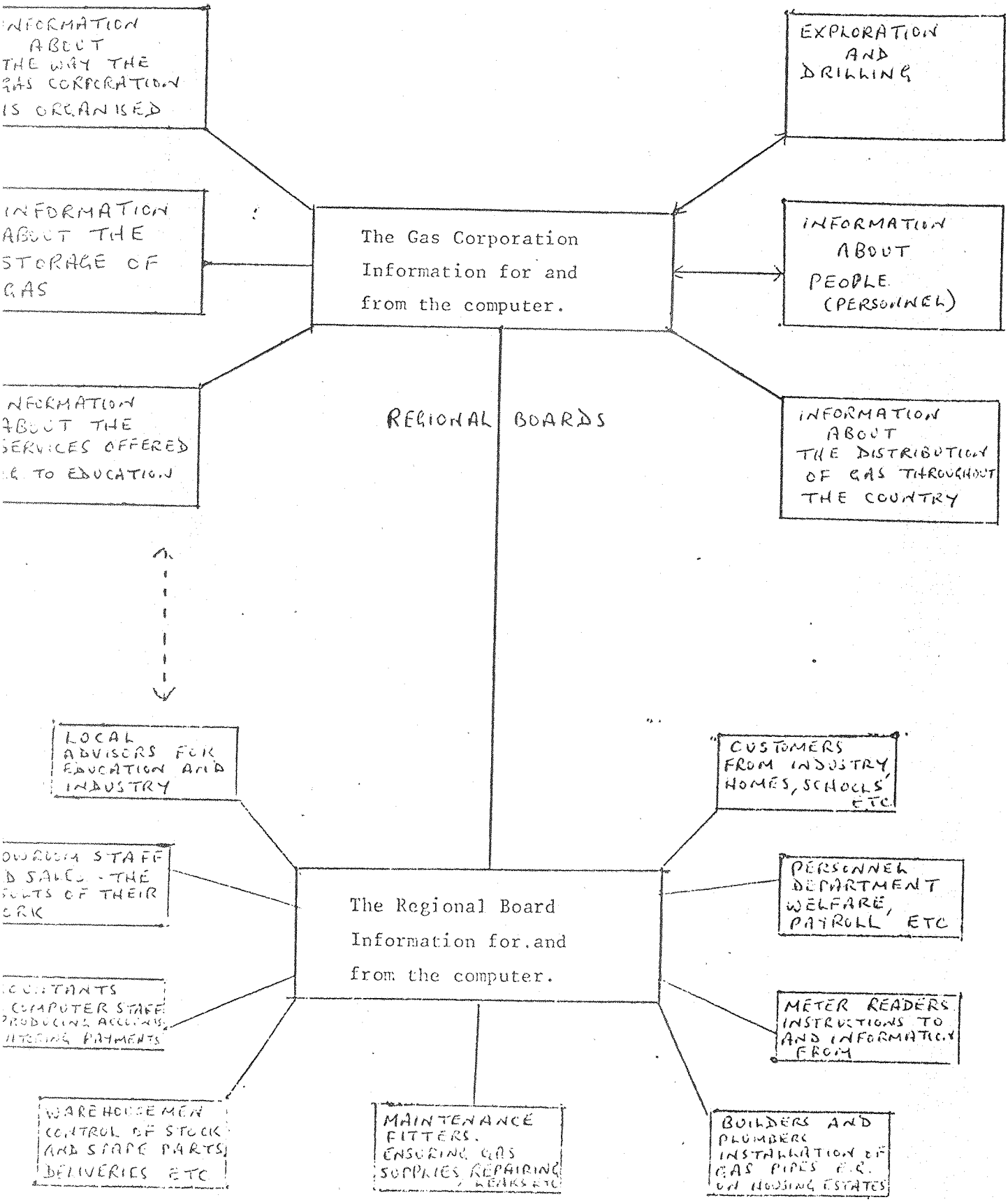
Ask the children where they might find out about each item of information? Hand out the leaflets (G/V/3) you have available – ask them to look at these , and then to put a tick against a box on the

if they think any of them would answer some of the queations which could be asked. Give them some time to do this, and when they have finished ask if any box can be completely covered by the information they have in front of them - if they think so think of a couple of questions to which they cannot find the answer on the sheets - this should not be too difficult. Point out again that again we have an information problem - remind them of the first definition of information in the first module, where there is a question to be asked a piece of information must exist for the answer. Ask the children to compile a list of questions about gas - perhaps six, which they may like to put to any specialist working for the Gas Borporation.

Give out the book list (G/P/12 G 15) and point out thatperhaps many of the answers lie among the information given by this. If you feel that your class is capable and willing to do so, swap round the lists of questions and set each child the task of answering someone elseŝs questions for him by next week.

G/T/16

INFORMATION IN GAS - What's it all about?



f) The Gas Game. This lesson is fairly self-explanatory insofar as the children are expected to play a manual simulation type game in groups. The game (G/V/4) outlines the processes of meter-reading and the construction of Gas Accounts from the information supplied.
Full Notes are given with the game.

g) This section deals with the way in which an Information Services Department in the Regional Gas Office uses the computer system to deal with the usual and unusual information problems which crop up daily. It is presented in the form of Systems flowcharts which explain the what if.... situations much more clearly than a passage of writing. In this respect the lesson on flowcharting (d) previously) will come in useful as an explanation of the type of thinking needed to set up an information system.

Firstly present the following facts to the children, either by writing them on the blackboard, by putting them on an OHP transparency or orally.

- The Gas Corporation has approximately 14,000,000 customers
- It employs more than 110,000 people
- There are 127,000 miles of gas main in use
- 10,237 therms of gas are sold daily
- The Gas Corporation is divided into 12 regions
- Each region is divided into areas
- Each area has a Gas Team comprising about 20 people
- The Gas Team comprises fitters and meter readers
- Gas Accounts are sent to all customers every 13 weeks

Remind the children about the Gas game they have played and how the system was set up around the computer so that bills were processed and produced automatically. This is the normal system and we don't intend to go through it again formally - if you wish to revise the system they played do so. Point out that any system has exceptions - people who don't fit into the main-stream. What might these be? Discuss these differences - put them on the blackboard if necessary.

- People who do not pay the gas account
- People who move
- New Customers
- People who stop receiving gas
- People who choose to pay in instalments
- People who have payment meters
- People who are not in when the meter reader calls

and others who might not fit into the system.

Point out that any good information system has to be flexible so that the things which don't fit into the system can be dealt with efficiently - in fact an auxiliary system has to wrapped around the main information system.

Look at the flowchart 'What happens if you don't pay?' (G/P/16) - go through it with the children asking them questions about what happens if... (there are also 2 pieces of information at the top right which indicates how much storage space is needed for just one file among many.)

An exercise which illustrates the efficiency of flowcharts in giving information of this type is to ask the children to write out what information is contained in prose. Point out that this is what is actually done in many cases for example in documents which try to tell people what benefits they are entitled and the conditions they must fulfil to obtain them. How much better it might be to put this information in flowchart form.

Two other flowcharts 'New Customers' (G/P/17) and Leavers (G/P/18) are also supplied for your use in this lesson - a sheet of questions about all three of these flowcharts is also given (G/P/19).

You may wish to spend the rest of the lesson in getting the children to complete the question sheet, or in going through the flowcharts orally, or in setting a separate exercise which requires the children to draw up possible flowcharts for some of the other eventualities which have occurred in your discussion about people who do not fit into the mainstream of the normal gas information system. (see page G/T/18).

For example for those who only pay part of the cost.

This lesson has tried to bring to light some aspects of an information system in one of the regional gas boards and the fact that the activities of the people who work for it are all linked to the central computer for the benefit of the customer. The documents they receive and the documents they produce are all tied in to the use of the computer, and there has obviously been much thought and effort put into the devising of the forms and the systems.

A final topic for discussion would be why mistakes tend to occur with computer forms and how infexible systems tend to lead to misunderstandings and bad customer relations. For example, many of us have had computer form letters asking for payments which have already been made, and these tend to be repeated because there seems to be no way to put the computer straight after a mistake.

h) The final lesson comprises a revision/look at the future of the module and of the Gas Industry. The emphasis is on change and the way Industry and people respond to it. Much of the course, in fact, centres on this implicitly and in this lesson the effects of change are made more explicit. The film 'Flame of the Future' (G/V/5) outlines contrasts between the old and the new Gas Industries, the changes which were needed and the way these changes were brought about. For example the massive conversion programme from town to North Sea Gas required a highly organised and developed information system to keep track of what had been achieved. To assist with your treatment of the film there is a set of discussion notes (G/T/22) which also includes a synopsis and questions to ask. For the pupils' own follow up work two worksheets about the film are on pages G/P/20 and G/P/21 . It is suggested that you show the film twice - once after a short revision of what has been covered in the whole module, and the second time after you have used the discussion and just before the children attempt their worksheets. This would mean that this topic will take two weeks to be covered thoroughly - if time is more pressing than this you can deal with the problem in any combination of film/discussion or film/worksheets.

This completes the Gas Module unless you have been able to fix up a visit to the local Gas Company or arrange for a speaker to visit the school. In it we have attempted to cover the whole range of information about Gas,fromthat which is taught in a normal Geography lesson to the information services which make the industry tick and without which there would be no industry.

9/T/21

Natural Gas for Britain - Synopsis

The following notes comprise a synopsis of the film 'Natural Gas for Britain' which the teacher may use as a discussion guide after showing the film.. The film itself provides a good introduction to the early part of the Gas module in supplying information about the commodity which is the focus of the module.

++++++++++++++++++++++++++++

History of the development of the Gas Industry from the middle 19th century. Coal - the only fuel found in quantity in Britain. For 150 years town gas made from coal, then in middle 1950's oil also used as a source for making gas - pictures of the equipment used in the conversion process. From 1964, Algerian Methane brought in tankers and stored at Canvey Island - first liquefied at 160 degrees Celsius for transit, then regasified before being piped to distribution points.

The discovery of North Sea Gas - use of maps to explain why geologists thought it existed in North Central Europe. Pictures of seismic explorations. Geological history of the area, Decaying vegetation from swamps of Carboniferous Period covered by sandstones of Permian. This in turn covered by salt strata and domes which are impervious and trap gas in sandstone below. Exploratory drilling on land areas of Eastern England, Holland and North Germany not at first successful. Discovery of massive Gas deposits at Groningen field, North Holland in 1959.

Exploration in the North Sea. Seismic soundings and seismographs produced by special shipboard instruments. Division of North Sea into international areas which can be explored by countries bordering the Sea. Division of British Sector into 90 square mile blocks in which drilling concessions can be sold. Exploration within these areas by British and Multi-national concerns. Rigs - how they are positioned. Drilling, the only way to verify geologists' findings, techniques. How rock strata are produced and examined for likely gas deposits. Drilling rig costs (£2½million in 1971 and £5,000 per day to operate for 24 hours). BP strikes first gas in Autumn 1965.

Differences between Town and North Sea Gas. Cleaner, non-poisonous. Will not burn in the same burner because of higher calorific(heat) value. Picture demonstrations of the different gases in the same burner. Conversion process needed. Advantages of Natural Gas also - needs little plant, costs nothing to make, no needless transport of solid fuel, in a politically stable area..

Problems of whether to make it available and how. Size of reserves (20 years - is it enough?) - Cost of conversion process - control over price of indigenous gas - future growth of industry after conversion - cost of building a Gas Grid. Information on all these things required. Positive response - pipe-laying in building the grid. Conversion of existing appliances.

The film was made in 1971 - since that time, conversion has gone ahead and now well over 3/4 of the country is converted to North Sea Gas and 3/4 of the pipe laying is completed. You may wish to follow up the discussion by a class survey of the use of gas in the childrens' homes, and a session on how they were 'converted'.

A recommended treatment of this film during a one hour lesson is as follows.

a) Short Introduction - about five minutes.
b) Show the film - 18 minutes.
c) Discussion session, bringing out the points made in the film - 20 minutes (could include the survey).
d) Show the film again - 18 minutes.

Flame of the Future - Some Discussion Notes

G/T/22

This film introduces some interesting points about the functioning of a large organisation and the questions it must ask before going about solving its problems. Some of these points are raised anecdotally by presenting short cameos of situations which frequently may crop up, and others are presented didactically by a more direct approach. The following points are all raised in the film and are given here for use by the teacher in an after-film discussion session. They may be used separately from or in conjunction with the question sheets entitled 'Flame of the Future - what did we learn from the film?'.( )

Discussion Point	Film reference	Questions to be asked and points to be made
Contrasts between the old and new Gas Industries.	Opening sequence - gas lamps and dirt and smoke of coke ovens. Large gasholders v modern small ones. Frequent shots of control rooms and mention of computers. Ref. to coal trains v energy potential at Becton. Emphasis on organisation and method. 'making gas' - final scene by turning valve.	How did gas used to be made? How is it 'made' now? What characterised the smelting of ore and making of coke? How is the coming of North Sea Gas the end of an era?-and the beginning? How much coal was needed? Who said 'It's not natural, is it?' why? in what context? How much can the children remember about the old industry - what evidences are there in the area? Old gas lamps are now antique pieces found in gardens. Still large gasholders to be seen - why? What did Mr Pullen say?('Things change')
Methods of obtaining North Sea Gas.	TV series watched on rig. Pictures of rig and valves. pipeline laying scenes. Photographer showing pictures of rig for magazine.	What was the TV series? Why was it very relevant to what happened next. How many people on the rig(apparently)? What would be the life of such a person? What was its name?(Mr Louie) What sort of machines were used for pipelaying? What would the difficulties be in such a programme. What evidence is there locally of this process? How is gas taken to houses of children? Why is it not noticed?
People involved in the Gas Industry.	Crowds leaving large office. pictures of gas people at work - meter readers, fitters, research and development, large office shot, clerks receiving complaints etc.	What sort of people are involved in the industry? (make a list?). What are the functions of each? Why did the old lady think that the gas people provided a service only for her? What was the old lady complaining about? What research was being done into what? why? What were some of the other problems involving customers? What are the likely problems which arise as a result of so many different people being involved? Mention communications problems with reference to film details.
Large-scale Organisation problem Conversion to Natural Gas.	Manufacturing cookers. Making conversion sets. Warehouses of sets. Lorries carrying out conversion. Fitting new sets(how many more?) map work.	How many appliances needed to be altered? Why? Where are they all? Who alters them? What sort of things needed organising? Before this, what information was needed? Which machine helped in this? What problems could occur in an enterprise like this? Have the childrens' homes been converted? How was it done. Planned, controlled, computerised. What was? Is it worth it? How do they know? Which machine would help in making this decision? What needs to be done

G/T/23

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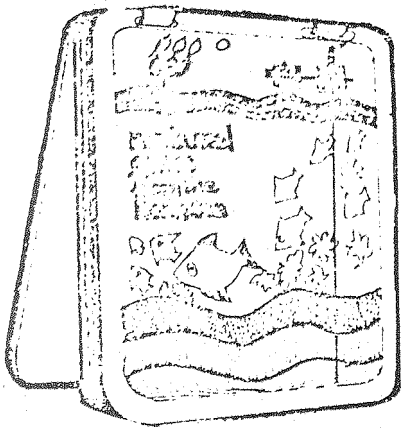
British Gas Educational Aids

G/T/24

British Gas offers the following aids to teachers. Requests for educational material should be sent to the Chief Home Service Adviser of the British Gas Regions (list attached). Many of the larger aids may also be borrowed from the Regions if sufficient notice is given.

Natural Gas Aids

Natural Gas Storyboard



26" x 20" A lecturing aid of ten boards, with coloured illustrations, describing exploration for gas, its transmission and use. £5.00 + 50p VAT

Natural Gas Posters

A set of seven 30" x 20" posters in colour show with simple diagrams where Natural Gas is found and how it reaches the home. £1.50 per set + 15p VAT

North Sea Heritage
by D Scott Wilson

$9\frac{1}{4}$" x $5\frac{3}{4}$" 60 page book written by the Scientific Information Officer of British Gas, giving a detailed account of North Sea Gas. It is available either together with the Natural Gas Story Board or Natural Gas Posters. It is also available separately at 30p a copy.

Britain's Natural Gas

$8\frac{1}{4}$" x $11\frac{3}{4}$" 47 page book in full colour with many illustrations for senior students.

G/T/25

How Gas Reaches Your Home

12 page booklet in 2 colours, for the middle years. An easy-to-understand publication dealing with Natural Gas. Illustrated throughout.
75p per 30

Natural Gas Country

$8\frac{1}{4}$" x $11\frac{3}{4}$" 12 page booklet for schools dealing with Natural Gas and its use in industry, commerce and the home.
Sets of up to 20 free

Up to date with High Speed Gas

11" x 8" 6 page leaflet on Natural Gas. Gives a comparison with Town Gas and some details of conversion.
60p per 30

'Natural Gas from the North Sea'

A 36 frame 35 mm filmstrip in full colour, comes complete with teachers' notes. Please state when ordering whether vertical single frame or horizontal double frame is required. 95p each + 10p VAT
Also available in slide form at £2.95 + 30p VAT.

Home Economics - Domestic

How it Works

$8\frac{1}{4}$" x $11\frac{3}{4}$" 13 page book with detailed diagrams and notes explaining basic scientific principles of gas appliances and systems. The book comes complete with 13 overhead projection transparencies.
£2.50 each

Central Heating Storyboard

28" x 19" 8 boards A lecturing aid with coloured illustrations describing how gas central heating systems work.
£5.00 + 50p VAT

G/T/26

Lighting the Gas Oven

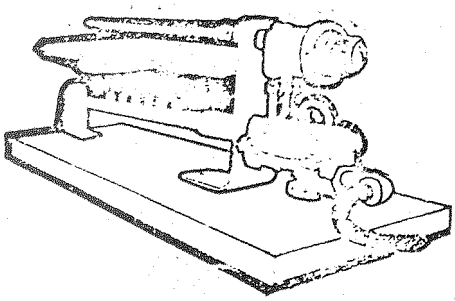
8" x 10" 6 page leaflet showing four different principles involved.
Limited numbers Free, state requirements.

This is also available as a poster.
Single copies Free.

Guide to the Use of Your Gas Oven

8" x 5" 4 page leaflet describing the use of the zones of heat in a gas oven. It includes a guide which can be used when recipes give temperatures instead of gas marks.
Limited numbers Free.
State requirements.

Thermostat Working Model



Complete model in fibre board case, which can be connected to the gas supply for demonstrations. £7.25 + 73p VAT

Gas in Focus

$11\frac{3}{4}$" x 8" A series of five leaflets in full colour for home economics students.
£1.50 per 100

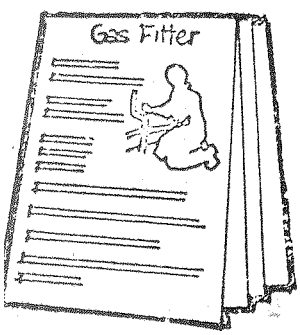
No.1 Natural Gas
No.2 The Gas Cooker
No.3 Home Heating (not available at present, being revised)
No.4 The Gas Showroom
No.5 British Gas

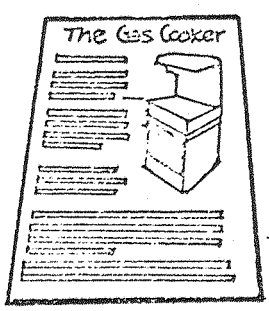
Recipe Cards

$8\frac{3}{4}$" x $5\frac{7}{8}$" 9 cards illustrated in 2 colours, containing simple recipes.
Class sets Free

Project Cards

$11\frac{3}{4}$" x $8\frac{1}{4}$" A set of 5 project cards intended for primary and middle school pupils, as an introduction to the Gas Industry's services to the public. Subjects are The Fitter, The Showroom, Signs and Symbols, The Gas Meter and The Gas Cooker.





Class sets of up to 30 copies of each card Free.

9/7/27

Home Economics - Commercial

Large Scale Catering Magnetic Board	24" x 51¾" A metal board with movable 'pieces' to enable students to study the principles of kitchen planning in catering. £7.25 + 73p VAT

Other Gas Industry Services to Education

Films

Among the colour films available on free loan are: "I'm Glad You Asked That Question", an award winning cartoon about the origins of natural gas, "Flame of the Future", the story of the gas industry at work, and "The Germ War", containing a serious message about hygiene presented in entertaining cartoon and live action. An illustrated catalogue of all British Gas Films may be obtained on application to the British Gas Film Library, 16 Paxton Place, London, SE27 9SS.

Lectures

Mr D Scott Wilson, The Scientific Information Officer of British Gas has a lecturing service to schools. These are illustrated by slides and can be arranged at any time and there is no charge either for the lectures or expenses.

D Scott Wilson Esq
Scientific Information Officer
British Gas Corporation
59 Bryanston Street
Marble Arch
London
W1A 2AZ

G/P/1

GAS ACCOUNT

NOW DUE

Please Pay Promptly

MR J C BLOGGINS
91 HIGHWAY ROAD
BROADWAY
EREHWON
BUFFS

re:-

P.O. Box 17, 232 Winchester Road
Southampton SO9 7AW

a part of the
British Gas Corporation

Telephone 775544 Ext. 637

VAT Registration no.
232 1770 91

Meter Readings Present	Meter Readings Previous	100's Cubic Ft.	Calorific Value	Therms	REFERENCE
6452	6340	112	1035	115.920	204 1/017/066/151

Please quote above reference in all communications

E = Estimated

Therms	Price per Therm PENCE	Amount	Value Added Tax Rate %	Value Added Tax Charge
115.920	9.450	10.95	ZERO	0.00
STANDING CHARGE		3.15	ZERO	0.00
TOTAL (EXCL VAT)		14.10		
VAT 14.10 @ ZERO%		0.00		

TOTAL DUE (incl. VAT) £ 14.10

Period Ended (Tax Point) 20/ 7/73

Information and payment details overleaf
If a receipt is required, put 'R' in this box

PAYMENT STUB 204

credit British Gas Corporation

P.O. Box 17, 232 Winchester Road
Southampton SO9 7AW

Giro account number 211 1004

by transfer from Giro Account number

the amount shown below

13P
20B

the Post Office
National Giro
Bootle Lancs
GIR 0AA.

Put Receipt Stamp Here

Signature

date / /

0829

MR J C BLOGGINS
91 HIGHWAY ROAD
BROADWAY
EREHWON
BUFFS

1017 066151

£ 14 10

10 101706615182 A72111004 000014109 V

A Gas Account - The impact of numbers

G/P/2

The use of the computer to help in producing Gas Bills (and indeed in processing all sorts of information has led to a great increase in the use of numbers to represent the symbols of the way we live in the modern world. This sheet shows us this process in action by looking at an ordinary Gas Bill for Mr Bloggins of Erehwon (what does this spell backwords?). Let's look at the bill closely to find out what some of the numbers mean.

---

1. Count how many separate numbers there are on the account and payment stub._____

2. In the right hand column below we have a few of the numbers on the account. In the left hand column is the explanation of what the numbers mean. Each side has a blank - see if you can complete the blanks either by finding the right number for the explanation or the right explanation for the number. Leave those you cannot do, but you should be able to identify most of them.

The number of Mr Bloggins House on Highway Road		
	20/7/73	
	211 1004	
The meter reading at the end of the last quarter		
	232 1770 91	
The Postal Number of the Gas Office		
The total amount of Value Added Tax payable on this account		
	3.15	
	0829	
	637	
The number of the payment stub for this account		
	1017 066151	
The calorific value of the gas supplied to Mr Bloggins		
The telephone number of the Gas Office		
	14.10	
	17	
	232	
	115.920	
The price of one therm of gas		
The percentage rate of Value added tax on Gas		
	A72111004	
	000014109	
	112	
	6452	

3. When you get home, find your gas bill and write in the extreme right hand column above, the numbers which appear under the same headings on your family account.

4. This is just a gas account illustrating how codes and numbers are being used increasingly. Most people have well over 30 numbers in some computer or other referring to themselves, from National Health to address etc. On the back of this paper think what 10 of these codes might be referring to yourself. List them whether you know the actual number itself or not, then find out the code.

9/P/3.

GAS ACCOUNT

NOW DUE

Please Pay Promptly

re:-

P.O. Box 17, 232 Winchester Road
Southampton SO9 7AW

a part of the
British Gas Corporation

Telephone 775544 Ext.

VAT Registration no.
232 1770 91

Meter Readings		100's Cubic Ft.	Calorific Value	Therms	REFERENCE
Present	Previous				

Please quote above reference in all communications

E = Estimated

Therms	Price per Therm PENCE	Amount	Value Added Tax	
			Rate %	Charge

Period Ended (Tax Point)

TOTAL DUE (incl. VAT) £

Information and payment details overleaf
If a receipt is required, put 'R' in this box ☐

PAYMENT STUB

credit British Gas Corporation

Giro account number **211 1004**

by transfer from Giro Account number

P.O. Box 17, 232 Winchester Road
Southampton SO9 7AW

13P
20B

the Post Office
National Giro
Bootle Lancs
GIR 0AA.

Put Receipt Stamp Here

the amount shown below

Signature

date / /

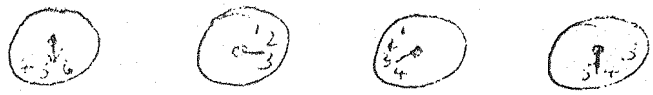
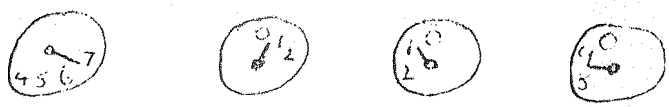
£

G/P/A

Write your own Gas Account

You have looked at a Gas Account quite closely - now is the time to be a computer and write your own account. You are given a blank account form and the following information. To help you, you have the completed account which you studied before. Fill in all account numbers and figures exactly as it would appear on your account and payment stub.

Information

1. Your previous meter reading was 
2. Your present meter reading is 
3. You have to pay a quarterly instalment on a gas cooker you have bought of £6.32 (plus VAT 10%)
4. Your road is the 24, 532nd on the gas board map.
5. The calorific value of the gas you receive is 1020.
6. The extension number of the Gas Board telephone servive for your area is 768.
7. Use today's date.
8. Your payment number is 582.
9. You are the third person to live in your house since gas was first installed.
10. The font style used in printing is 'g'.
11. Gas is zero-rated for VAT - but you pay at 80% for buying your cooker
12. You have elected to pay the Silver Star tariff- ie a standing charge of 2.90 plus a price per therm of 10.16p

You now have enough information to fill in the gas bill completely without making up any numbers at all.

13. Your meter was the 127th to be read by the meter reader on his round
14.

ANSWER

6/12/5

GAS ACCOUNT

NOW DUE

Please Pay Promptly

re:-

MR. R. CACKETT
8 TOLPUDDLE WAY
YATELEY
HANTS

P.O. Box 17, 232 Winchester Road
Southampton SO9 7AW

a part of the
British Gas Corporation

Telephone 775544 Ext. 768

VAT Registration no.
232 1770 91

Meter Readings Present	Meter Readings Previous	100's Cubic Ft.	Calorific Value	Therms	REFERENCE
6008	5234	774	1020	789.480	582 3/024/532/127

Please quote above reference in all communications

E = Estimated

Therms	Price per Therm PENCE	Amount	Value Added Tax Rate %	Value Added Tax Charge
789.480	10.160	80.21	ZERO	0.00
STANDING CHARGE		3.38	ZERO	0.00
TOTAL (EXCL VAT)		83.59		
VAT 83.59 @ ZERO %		0.00		
GAS COOKER INSTALMENT		6.32	10%	0.63
VAT 6.32 @ 10%		0.63		

TOTAL DUE (incl. VAT) £ 90.54

Period Ended (Tax Point) 1/7/74

Information and payment details overleaf
If a receipt is required, put 'R' in this box

PAYMENT STUB 582 credit British Gas Corporation

Giro account number 211 1004

by transfer from Giro Account number

the amount shown below

P.O. Box 17, 232 Winchester Road
Southampton SO9 7AW

13P
20B

the Post Office
National Giro
Bootle Lancs
GIR 0AA.

Put Receipt Stamp Here

Signature

date / /

0569

MR. R. CACKETT
8 TOLPUDDLE WAY
YATELEY
HANTS

3024 532127

£ 90.54

10 3024532127 56 A7 2111004 000090549 G

Module 7 Notes on the Gas Account

The numbers refer to the circled figures on the answer to the exercise.

1 and 2 Information given on sheet and in small pamphlet 'How to read you Meter'.

3 1 - 2

4 given on sheet

5 3 x 4 divided by 1000 (see 'How to read your Meter')

6 Information given on sheet - corresponds to 13

7 Information on sheet

3 means 3rd tenant
024532 means number of road in Gas Board Area
127 is the number on the meter reader's list

8 to 12 Information given on sheet

13 Information on sheet - corresponds to 6

14 1st digit is document sub-type and corresponds to last digit on 15

2nd and 3rd digits are the last two figures on 16 which make it divisible by 97

4th digit corresponds to last digit in 18 (the check digit making it divisible by 11 in a special way - to be explained in 18)

15 1 = document type - corresponds to line above 14

0 = document subtype - corresponds to 1st digit in 14

16 Corresponds to 7 plus two check digits on the end which make the complete number divisible by 97 (To find out what these check digits are, divide original number by 97 and then add)

17 A7 are control characters for checking (A means that there is alphabetic data on the full line - the rest is the giro number)

18 Corresponds to total amount plus one check digit on the end which makes the complete number divisible by 11 in the following way:

1st digit multiplied by 9
2nd digit multiplied by 8
3rd " " 7
4th " " 6

and so on down to

8th digit multiplied by 2

The products of each are then added together and the number which is added makes the sum of the products divisible by 11.

eg

0	0	0	0	9	0	5	4
x	x	x	x	x	x	x	x
9	8	7	6	5	4	3	2
=	=	=	=	=	=	=	=

0 + 0 + 0 + 0 +45 + 0 +15 + 8 = 68

Thus, to make divisible by 11 in this way the check digit becomes 9 (68 + 9 = 77)

19 G indicates the type of font used in this line of writing.

Gas in Britain - looking a little deeper

Early on, when we first started finding out what we mean by information, we found out that there are various levels of information. When we ask a question we can either receive a one word reply which may, or may not, satisfy us, but it can always lead to another question if we want more information than we have received. It is the same when we start to look at the Gas Industry. If we ask, for example, How is North Sea Gas obtained? we may receive (or even give) the answer 'By drilling for it'. I suspect that you may have known that answer already, especially since you saw the film last week, and we know, don't we, that it isn't really a very full answer and there are lot's more questions it hides - think of the words what? where? how? why? and when? for a start, and many question immediately spring to mind. Remember, too, that when a question is asked, information is given in reply - even if that reply is 'I don't know'. This sheet, and the next two, enable us to look a little deeper into some of the things we saw on the film, and to answer some of the questions which we might not have asked but which we might have wanted to ask - the information is given in the booklets which you can obtain from your teacher.

++++++++++++++++++++++++++++++++

Assignment 1 Where Gas is Found

Source: How Gas reaches your home.
Gas in Focus No.1 Natural Gas

1. In one of the booklets above you will see a map of the North Sea. It shows the location of Gas Fields and gives each a name. In the boxes below write down what eight of these names are.

2. Gas in the Ground is found in three main types of geological formation. It becomes trapped - in the spaces below draw the geological diagrams which show what the geologists look for when searching for gas. Use colour if needed.

3. Questions 1 and 2 don't answer all the questions we could ask about where gas is found - we probably couldn't fit them all onto this page. In the boxes a, b and c below write down three questions which could be asked about where gas is found.

a

b

c

Assignment 2 How Gas is found

Source: Gas in Focus No.1 Natural Gas
How Gas reaches your home.

1. Geologists are the first to make a guess where gas is likely to be found. They do this by seismic sounding. On the lines below explain how this is done either from your recollection of the film or by referring to the books.

2. Geologists can however only say where gas is likely to be found. The real test comes by drilling for it. In the space below draw a Gas Drilling Rig. Put notes on it saying what each part is.

Assignment 3 How Gas is Distributed Source: How Gas reaches your Home
Gas in Focus No 1.

1. There are two stages to this. The first involves getting the gas from the rig to the shore. On the left hand side below write down how this is achieved - on the right draw a diagram showing how it is done.

2. Name the three places on the coast to which the North Sea Gas is first brought.

3. On the map of England and Wales below draw the distribution pipelines which bring the gas to your home from the coast. This is the second stage in distributing gas. Put in the names of the chief towns.

4. The questions we have answered so far only just begin to look at the problem of the distribution of gas throughout the country. There must be many more. Think of the problems involved, imagine you had the man in charge of the whole operation in front of you. Write down just two questions which you could ask him.

a

b

Assignment 4 How Natural Gas is different

Source: Up to Date with High Speed Gas

1. The questions we have asked and answered so far are all fairly simple and there hasn't been much difficulty in finding the answers. They haven't gone into any difficult detail either, so perhaps now we should stretch ourselves a little and find some information about things we don't know much about. That might be a bit more difficult but that is no reason for not trying - we might even surprise ourselves pleasantly at our ability to get information. On the opposite side of the page there are some quite difficult questions. The answers are all to be found in the booklet above. See if you can answer them all.
2. If you have answered all the questions. well done. You will have noticed that the words used in this booklet are more difficult to understand than in the other ones we have used. Look now at the last booklet entitled 'The Natural Gas Country". You know what gas can be used for now - write down on the lines below some of the things which it is thought gas may be used for in the future.

Q. What is an 'inert' Is it useful?

A.

Q. Why is Natural Gas almost double the heating value of manufactured gas?

A.

Q. What is another name for 'heating value'?

A.

Q. Why is it necessary to convert all appliances to suit natural gas?How many?

A.

Q. What happens if a cooker is found which cannot be converted?

A.

Q. What happens to a flame if there is not enough air around it - assume that there is just enough to enable it to keep going.

A.

Assignment 5 What more? Sources: All -he booklets

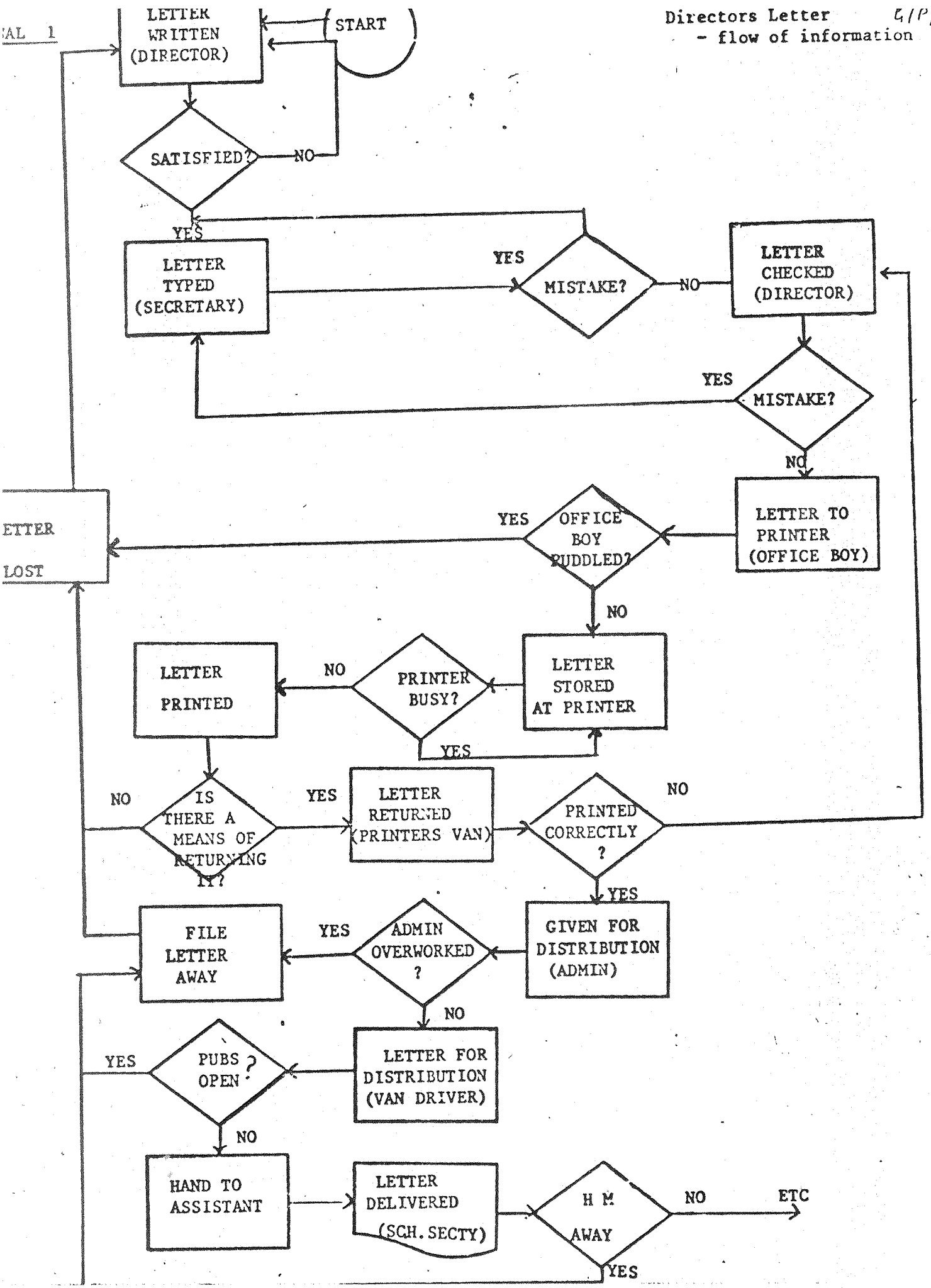
We have looked a little deeper into just a few of the things the Gas Industry is all about. There are lots more, as you will know, and you can imagine that one person cannot know everything about everything to do with the industry - not even the Chairman of the Gas Corporation himself. Supposing that you had the people named on the left below in front of you and you had to ask just one question of each of them. Write in on the right what your question would be.

1. The Chairman of the Gas Corporation
2. A fitter at your home
3. A lady trying to sell you a gas cooker.
4. Aman from a drilling rig.

Doesn't this section tell you that information is about people

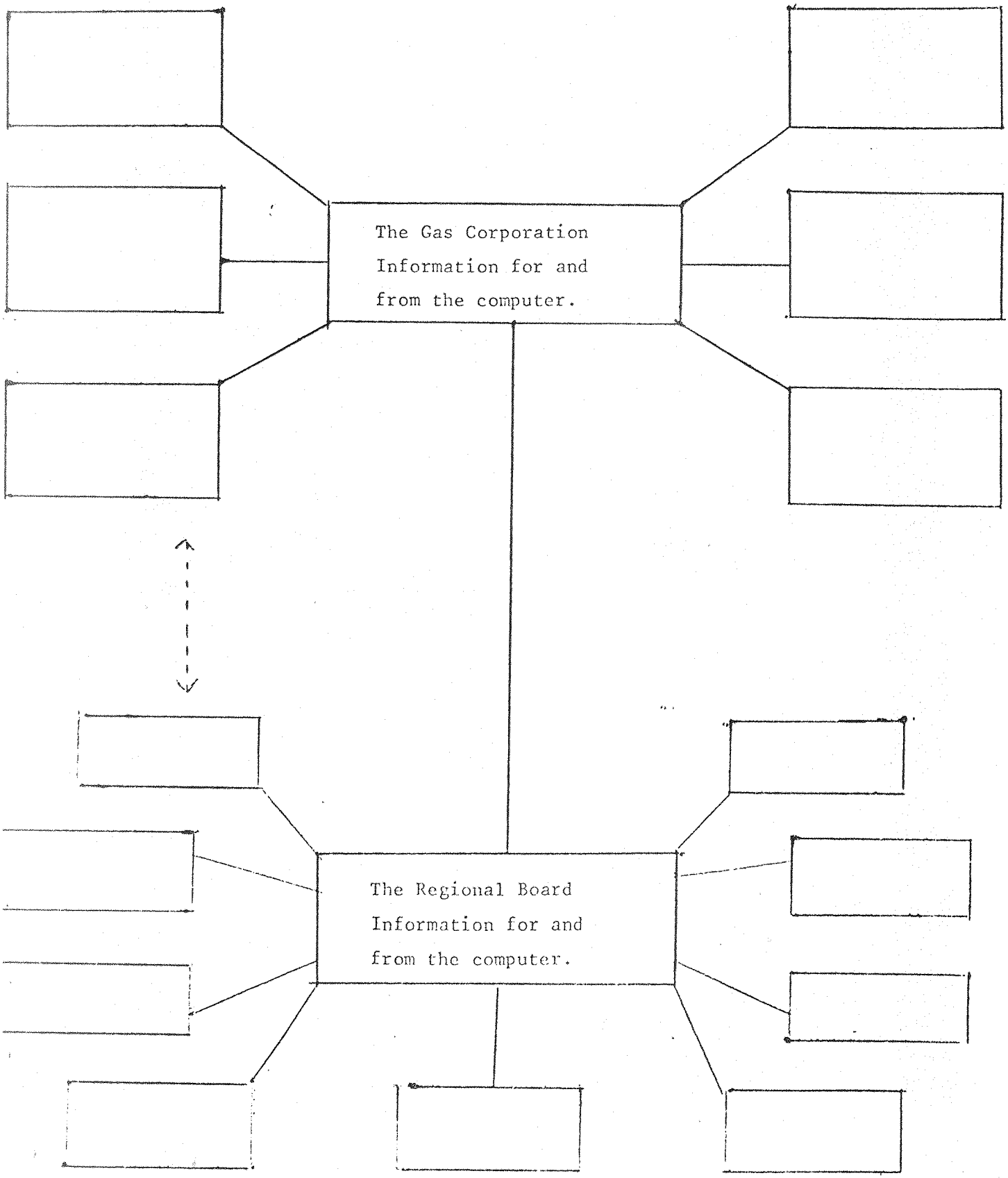
Directors Letter - flow of information

G/P/10



5/P/11

INFORMATION IN GAS - What's it all about?



BRITISH GAS

INFORMATION AND REFERENCE MATERIAL

1) HEINEMANN, 1966. "North Sea Oil - The Great Gamble" by Bryan Cooper & T F Gaskell (Price: £1.75)

This book covers the dramatic search for oil and natural gas in the North Sea. It is about a 'gamble' that is as costly as it is important and also records one of the latest of man's most exciting adventures.

2) G T FOULIS & CO. LTD., 1966. "Fortune in the North Sea" by Peter Hinde (Price: £3.25)

This book is most informative and is written in an easy style which provides absorbing reading. The author manages to answer many of the questions which naturally arise from the search for natural gas.

3) SCIENTIFIC PRESS LTD., 2nd Ed. 1972. "Natural Gas - A Study" by E N Tiratsoo (Price: £5.50)

This book considers the subject of natural gas from the point of view of the reader who wishes to gain a general appreciation of what this mineral is, the history of its discovery and utilisation etc.

4) CLIFTON BOOKS, 1970. "New Gas for Old" by C H Doherty (Price: £1.75)

This book describes how natural gas was formed and the methods of exploration, production and distribution. It also mentions political and other factors which have increased its attractiveness in comparison with other fuels.

5) WHEATON, 1971. "Gas" by M Barash & W J Gooderham (Price: £1.50)

This book describes the old and new gas industries of today; it is written by scientists but with understanding for the non-scientific reader.

6) THE BRITISH PETROLEUM CO. LTD., "Gasmaking & Natural Gas" (Price: £2.00)

A detailed view of the process aspects of present day gas manufacture and natural gas supply for the scientific reader. Available from B.P.

G/D/13

7) WILLS & HEPWORTH LTD., 1967. "The Public Services - Gas" by I & J Havenhand (Price: £0.12½)

A Ladybird easy reading book, which describes the sources of our gas supply and how it is brought to our homes and factories.

8) BASIL BLACKWELL OXFORD, 1970. "Gas and Its Uses" by H Adams Blackwell's Learning Library No.9 (Price: £0.60)

A book planned to help children, giving information in a clear and simple style, with careful illustrations.

9) EDWARD ARNOLD, 1969. "The Modern Gas Industry" by D Scott Wilson (Price: Hard back £1.00 or paper back £0.60)

This book gives an up-to-date and authoritative account of the developments in the British Gas Industry.

10) THE GAS COUNCIL, 1947. "The Vital Flame" by Compton Mackenzie (Only available from libraries)

This book, published at the end of the second World War, surveys the historical past, the progressive present and the future importance of the Gas Industry at the time.

11) MANCHESTER V.P., 1938. "The British Gas Industry" - An Economic Study by P Chantler (Only available from libraries)

This book covers certain problems of the Gas Industry in their economic aspects, especially the effects of public regulations on gas rates and supply.

12) P.E.P., 1939. "Report on the Gas Industry in Great Britain" (Only available from libraries)

This book covers the organisation and economics of the Gas Industry before nationalisation.

13) THE GAS COUNCIL, 1949. "The Rise of the British Gas Industry" by D Chandler and A Lacey (Only available from libraries)

This book was the outcome of many years' historical research by two authors, with a life-long experience in the industry.

14) ERNEST BENN LTD., "Le Fevre's Domestic Utilisation of Gas" by B Taylor Rev. 3rd ed. (Price: £4.50)

This book, essentially for students, discusses the principles of gas utilisation, as distinct from specific data concerning particular appliances or equipment.

*

15) WOMEN'S GAS FEDERATION, 29 Great Peter Street, London, SW1, 1971. "Gas and Its Domestic Uses" by E M Plant (Price: £0.85)

The main purpose of this book is to assist students of Home Economics who will be studying the general use of fuel in the home, but it will also be of great value to all teachers of Home Economics.

16) JOHN BAKER, 1970. "Gas It's Made Like This" by George Kay (Price: £1.00)

Written for young people, the book aims to show the drama of industry. It deals with all aspects of the modern gas industry.

17) GOOSE & SON, 1972. "About Natural Gas" by Phyllis Ladyman (Price: £1.25)

Extensively illustrated, this book describes the formation, exploration, transmission and distribution of natural gas. It is particularly suitable for younger pupils.

18) LONGMAN, 1972. "Britain's Fuels" by J J Milbourn (Price: £0.30)

Dealing with all fuels, this book is designed to be used in a Nuffield Science Course. It would also be useful for project work.

19) GAS COUNCIL, 1972. "North Sea Heritage" by D Scott Wilson (Price: £0.30)

This book was written by the Scientific Information Officer of Gas Council, giving a detailed account of North Sea Gas.

C/P/15

GOVERNMENT PAPERS

1) Ministry of Power. Fuel Policy - presented to Parliament November 1967. Cmnd. 3438. Published by H.M.S.O. (Price: £0.40)

2) National Board for Prices and Incomes Report No.57 'Gas Prices' (First Report) Cmnd. 3567. Published by H.M.S.O. March 1968 (Price: £0.16)

3) Report No. 102, 'Gas Prices' (Second Report) Cmnd. 3924. Published by H.M.S.O. February 1969 (Price: £0.62½)

4) Select Committee on Nationalised Industries Second Report on Nationalised Industries 'Exploitation of North Sea Gas', Session 1967-68 H.C.P. 372. Published by H.M.S.O. July 25th, 1968 (Price: £1.70)

5) Select Committee on Nationalised Industries, Report on Nationalised Industries 'The Gas Industry', Volume 1, Report and Proceedings H.C.P. 280. Published by H.M.S.O. July 31st, 1961 (Price: £0.32½)

6) Select Committee on Nationalised Industries, Report on Nationalised Industries 'The Gas Industry', Volume 2, Minutes of Evidence H.C.P. 280-1 Published by H.M.S.O. July 31st, 1961 (Price: £1.50)

7) Ministry of Technology. Report of the Inquiry into the Safety of Natural Gas as a Fuel by Professor Frank Morton, July 1970. Published by H.M.S.O. (Price: £0.42½)

8) The Gas Council Annual Report and Accounts Published by H.M.S.O. yearly

9) Annual Digest of Energy Statistics Published by H.M.S.O.

10) Many articles and papers appear in the Journal of the Institution of Gas Engineers. Copies of the journals may be obtained by local libraries on request from:-

The National Lending Library for Science and Technology,
Boston Spa,
Yorkshire.

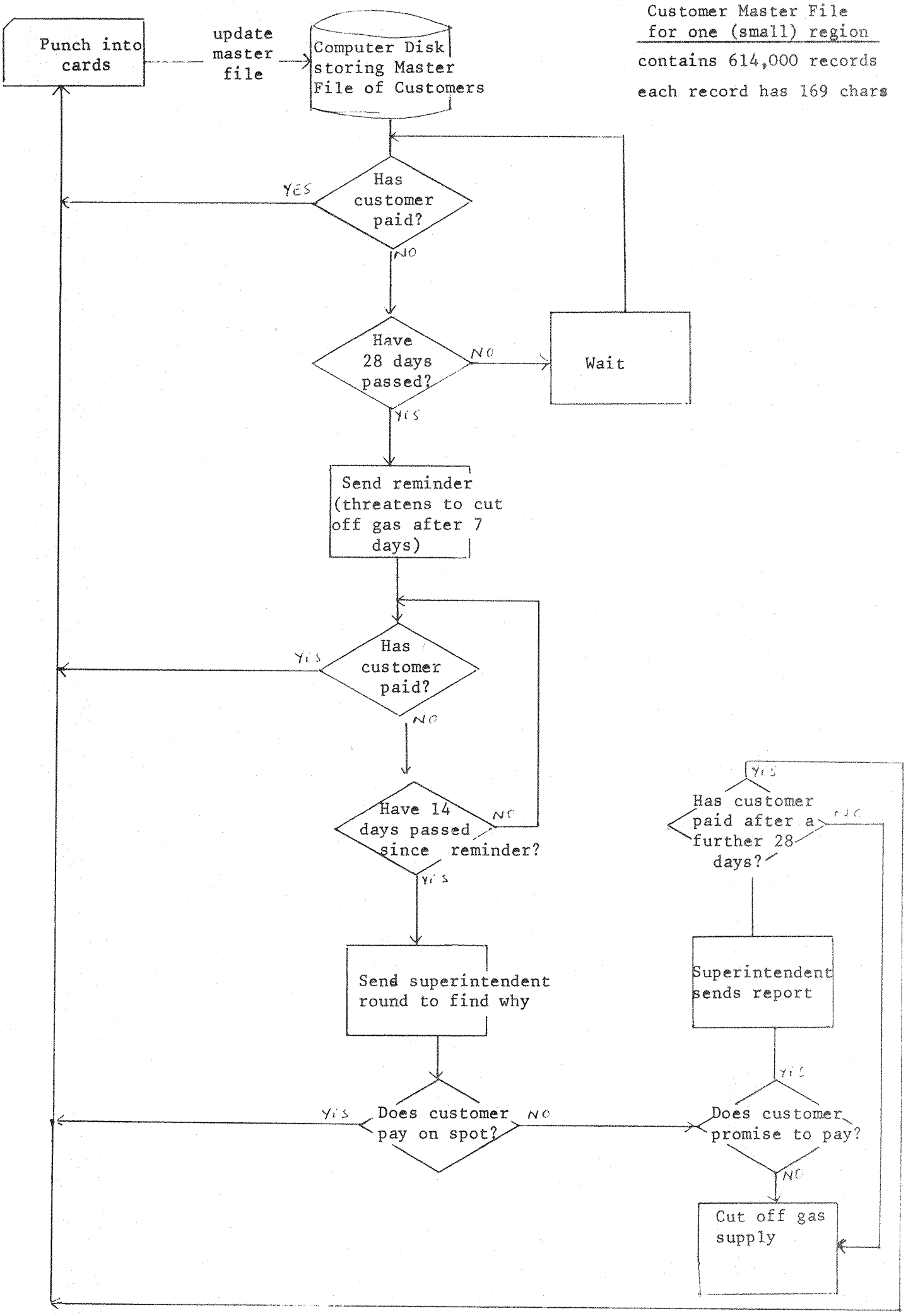
What happens if you don't pay?

G/P/16

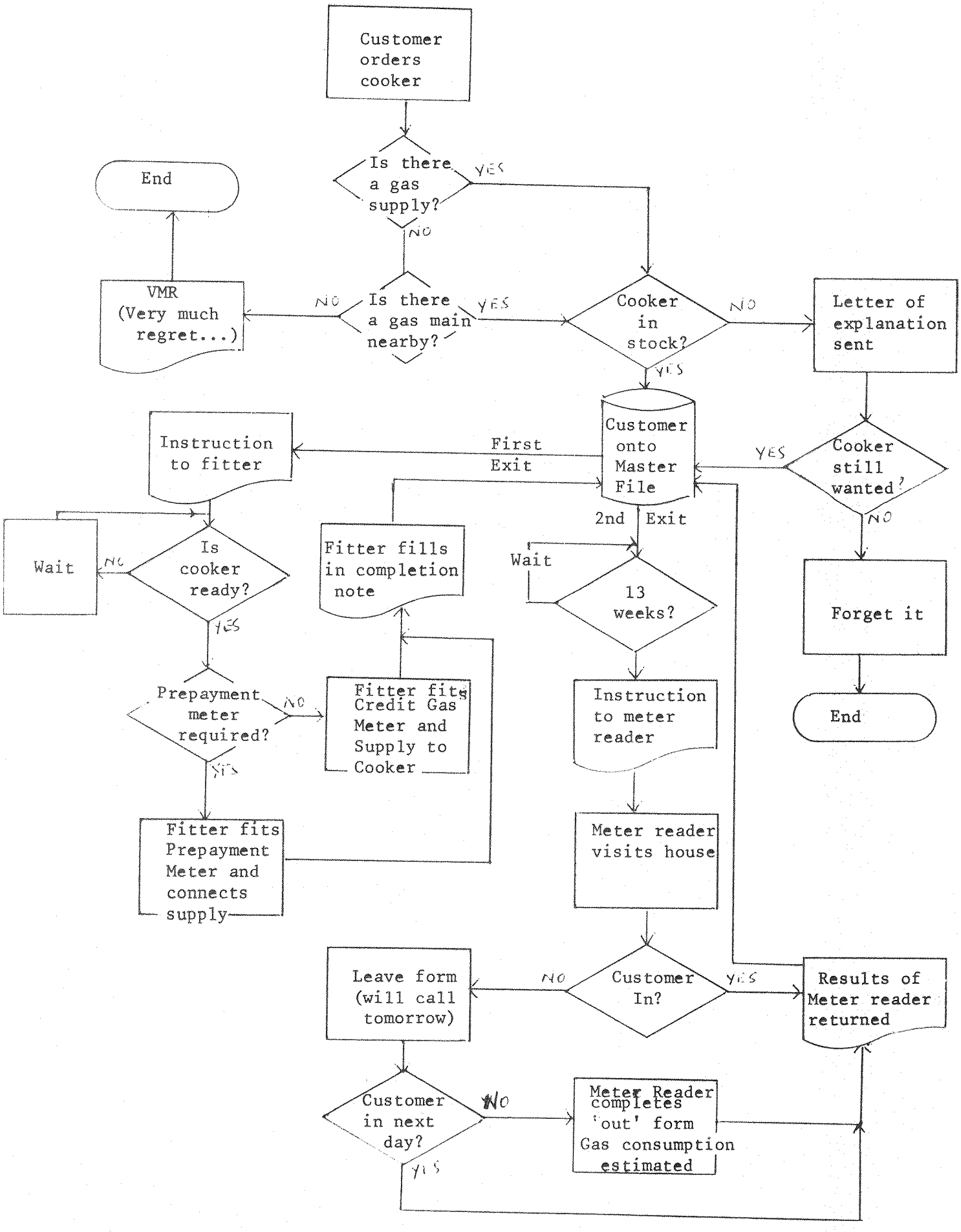
Customer Master File for one (small) region

contains 614,000 records

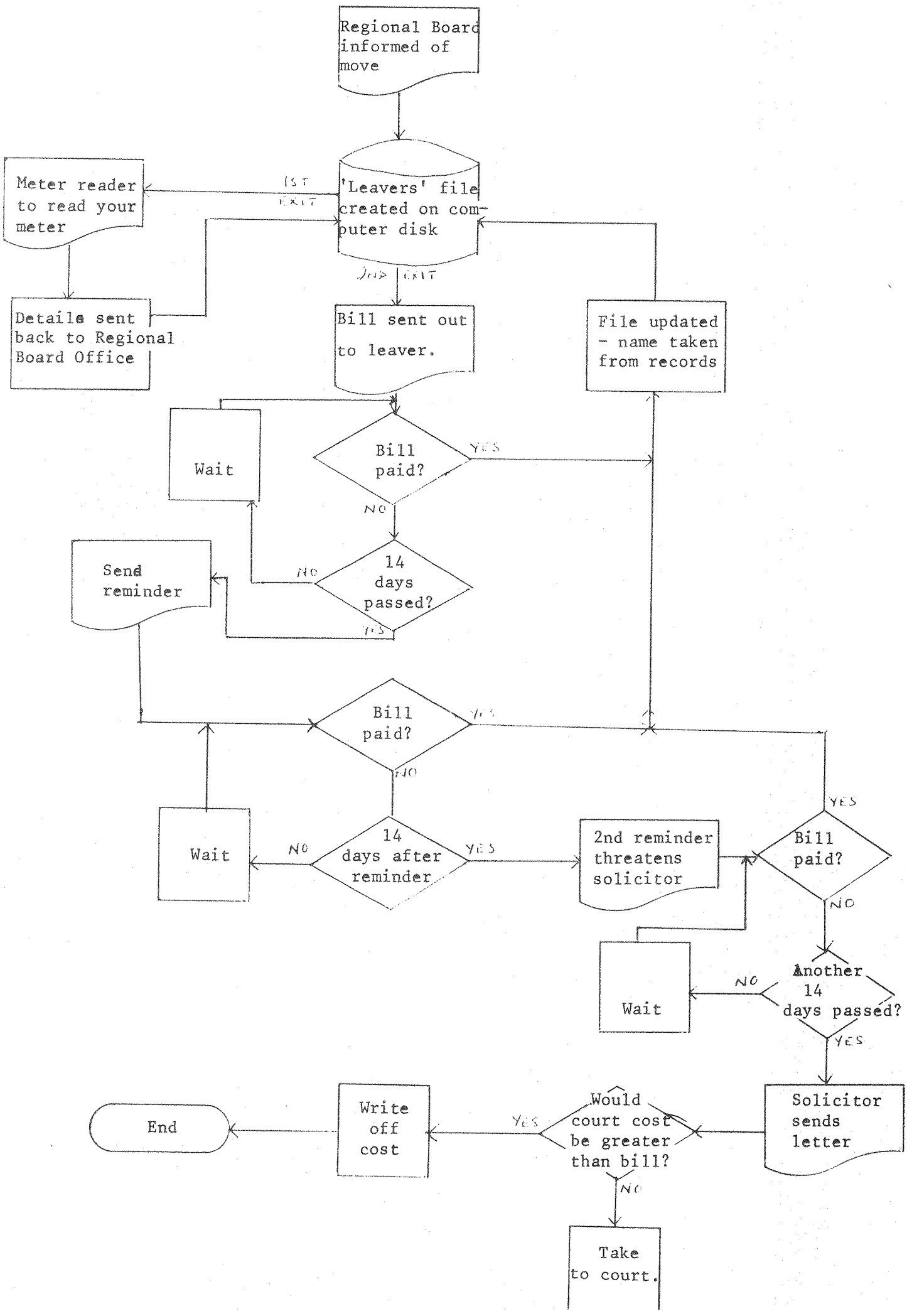
each record has 169 chars



NEW CUSTOMERS



'Leavers- What happens if you move?' G/P/18



A Computer Information System for Gas

In this lesson you have been learning about how the computer is the central information point in a Regional Gas Board. You have been looking at flowcharts showing 'what happens if....'. Look at the three flowcharts you have and see if you can answer the following questions about them.

****

1. Imagine that you are about to move house and that you have an outstanding gas bill to pay. The Gas Reagional Board puts your name on to a special file. What is this file called?..... How does the Board know how much you owe?..... ..... How much time have you to pay before you get a reminder?..... If you weren't moving house how much time would you have to pay?..... Why do you think there is this difference in time?..... If you pay after 38 days how many letters will you have received from the Gas Office? ..... Suppose your bill was for £0.10p - what would be the likely outcome if you do not pay it?.....

2. Imagine you haven't enough money to pay your gas bill - you are an ordinary customer, not moving house and not new. How could you save yourself the price of the stamp?.....
How many days would have passed at least before this could happen?.....
How many days would pass at a maximum before your gas supply is cut off?.....
How is your file updated after you have paid?.....
.....
The Gas Board computer has how many characters reserved for your entry on its disk?.....
On the back of this sheet see if you can guess what is contained on your gas file (The Gas Bill you received in your first lesson might help you with this). eg
Name ____characters etc

3. Imagine your mother has just bought a new washing machine from the Regional Sales Office. Give two reasons why she might not be able to have it. a)..... ..... b)..... .....
Assuming she can have the machine, and that you have not had a gas appliance before, what are the two ways in which she might pay for the gas it uses? a)..... ..... b).....
From where does the fitter get his instructions?.....
From where does the meter reader get his instructions?.....
How long is it before your first Gas Account is received?.....
What happens if there is no one at home the first time the meter reader calls?.....
.....
Where do the meter reader's slips go to?.....
What happens if the meter reader cannot get in to read your meter?.....
.....

Flame of the Future - What did we learn from the film?

9/2/20

The film you have just seen raised a lot of points about the running of a large organisation. Some day you will be working for an organisation, and, like the Gas Board, you will meet different people different problems and different ways of dealing with them. Let's have a look first of all at some of the problems of the people you saw on the film. See if you can write down what these problems are.(If we don't see the problem, we are unlikely to come up with the answer, aren't we?)

1 a) What was Mr Pullen's problem? (He was the welshman)

b) What was the problem of Mr Robinson? (He had an old lady as a frequent visitor)

c) What was the problem of one of the people at Killingworth (Near Newcastle)

d) What was the problem of the (probably)newly married man eating his steak? What new problem is likely to crop up soon.

e) What was the fitter's problem? (He was modifying a gas pipe)

f) What would be the problem of the man organising the whole conversion of appliances to suit North Sea Gas?

g) What is the problem of the man on the Gas rig?

The film also showed us some of the differences between the ways in which gas used to be made and the way in which it is now made. What are the differences between:

2 a) Old Gasholders and modern ones?

b)The way gas used to be transported to towns and the way it is now transported?

c)The way gas used to be made and the way it is 'made' now?

d) The way Gas accounts used to be made out and the way they are done now?(This wasn't actually in the film but I'm sure that you can make a good guess.

3. What Gas appliances do you have at home?

4. Have they been converted for North Sea Gas?

5. What changes were actually made and how was the whole operation carried out?

6. There were a lot of complaints in the film about one thing and another. What happened to the lady who had her cooker changed while she was out?

7. Supposing you wanted to make a complaint - say, your gas fire has just been converted and now it gives off a blue light and keeps going out. What would you do?

8. What would you then expect to happen?

The film taught us quite a lot about the Gas Industry. One of the ways it tried to do this was to tell some amusing stories which could crop up every day. One example is of how the old lady wanted to be last on the list for conversion to North Sea Gas. If you had been the person she saw about this (and assuming that she stayed to listen to your reply) put into your own words what you would have told her and how difficult it is to comply with her request.

9.

10 What did you learn from the film about:

a) Life on a Gas Rig?

b) The use of a computer in the Gas Board.

c) The different people involved in the Gas Industry

d) The organisation of a programme to convert all gas appliances to North Sea Gas.

e) The Industrial uses of Gas

f) Gas storage

g) The Way in which gas is distributed

h) The future of the Gas Industry

11. These words were used in the film. See if you can explain what they mean to you.

a) Centralised Control

b) Calorific value

c) The Gas Grid

d) A natural, indigenous fuel

e) The camaraderie of the Gas People

The computer made out a bill for £0.00. Why did it do this according to the film.

Did you learn anything else from the film which you didn't already know? What?

S.U. Theses M.Phil 1974 Longworth

L/T/1

MODULE 8

FINDING OUT!

FROM IGNORANCE TO KNOWLEDGE..... AND BACK AGAIN!

SOUTHAMPTON UNIVERSITY LIBRARY

76-108563

Module 8 - From Ignorance to Knowledge .... and back again

Introduction: For a long time this module was conceived of as the 'Library' Module. It's present title is meant to convey much more than that information can be found in a school library. Not only is it not true that all information is in any one library, much less the school library, but also the very finding of the information you require leads to cognisance of the fact that there is so much more to be found. Hence '...and back again'.- humility before the enormous information explosion created by modern computing techniques is no bad thing.

Nevertheless, this is a module which takes place in a library, which presents the school library as a storehouse of facts and information, and for which the use of a library is essential. It follows from the work done in module 1, in which the children found such a multiplicity of information on every street corner, but it does not have to be taught immediately following that module. The library is only one answer to the information problem, but an important one from the childrens' point of view, since it may be their only formal source of reference.

The first part of the module re-creates the situation in which the children take into account all the sources of information at their disposal - it focuses in on the library by retaining some of the lack of structure in Module 1.

The second part attempts to define a structure by which information can be classified and crossreferenced, focuses in on a particular method (Dewey) as an example and uses it. In also dealing with booking out systems it points out those areas in which the structure might be damaged by abuse.

The last part examines a situation of the future in which technology has overtaken the structure, refined it and made information storage and retrieval in the library the end purpose. Further, it enlarges the library scheme of reference into the activities of the whole school of the future. The story is a projection but teachers should find it interesting in the ideas and enthusiasm it generates in the children.

In all parts of the module, practical work is given the highest importance. Thus in dealing with indexing, classifying,reference books and booking out systems the children are required to get up and do something in the library. There are therefore a lot of activity worksheets which must be treated according to the level of the class taught - some will be able to complete them without close supervision, others will need to have their hands held tightly. The teacher should also try to make explicit the message of the module - that there is a lot of information about, the computer is generating more and more and that the more we know, the more we know we don't know.

Module 8 - Finding Out - From Ignorance to Knowledge... and Back Again

Resume of Module: This resume comprises an outline of seven to ten lessons each lasting about one hour. This may be augmented by special projects, visits or visiting lecturers if the teacher wishes to introduce these. The topics outlined contain several items within the body of knowledge representing their titles.

Topic 1 - An Introduction to the Problem (2 sessions)

a) A round-up of sources of information based on precepts learned in other modules, particularly in Module 1. An assessment of the size of the problem.

b) An unstructured fact-finding session using question sheets and the books on the library shelves.

Topic 2 - Organising Information and Knowledge. Retrieval (5 sessions)

a) Classifying and Crossreferencing. A series of Exercises using record titles outlining the problems of classification and suggesting some solutions.

b) The Dewey Decimal System. A practical exercise introducing the children to the methods of classification currently used in school libraries.

c) Using the Catalogue. Practical exercises using the school library index. Incorporates Case Studies of several situations in which use of the index is essential and which could be useful to the different departments in the school.

d) Using Reference Books. A series of practical exercises making clear the differences between types of reference and requiring the children to choose between them for different items of information.

e) Keeping Track - Booking Out Systems. A lesson outling the problems of building up an information system to keep track of books lent out. A roleplaying exercise and system design exercise to be played in groups. Using the present system.

Topic 3 Libraries of the future (1 session)

A story explaining how library users of the future may retrieve information, how libraries may store it and how information may be communicated to those who need it. Brings in microfilm, microfiche readers and computers, and the way in which they might be used.

Module 8 - From Ignorance to Knowledge ... and Back Again

Materials needed

For Topic 1 - Finding Out from Books (Sheet L/P/1)

For Topic 2 - Classifying and Crossreferencing (Four sheets L/P/2 to 5)

The Classification System of Melvil Dewey (4 sheets L/P/6 to 9)

Using The Catalogue (5 sheets L/P/10 to 14)

Reference Books - Finding Facts (4 sheets L/P/15 to 18)

For Topic 3 - Microfiche Card (L/V/1)

How you might use your Library in 1986 (L/P/19 to 22)

A Student ~~Record~~ Library Card (L/P/23)

In addition, most lessons use books from the Library, the Library Index etc.

Module 8 - Finding out - from Ignorance to Knowledge?

Teaching Notes: As in the other modules these notes are suggestions and can be modified to suit the immediate classroom needs. Since, as far as is possible, this is meant to be a practical module in which the children find out for themselves what they need to know, the teaching notes will not be as copious as in other modules - the main impact of the work will be contained in the worksheets which the children complete. It is the teacher's responsibility to make available what the child will need, and since most of the reference sources are in the school library, perhaps it would be a good idea to hold the majority of the lessons there. The notes below are in order of the topics listed in the resume (pages L/T/3 and L/T/4).

Topic 1: a) Finding out - an introduction.

This follows the lines of the lesson in module 1 (pages I/T/)
in which the various sources of information were discussed in relation to the exercise of asking questions about a specific item on the visit.

To introduce again the problem you have several choices

i) to take the children out of the classroom agian and complete a similar exercise as in Module 1.

ii) to take a specific item from within the classroom or which can be seen outside the windows and relist the questions which can be asked about it. Use the question worksheets( ) or blank paper or make a list on the blackboard.

iii) To use the completed worksheet from the time the original exercise was completed - this should be (hopefully) in the childrens' folders.

Discuss with the children where the answers might be found - in this discussion you are trying to elicit from the children what the sources of information might be, so use the blackboard to make the list, or ask the children to write them down (a worksheet like this is easy to construct), and prompt when silence is the only answer. The list you might compile may look like this:

Books (What sort?)	reference books	encyclopaedias
'the written word'	dictionaries	indexes
	bibliographies	newspapers
	pamphlets	yearbooks
	magazines	text books
Libraries (which?)	School Libraries	Class Library
	County Library	Bookshops
	National Libraries	Corner Shops Libraries
People (Who)	Librarian	Teacher
	Parents	Police
	Councillors	Inhabitants
	Specialists	Old people

Module 8 - Finding Out - From Ignorance to Knowledge?.. and back again

Organisations (Which)

County Council	Post Office
Police Station	Museums
Community Centres	School
Local Societies	Citizens Advice Bureaux
	National Organisations

Machines and methods (Which?)

microfilm	computers
pictures	edge-punched cards
filing trays	indexes

To obtain most of these, ask specific questions eg suppose I wanted to find out about Archery? How could I find out about dinosaurs? Also use your list of questions formulated at the beginning of the lesson.
To complete the lesson ask the children to scan the questions they have asked and to decide where they would find the answer for each.

b) Finding out from books.

The list of questions on sheet L/P/1 form the basis for a lesson in the library using the books on the shelves and without using the index. The purpose of this is to show the children that answers can be found from books, but that this is a painstaking process which requires them to classify the question and then to guess where the answer might be found. To obviate the crowding of children around the same point on the shelves start each child off at a different question. This process should take up a whole lesson and teach that some structuring of knowledge is necessary if much time is to be saved - after the exercise has been completed ask the children what their difficulties were and how these could be overcome - point out that in fact the information in the library is structured, indicate where the index is and explain that, in the coming weeks, they will be learning much more about the structure of knowledge.

Topic 2 a) Organising and classifying information

The problem of classifying and crossreferencing information is one which all librarians are ruefully familiar with. In a way we are carrying out this process in our own minds all the time - each time we receive a piece of information to store in out memory banks we usually subconsciously relate it to another similar piece of information already there. Try to get this point over, either by asking explicit questions or by giving a piece of information, say, Charles the First was beheaded in 1649, and asking the children to store this in their own memory banks. What images do they think of when the piece of information is given? Do they have a mental picture? What does it look like? Relate it to the clothes worn in the period (which may be part of the picture) and the axe (likewise).

Point out that the more pieces of information we have about such things the clearer our mental picture becomes. Get the children to examine what they are doing when they are storing and point out that this is part of the brain's automatic crossreferencing and classifying procedure. Expain the terms.

Give out sheet L/P/2 which contains a list of records - ask general questions about records and record shops and how the children buy their own records to set the scene. What do they think of this selection?. Fairly obviously the list is in no sort of order, and can be used to point out the problems of classifying and crossreferencing - point out that this is an exercise which can be done at home, and often is.

Sheets L/P/3 , 4 and 5 use this list to teach the children how to go about tackling the problem. You will note that they are self-explanatory, incorporating exercises to complete. If you feel that the children can satisfactorily complete the sheets without supervision, allow them to do so; otherwise give what help you feel necessary - with the less able children you may be required to read through it stage by stage.

After the exercise has been completed, point out that this is but a tiny subset of the total knowledge available to human beings, and that the really large systems need to take into account all its aspects - next week they will be looking at one such system.

b) Using indexes - the Dewey System

Revise the previous exercise and in particular the difficulty experienced by the children. Point out -hat this was just a small part of human knowledge. What do the children understand by human knowledge? Discuss the term with them, ask for examples - they will most likely give you labels which classify a whole area of knowledge - point out to them that this is what they are doing, just as an encyclopaedia does. Explain that within these labels there is a whole area of sub-classifications right down to the individual pieces of information. Discuss this idea with reference to the record exercise. Ask how much human knowledge they think there is. If necessary give them two minutes to write down on a piece of paper all the things beginning with say 'S' - pool their lists on the blackboard - point out that these are only a few, referring them to the encyclopaedia if necessary. How many individual pieces of information are there within each label? take an example eg 'snails' ask how many questione they can ask about them. Give the impression that there are hundreds and thousands of different aspects of this one subject. By now you should have established that human knowledge extends to many billions

of information items, facts about this and that, things that people over the centuries have discovered about themselves and the universe they live in. Ask how we know so much - how, for example do we know that there are xxx species of snail, how the snail lives, what it eats etc. Point out that the snails have not told us - explain how this knowledge is the result of patient research and observation over many hundreds of years. There are so many items like this that there is no-one able to remember everything, hence the need to classify knowledge so that it can be looked up by others.

Introduce the children to the life of Melvil Dewey. Give out sheet L/P/6 and read with them the top half of the sheet, making sure that they understand the concepts expressed. Refer them to the books in the Library and indicate the numbers on the back of each one - explain that Dewey had something to do with these. Give out sheets L/P/6, 7, 8 and 9 . Dependent upon the level of the class and your assessment of your teaching situation either go through the questions individually, making each separate point, or allow the children to complete the sheets in their own time.

c) Using the Catalogue

This lesson is a practical exercise in using the catalogue. After revising how you have already discussed the need for indexing and how the Dewey System was formulated to satisfy this need show the children where the indexes are and give out sheets L/P/10 to L/P/14. This lesson can only be given in the library.

Read the first paragraph with the children and decide whether you wish the children to complete the sheets in their own time or whether you would prefer to take the sections one at a time. The Case Studies on Sheets L/P/13 and 14 are designed to be as realistic as possible in the school situation. You may wish to choose from them which ones would be most applicable - for example Case Study three may be useful in teaching the children how to tackle projects in general and you may wish to expand on this theme. Case Study four is a practical exercise which your colleagues might appreciate - to make it real insert the actual topics and subject; there is also a possibility on this one of involving groups of children making lists of reference sources for several departments in the school. The designing of a form to complete the exercise is a useful problem with which the children may need help.

d) Reference Books - Finding Facts

This lesson continues the twin themes of teaching children about the enormous quantities of information in the world today, and the practical exercise of retrieving that which we need to know.

As an introduction to the lesson, ask the children what they understand by the term 'reference book' - discuss this and ask for examples of reference books. How up to date can they be? Discuss the fact that most reference books have to be constantly updated - what does this tell them about information?

The practical content of the lesson is contained on sheets L/P/15 to L/P/18 inc.

These take various types of reference book and require the children to retrieve information from them. The final exercise requires them to decide which is the right reference book for a particular problem before finding the information.

e) Booking Out Systems - keeping track of books

In this lesson we wish to indicate that books are not just for storing on library shelves, but are for lending out for people to read. This creates a new information problem in that some information system has to be set up so that the librarian can kepp track of the books lent out.

What do the children think the present method is? Get them to describe it to you, perhaps by reference to a specific Case Study.

Discuss what the requirements of a booking system are, taking into account all the things which might crop up. Write the suggestions on the blackboard perhaps as follows

- The librarian must know where any book is at any time
- There must be a specific lending period
- There must be a system of knowing which books are overdue
- There must be a system of reserving books for the next reader if required
- There must be a system for obtaining specific books not in the library catalogue
- There must be a system of reminding people about overdue books
- There must be a system for repairing damaged books
- There must be a system for checking books for damage
- There must be a system for updating the catalogue
- There may be a system of fines
- What happens about lost books

etc etc including registration of readers

A creative exercise for the children to do would be to ask them to design a way of coping with all these situations - tell them to use their imagination taking little notice of the existing method - they may use computers if they wish. Ask them to design the necessary forms and then do a roleplay using them -(this could be a group exercise) . For example one child would be the librarian using the system the group has devised while the other children in the group would be borrowers - each would be registered and then, using a book from the library shelves would present a different problem for the librarian to solve eg one wants a book not on the shelves, another wants to reserve a book already out etc This type of exercise often provokes great enjoyment and teaches a lot about the design of systems.

Finally, teach and explain the system as it is,; if possible get the children to take out a book from the library and in twos' book each others book out using the system (closely supervised of course by someone who knows the system).

Module 8 Finding Out - From Ignorance to Knowledge ...and back again

Topic 3 Libraries of the Future.This section uses the story on sheets L/P/19 to 22 called 1985 and all that...?. The story itself is a projection and as the introduction says, may not be true in either content or timing. Nevertheless it opens up areas for discussion and creative activity in many fields. In effect, the story is about much more than libraries- it opens up ideas in the whole field of education to future generations of children and the role of the school in the community. For the less able classes there are opportunities of drawing the classroom (or 'baseroom' as the story puts it), of exercising their imaginations in descriptive work by word or picture; for the more able there are opportunities for discussion and value judgements and comparison. What exactly you wish to do with the story is left up to you, but at the end of the lesson don't forget to revise the wider picture of information in the Library and the school. And to finish off the module, give the ethos of it all - 'The more we know, the more we know we don't know'.

For use with this last topic a microfiche card should be available (L/V/1. The more information and visual material you can get about microfilm and other micro-miniaturised methods of storing records the better. Sheet L/P/23 shows a Student Card presently being used at the University of Southampton. It may be duplicated and given out or shown as an exhibit.

Information in the Library

If we want to find out a fact, or if we are doing a project, or if we are simply interested in the things around us, we often have a need for information. The school or County or City Library seems to be the natural place to go for this information. Have you ever stopped to think how this information got there in the first place and the organisation needed to make it available to you, and to everyone else? These questions are practical exercises which will help you to find out what there is in your school library, and eventually how to use it more efficiently.

Section A finding facts. The following questions all have the answer somewhere in the non-fiction or fiction books section of the Library. Let's first of all try to find the answers simply by browsing along the shelves to find a likely book which will contain the information we require. You don't need to start at question 1 but try to complete them all in the shortest possible time. What time is it now? .....

1. Who wrote 'The sword in the Stone?'.....

2. What is the Dutch port at the mouth of the river Rhine?.....

For all the following questions, write down after your answer the name of the book you found the answer in. A box is provided on the right hand side for this.

Book name

3. Who is Bartok? What is his first name?.....
.....

4. What is the name of the King of Scotland in Shakespeare's 'Macbeth'?.....

5. Name the two moons which circle Mars.....
.....

6.What was the name of Britain's first Jet Plane?
.....

7. What is the Latin Name for the Dahlia?.....

8. In Norse Legend:
a) Who was the first man?.....
b) Who made him?.....c) What from?.....

9. Write down the first 8 figures of Pi.....

10. What is the Chemical Symbol for Potassium?.....

11. When was the last Model T Ford sold?.....

12. What is the first word of Robert Browning's poem entitled 'The Glove'?.....

13. Name 4 dangerous snakes. a).....
b).....c).....d).....

14. Who wrote the Ballet 'Coppelia'?.....

15. What is the name of the first chapter in the book by the Greek Homer called 'The Iliad'?.....

16. Who was known as 'The Microbe Man'?.....

17. When was Mohammed born?.....

18. How many keys on a typewriter?.....

19. In electronics, what is a diode?.....
.....

20. In which years did Henry II reign?.....

What time is it now(after finishing)?.....How long did you take?.....

Classifying and Crossreferencing

I recently made a list of some of my records. This is it below. I like most kinds of music as you can see. Let's use this list to see if we can put some sort of order and organisation into it.

****

1. Mud Rock Mud
2. The four and only seekers. The old seekers
3. Godspell - Music from the musical. Original cast and chorus
4. The World of the Harp. Marisa Robles on harp.
5. Beethoven's Symphony No 7. Philharmonia Orchestra conductor Efrem Kurtz
6. Christmas Carols from Canterbury Cathedral. Canterbury Cathedral Choir.
7. Smash Hits 1972. All the No 1 s sung by the original singers.
8. Tijuana Hits. Chico Rodriguez and his Orchestra.
9. Brahm's Violin Concerto. Soloist David Oistrakh - Saxon State Orch. cond. Konwitschny
10. Stereo Gold Award Series. Pop hits.
11. The World of Kathleen Ferrier. Kathleen Ferrier.
12. Jesus Christ Superstar. Original Cast and Chorus.
13. The voice of Richard Dimbleby. Commentaries of past events.
14. The Sound of Music. Rodgers and Hammerstein. Mike Sammes Singers.
15. Sunday and Every Day. Frank Sinatra sings.
16. Espanol. Teach Yourself Spanish.
17. Pictures at an Exhibition. by Moussorgski. London Philharmonic cond by John Pritchard
18. Please Mr Postman - Beatles. Sung by the Carpenters
19. Come to our surprise Party Vol 1. The Gatecrashers.
20. Beethoven Violin Concerto. soloist Leonid Kogan. Paris Conservatoire Orch / Silvestri
21. Music from 'The Sting'. Marvin Hamlisch (piano).
22. Ella Fitzgerald sings George Gershwin. Ella Fitzgerald.
23. Place Vendome. The Swingle Singers with the Modern Jazz Quartet.
24. Music from Doctor Zhivago. Metropolitan Pops Orch conducted by Nicolai.
25. Sergeant Pepper's Lonely Hearts Club Band. The Beatles.
26. Harpsichord Concertos by Bach. George Malcolm with the Menuhin Festival Orchestra.
27. One over the Eight. Folk songs by Robin Hall and Jimmy Macgregor.
28. The Best of The Sweet. The Sweet.
29. Classics with a Beat. The Conway Sinphonia.
30. Prokofiev Classical Symphony. Philharmonia Orchestra conducted by Efrem Kurtz.
31. Johann Strauss's Greatist Hits Vol 3. Philadelphia Orchestra/Eugene Ormandy.
32. Slayed? The Slade.
33. Symphonie Pathetique - Tschaikowski. Philharmonia Orchestra / Silvestri.
34. Fidler on the Roof. Allegro Theatre Orchestra and Chorus.
35. The Most of Herman's Hermits. Herman's Hermits Hits.
36. Dance Party. Cyril Thomson and his Orchestra.
37. Liszt Piano Concertos No 1 and 2. Solomon. Philharmonia Orchestra / Silvestri.
38. I love you love. Gary Glitter.
39. John Williams plays the Guitar.

CLassifying and Crossreferencing (2)

The records listed on the first sheet are in no sort of order. Our first task is to classify them according to type. Remember that these are just a very small fraction of the total number of records available. Remember too that peoples' musical tastes differ. For example someone who is intersested in Violin Concertos would not likely be interested in what Slade have recently released, and even if he were, he would not likely look up both at the same time. So we need first of all some broad classification of musical tastes. What might these be? In the boxes below you see four broad classifications of music (one of them is other which acts as a catch-all for those we can't at first identify into any category. Using the numbers on the left hand side of the list, put into the boxes what you think each record relates to.

Classical	Light Music
Pop Music	**Other**

Now lets make some comparisons. Does your list agree with everyone elses? Perhaps one of the first things to remember about classification processes is that not everyone agrees with each other about where things should go. This is one of the reasons why we need to crossreference - so that one title might go under several headings. We will look at crossreferencing later. We have only made it a little easier to find out information we need. There are quite a lot of entries in the 'other'column which may need to be sorted out. There are two reasons why there should be so many 'other' entries - a) You weren't sure about some of the record titles what sort of music it is because you had never heard of it before (Perhaps you thought Kathleen Ferrier was an early pop singer). b) The record didn't seem to fit into any classification . Let's deal with a) first. You need information. Every clasifier comes up against this problem since no-one knows everything about everything. The information you need is probably somewhere in the library. In the box on the left below put the number of the record you need to find more information about in order to put it into its right box above - on the right write the name of the box it should have gone in. You will need to do some personal research to find out.

Number	Classification	Number	Classification

To deal with the second problem we obviously need more headings. It is time to think again about our headings and general classifications. How do they do it in Record Shops?. The first task is perhaps is to enlarge the number of our classifications but thinking within the three main ones we have used so far. For example Light Music includes, musicals, popular beat music, popular singers (vocals) and a few more. In the boxes below think of classifications within classifications as in the above example, and write down what these might be. A good idea so that the ideas of the whole class are used would be to discuss these with your teacher and get him or her to write your pooled ideas on the blackboard first.

1. Classical

	(Leave Blank)

2. Light Music

	(Leave Blank)

3. Pop Music

3. Other

Now we can start again from our original classifications and get down to more detailed classification. Again there may be some disagreement about what comes where eg Country and Western might come under light music or pop, and you may find that some of these classifications can be broken down still further. (What you are doing is in fact creating a hierarchy of classifications - ask your teacher what this means if you cannot work it out for yourself - or look it up). Using the list again put in the space on the right of each box the numbers of the records which come into that description you have written. It says 'Leave Blank'at the top.

If classifiers only had to deal with numbers like this life would be a little easier for them, but they don't. Look at the list again - copy what is on the list against the numbers on the left hand side below.

9.	
14.	

You can see from this that each record title gives a lot of information. For example what information does record title number 20 give? Answer below.

Can you also think of some information which record title number 2 does not give - there may be quite a lot. Answer below.

Because all this is information which some people will want from a record, we often have to set up a crossreferencing system. Look at the list again, pick out all those records which have a man called Silvestri conducting the Orchestra. Put the numbers on this line. _____ Some people think that Constantin Silvestri is the greatest conductor in the world and would want to know which records he had made. Others might be interested in Beethoven, or the Sweet or the seekers. So we have to have not one list but several lists so that they can look up what their special interest.

Often catalogues have special crossreferences. This means that an entry in one record title is referred to another which is similar.

For example, why might record number 18 be crossreferenced to record number 25?

Now find eight other examples of records which might be crossreferenced in this way - use record numbers and the boxes below. Find at least one 3 or 4-way Xreference.

Record Number	to Record Number(s)	Reason

We have used record titles as our example of classifying and crossreferencing. You might try to make a catalogue of your own records at home in the same way, so that your parents and friends can use it when they need to. As a final exercise in classifying, in the boxes below make a few classifications for the following.

Television Programmes	Furniture

The Classification System of Melvil Dewey 1

We have tried some classification exercises with a small selection of records - what happens when you have a library full of books on any subject from snails to sails, from windmills to whooping cough? This time the problem is much bigger. Melvil Dewey was an American who, in the last century, devoted his life to trying to classify the whole of human knowledge into an elaborate system of numbers. He wasn't the first to try to do this, but he was certainly the most successful since most Public and School Libraries use the 'Dewey Decimal System' of numbering books to this day.

Look on the back of any book in your school library - you will see a number. Write it down here _____.

If we ever build a bridge across the Channel to France, how long would it be at the shortest?_____. If we now put every book in Britain's Public Libraries onto this bridge, only one copy of each, we could reach from Britain to France. Have a guess how long it would take us to read just the titles of all these books._____

A classification system such as the Dewey Decimal system is designed so that we wouldn't have to do this - we would look up a number instead by referring to an index of topics. In these sheets we are going to find out how the system works and do some practical exercises ourselves.

++++++++++++++++++++++++++

1. Do you remember how, when we were classifying our records,we thought up some broad classifications first of all - four of them in fact?Dewey's problem was to classify the whole of human knowledge into 10 classifications (hence a 'Decimal' system). This is what he came up with.

The Ten Main Groups

He numbered each subject group as a hundred:

900 is used for HISTORY, and also for GEOGRAPHY and TRAVEL books.

600 is used for TECHNOLOGY.

Books in this section explain the skills people have developed in engineering, farming, industry, building, running a home, business, etc. APPLIED SCIENCE and USEFUL ARTS were formerly used as headings for this group of books.

800 is used for LITERATURE.

Poetry, plays and books on the history of literature are placed in this group. Stories are shelved in a separate section of the library, called the FICTION section,

500 is used for SCIENCE.

Science means finding out about anything in the universe. Here we can learn about the heavens, the world, and all the living things which inhabit the earth, air and oceans of our world.

700 is used for books on THE ARTS.

These are the things such as music, art, hobbies, sports and games, which give us pleasure and make life more enjoyable. In some libraries, this section is entitled FINE ARTS, instead of THE ARTS.

400 is used for LANGUAGE.

This is the invention which has raised man above all other creatures—the power to communicate his thoughts to others, in speech and writing.

Continued at top of Next Page

300 is used for SOCIAL SCIENCES.

Books here tell us how people, having left caves as a way of life, have organised themselves to live as nations; how laws are made, trade carried on, the young educated, the sick cared for; how communications have been developed, and armed forces established for protection.

200 is used for RELIGION.

Bible stories and books about Christianity will be found in this section, which includes all religions.

100 is used for books on PHILOSOPHY.

These are about man's search for wisdom, and how our minds work.

000 is used for GENERAL WORKS.

These are books, such as encyclopaedias, which deal with many subjects.

We may not know what all of these things mean, but here's a little exercise for you to try. On the lines below you will see some actual book titles. By looking at the classifications above see if you can guess which general number they might be under.

The Bible _____ A Passage to India _____ Lamb's Tales from Shakespeare _____

Encyclopaedia Britannica _____ The Astronomer's World _____ A Young Person's Guide to the Orchestra _____ Black Beauty _____ Build Your Own House _____

Now let's use your own School Library. Firstly you might check your answers to the above questions by looking at the relevant books there. Secondly, In the boxes below, put one title from each section by looking at the numbers on the back of the books.

Books beginning with a 9	
" 8	
" 7	
" 6	
" 5	
" 4	
" 3	
" 2	
" 1	
" 0	

2. Of course the problem is still only partly solved, because dividing all the books into ten different sections still leaves us with a lot of books to look through if we want to find anything. So Dewey's next stage is to think about the second number, and to divide into sub-classifications (just as we did in sorting out the records into Jazz, Blues, Pop Music etc). At the top of the next page you will see a list of the next stage of classification. Look at this and then, for the book numbers underneath find an example in your school library.

Books beginning with 29	
52	
56	
78	

000 General Works	260 Christian Church	*500 Pure Science*	750 Painting
010 Bibliography	270 Christian Church history	510 Mathematics	760 Prints and Print making
020 Library science	280 Christian churches and sects	520 Astronomy	770 Photography
030 General encyclopaedias	290 Other (non-Christian) religions	530 Physics	780 Music
040 General collected essays		540 Chemistry	790 Entertainment, sport
050 General periodicals	*300 Social Sciences*	550 Earth sciences	
060 General societies	310 Statistics	560 Palaeontology (fossils)	*800 Literature*
070 Newspapers	320 Political science	570 Anthropology and Biology	810 American literature
080 Collected works	330 Economics	580 Botanical sciences	820 English and Old English
090 Manuscripts and rare works	340 Law	590 Zoological sciences	830 German literature
	350 Public administration		840 French
100 Philosophy	360 Social welfare	*600 Technology*	850 Italian, Rumanian
110 Metaphysics	370 Education	610 Medical sciences	860 Spanish, Portuguese
120 Metaphysical theories	380 Public services and utilities	620 Engineering	870 Latin
130 Branches of psychology	390 Customs and Folklore	630 Agriculture	880 Classical and Modern Greek
140 Philosophical topics		640 Home economics	890 Other literatures
150 General psychology	*400 Language*	650 Business	
160 Logic	410 Comparative linguistics	660 Chemical technology	*900 History*
170 Ethics	420 English and Anglo-Saxon	670 } Manufactures	910 Geography, travels, description
180 Ancient and mediaeval	430 Germanic languages	680 }	920 Biography
190 Modern philosophy	440 French language	690 Building	930 Ancient history
	450 Italian, Rumanian		940 Europe
200 Religion	460 Spanish, Portuguese	*700 The Arts*	950 Asia
210 Natural theology	470 Latin	710 Landscape and Civic art	960 Africa
220 Bible	480 Classical and Modern Greek	720 Architecture	979 North America
230 Doctrinal theology	490 Other languages	730 Sculpture	980 South America
240 Devotional and practical		740 Drawing and Decorative arts	990 Other parts of World
250 Pastoral theology			

New books come into your library very frequently. Putting them into your library system is called Cataloguing. This means that the librarian has to decide what number to give each book before putting it on the shelves. To do this he (or she) has to decide which category it comes into. We haven't quite finished with Dewey yet, because there is yet another stage to go through, but from what you know already and by referring to the chart above, see if you can do this. Imagine you are a librarian and you are given a pile of books to catalogue. Their names are on the left below. Say which number you would give to each.

A Little Book of London _____ The World of Science _____

Exploring Caves _____ Oxford Book of Wild Flowers _____ And so to sew _____

Dutch Museums _____ Let's write a Story _____ The Amateur Actor _____

A Book about Books _____ From Drumbeat to Tickertape _____

The Life of Kathleen Ferrier _____ Leonardo Da Vinci _____

The Faber Book of Modern Verse _____ How to Study Pictures _____

4/9/9

3. We said earlier that We hadn't finished. As you might expect, Dewey also used the third figure in the number to make a further stage in classification (Remember the word hierarchy?). Why need we go into such detail? Have you considered how many books there are in the world? For example, count up the number of books in your school library beginning with the figures 92 ____. and 94? ____. And these are only a very few of the many more you might find in a Public Library - there are many millions of books in the British Museum Library alone, for example. At the same time, you would need to read 100 books a day just to keep up, for that is the number produced in this country each day.

There is even another stage of classification, because all we need to do after our three figures is to put a decimal point and start again. The list below shows a part of the full list (We can't show you it all since this takes up a book in itself). On the right handside give some examples of books in your school library which use the decimal point with at least 1 figure after it.

History Geography Description Travels Biography

900 World history

For history of a specific region, see the region, e.g., history of Asia, 950, of India, 954

910 Geography, travels, description of many places

For geography of a specific region, see the region, e.g., geography of Europe, 914; description of England, 914.2; physical geography, 551

.3 Gazetteers

Including comprehensive works on place names

For personal names, see 929

.4 Travel and adventure

Including accounts of voyages, travels, journeys, trips, tours in several parts or around the world, shipwrecks, buried treasure, pirates' voyages

For travels, exploration, discovery in a specific place, see the place, e.g. travels in France, 914.4

912 Atlases and maps

For map-making, see 526.8

913 Antiquities and archeology

Add new text formerly classified at 571

920 Biography

Including autobiographies, diaries, letters, when none of these is primarily of literary, artistic or subject interest

For an alternative treatment of biography, see pp. 13–14 of the Preface

929 Genealogy and heraldry

Including personal names, surnames, flags, family histories

For place names, see 910.3

930 The ancient world

Class ancient history of individual countries at 931–939; but, if preferred, class this at 940–999

For medieval and modern world history, see 900; *ancient history of countries not provided for here,* 940–999, *e.g., ancient Britain,* 942.01

931 China to 420 A.D.

For history of China since 420, see 951

932 Egypt to 640 A.D.

For history of Egypt since 640, see 962

Number	Title

Look at the descriptions - obviously people who catalogue sometimes find it difficult to know where exactly a subject fits. Sometimes it might seem to fit in more than one place; under more than one heading. From what it says on the list what is the difference in the number of a book written by a man who explores and writes about the French Alps, and one written by Sir Francis Chichester who sailed round the world?

Using The Catalogue 1

We have studied how books in your library are numbered by the Dewey Decimal System, and have seen that the giving of a number and making a list of these numbers is called cataloguing. In your library you will see a number of drawers which are the index to the books it contains, so that rather than looking through all the books to find what you want you can refer to the index. Lets see how we can use the index and why we might want to do so.

****

1. First of all let's find out how the index in your library is organised. Most of them are divided into three kinds of books - fiction, non-fiction and reference. In the boxes below say what you think the difference between these types of books is.

a) Reference books are
b) Fiction Books are
c) Non-fiction books are

A typical organisation of the index might look like this:

Non-Fiction 001 - 599	Non-Fiction 600 - 825	Non-Fiction 826 - 899
Non-Fiction 900 - 999	Reference Section	Subject Index
Fiction A - H	Fiction I - P	Fiction Q - Z

Look at the diagram above and see if you can answer these few questions about it.

a) What is the subject index?_____

b) If you looked up the subject index under 'Romans' what would you expect to find?_____

c) The Reference Section is also non-fiction - why is it kept separate?_____

d) What do the initials mean under the words 'Fiction'?_____

e) What do the numbers mean under the words 'Non-Fiction'?_____

f) If you had a project to do, which section would you look up first?_____

g) If you read a book and wanted to find out the names of some other books by the same author, what would you do?_____

L/P/11

Now let's find out how the index in your library is organised - go and look at it - in the boxes below write down how it is organised. Split up the box into the shape you require.

2. Each book in the Library has a card with some details of the book on it. For example the card below shows tells us about a non-fiction book.

915.2
Jones, Pamela
Japanese Floral Art
Hodder, 1963
159pp., illus. 23cm (Junior Series)

A book for Juniors about how the Japanese use flowers to make things

You can see that quite a lot of information is given here - on the lines below, say what you think the details on the card mean.

a) 915.2 _____

b) Jones, Pamela _____

c) Hodder, 1963 _____

d) 159pp _____ illus _____

e) 23 cm _____

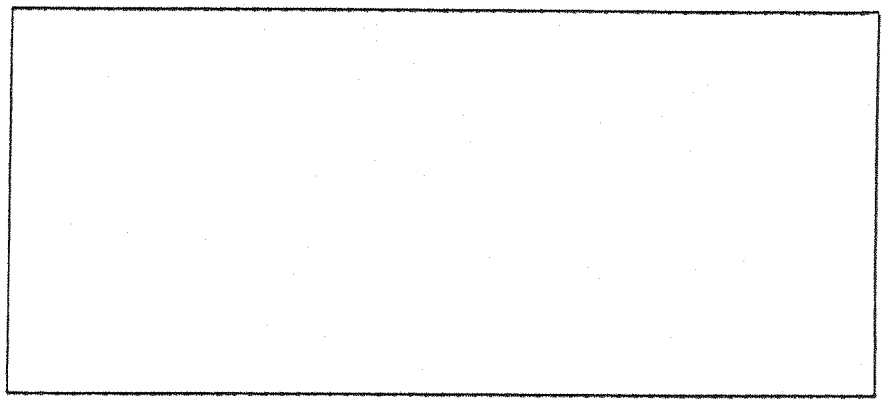
f) (Junior Series) _____

Look at the index for a non-fiction book and in the blank box below write down what information is given about it.

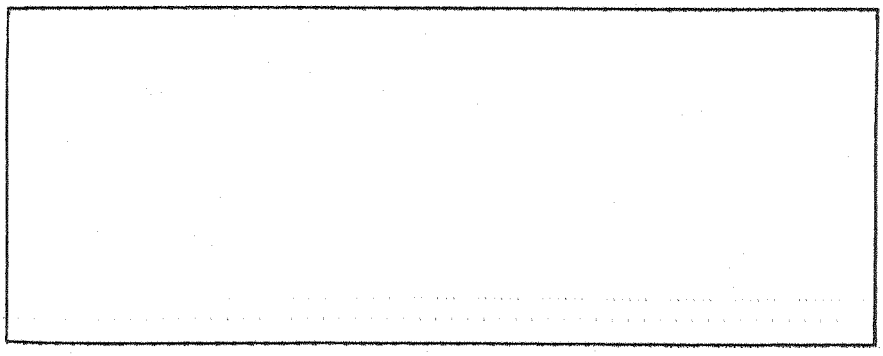
At the top of the next page you will see two more blank cards. On them write down the information given about Fiction Books, and what is on a subject index card.

L/P/12

A . Fiction Book Card



A Subject Index Card



Is there as much information given on a Fiction Book Card? _____

3. Once you have used the index and found your book (it may be one among many possibles) you have to decide whether it gives the information you need. Have a look at the following list of actions. If you want to find out what a book is like which order would you put them in. Give the most useful way number 1, the second most useful No.2 etc.

Look at the title	____
Look at the pictures	____
Read the first two pages	____
Look at the list of contents	____
'Dip' into the book at random	____
Look at the index at the back	____

Now get a non-fiction book from your library - any one. Before you open it write down the title below

_____

and then say in one sentence what you think it might be about. On the line below.

_____

Open it, go through it in your recommended way, and say on the line below what extra information it contains which you didn't perhaps expect to find.

_____

Let's use the index. First though, use the book to ask a question - the answer should be contained in the book. Write it down in the box below and replace the book on the shelves. Your teacher will collect in the questions and redistribute them .

Now we need to do some extended practise in using the catalogue. The questions which follow are all things which crop up frequently in our lives and where we need to be able to obtain information quite quickly. Using the catalogue is the best way of saving time looking through masses of books.

****

Case Study 1 - Last night on the television news you saw a feature about a war in Cambodia. You would like to know more about this strange country and the conditions which the soldiers have to go through when fighting there. Use the Index to find a few books on the place, On the first two lines say what the books are - on the rest say what the countryside around the capital city,where the fighting is taking place is like. _____

Case Study 2 - You are planning your holiday and have at last decided where you want to go. (If you haven't yet done this, choose a place where you would like to go most of all). Being an active sort of person you don't want to laze around on the beach all day long, and would like to know what the places of interest are in the area where you are going. Find a book on the place, give its name, and write down a list of the things you would like to see together with what you would expect to find there.

Case Study 3 - Your History Teacher has Just given you a project to do on 'The Romans'. There are many books on this subject, and many different aspects of the subject. Use the index to find five books which deal with the subject, list them below and then find them on the shelves. By the title say which you would use in order of preference.

Now use the books to break the subject down into Chapter Headings - what are they?

Case Study 4 - Your Teacher has decided what he/she wants to teach to the third forms next term. The general topics are as follows:

What is required is a list of all the library books which mention these topics, and a guide to what the books are like, eg whether they are stories or textbooks, what the language is like, easy to read or not, whether the book covers the whole topic or which parts it covers and a brief resume of the book. Think what information is needed and what it is needed for, make a list of the books and give the information required. This is obviously something which will be very useful and will be used,so do the job properly. Perhaps you might start by designing a form which makes the information you are giving easy to read and explains what it is you are describing.
Do this on a separate piece of paper.

Case Study 5 - Your father was digging in the garden when he overturned an old coin with a head and an inscription in latin on it - he thinks it might be valuable and asks you to look it up in the school library - which book would you recommend?

Another gardening problem he has is to decide whether to put lime into the soil in order to grow cabbages - he has read somewhere that a Ph value is important in this and has made a test of the soil in your garden to find that it has a Ph value of 5.9. He wants to know first of all what a Ph value means and secondly whether 5.9 is enough to grow cabbages in. Which book do you look up? What do you tell him?

Case Study 6 - One of your Birthday presents is a brand new telescope. You point it at the moon and see an area with thousands of craters on it. You would also like to be able to identify the planets in the night sky. Which area of the moon were you looking at? Which planets are visible in the night sky this month? How can you identify the constellations? How do you use a telescope? What must you not do? Say which book you have referred to and under which section, and answer the questions?

Case Study 7 - Make up your own Case Study outlining information which you may want to know at some time. Continue overleaf if necessary. Give the problem to someone else to solve for you.

4/5/15

REFERENCE BOOKS - Finding Facts

Most libraries have a reference section containing books which cannot be taken out, but which people can refer to. Your school library is probably no exception and some of you may even have some reference books such as encyclopaedias, at home.
There are many different kinds of reference book, catering for the person who wants to catch a train to the one who wants to identify a coin found in the garden. They are books for finding facts - not many people pick up an Atlas and read it from cover to cover as they would a novel. These notes tell you about some of the different kinds of reference book and give you something practical to do in using the different sources.

++++++++++++++++++++++

1. Encyclopaedias. These come in all sorts of shapes and sizes. The most common ones are the Encyclopaedia Britannica, Chamber's Encyclopaedia and The Oxford Junior Encyclopaedia. They try to pack as much general information as possible on a wide range of subjects into their pages and each section is often written by an expert. You should have an encyclopaedia in your school library. Perhaps more than one - on the lines below write down which are there and, if possible, who wrote it.

The encyclopaedia is a reference book - let's have some practise at using one. See if you can use your encyclopaedia to find the answers to the following questions - spaces are left for the answers.
Write down the offside law for football (boys) or hockey (girls).

How does a chameleon capture insects?
Write a short paragraph about Andrew Carnegie.

2. Dictionaries. We all know what dictionaries are for, but not everyone is aware that they give much more information than the meaning of words. Let's find out. First of all make a list on the lines below of the dictionaries in your school library.

Now look up the following words in one of these dictionaries and write down exactly what the dictionary says about it - everything! Copy the word as it is written first.
Fat

Euthanasia _____

_____

_____

_____

You will have found several abbreviations in the meaning given - also, if it is a good dictionary, several signs and symbols. Now turn to the part of the dictionary which tells you what these mean, make a list of those you have found and explain them.

____	_____	____	_____
____	_____	____	_____
____	_____	____	_____
____	_____	____	_____
____	_____	____	_____
____	_____	____	_____

Many dictionaries have other information as well. Take one and tick if it has....

A list of Abbreviations ____ A few blank pages for notes ____

An Introduction ____ An Addendum ____ Notes on how to pronounce the words ____

How is it made easy to find out whether you are on the right page (try looking up a word, and see how you do it)?_____

_____

Sometimes you will also find specialised dictionaries in the Libraries - some examples are 'A Dictionary of Phrase and Fable','A Dictionary of Quotations','A Dictionary of Abbreviations'. Are all these in your library?_____

3. Atlases and Gazetteers . These are used to give us information about places and placenames throughout the world - some of them only deal with a particular area while others try to cover the whole world. What have you in your library?

_____

_____

_____

_____

Let's see if you can use them. Using An Atlas or Gazetteer answer the following:

What is the population of Trowbridge?_____ In which county is it?_____

What height is Vesuvius?_____ What is the latitude of the City of Quito?_____

Atlases also give other information - about the height of mountains, the depth of seas, thewinter rainfall of countries and continents and lots of other details about weather. To show these they are often highly coloured - look at the map of France in your Atlas - how many colours are on it? _____(Choose one which shows the mountains). Look closely at your Atlas - on the lines below say what other information it tells us. _____

_____

_____

_____

What is the difference between an Atlas and a Gazetteer?_____

_____

L/P 17

4. Timetables . Most libraries contain timetables - perhaps your school library has some. If so, write down what there is on the lines below, and then answer the questions beneath them.

What time is the next bus from the nearest bus stop to your school?_____
Is there a railway station in your nearest town?_____ How many trains to London are there from it? (Every day) _____ If trains do not go to London from your nearest railway station use the timetable to work out how you would get there by train and how long it would take you._____

Use any time table, look at it carefully and put on the lines below what other information it contains apart from times._____

5. Directories. Most libraries have Telephone Directories, but there are also many other kinds of Directory from 'Who's Who' to the trades directories for the firms in your local area. On the lines below write down the names of all the directories in your school library or public library.

Look at any directory - the telephone directory if you like. Write down
a) How you would use it to find out a piece of information_____

b) What information it contains - there must be lots of it._____

6. Yearbooks and Almanacks. These give a lot of useful facts about things we may need to know at certain times of the year; for instance when we make a visit to a London Museum we want to know when it will be open, or we may want to know useful addresses or how much a dog license costs. Bits of information like this are useful only when we want to know them. Yearbooks tend to be more specialised - for example, the 'Computer Users Yearbook' tells us all the companies which use computers and which computers they use - they are called yearbooks because they have to be updated every year. Which yearbooks and Almanacks have you in your school/public library?

REFERENCE BOOKS - Finding Facts 4

Use the Almanack, see if you can find out the answers to the following questions:
At what time in the morning does the British Museum open on a normal weekday?_____
At what age does a dog need a license?_____ What is the address of the Canadian High Commissioner?_____
If you wanted to emigrate to Australia who would you contact?_____
_____ Name two Eating places on Totenham Court Road, London.
_____
How much is it to license a car for four months this year?_____
Name 6 other types of information you can obtain from your almanack.

_____ _____
_____ _____
_____ _____

7. Other reference Books There are many other types of reference - you can probably see that we have only looked at a few. On the lines below give four other examples of reference book we haven't yet looked at.

_____
_____
_____
_____

8. How much have we learned. Here are a few questions which use your reference library. They are not in any particular order. See if you can answer them and also put the name of the book in which you found the answer.
a) Which is further West,Edinburgh or Bristol? _____ (I found the answer in _____) b) What is the meaning of the word 'savant'? _____ (I found the answer in _____). c) What day is Boxing Day this year?_____(I found the answer in _____). In which year was Einstein born?_____ (I found the answer in _____). What is the telephone number of the Public House nearest to your home?_____(I found the answer in _____). f) Name one of the plays written by Christopher Marlowe. _____ (I found the answer in_____ _____). g) What time is the first train in the morning from Manchester to London?_____ (I found the answer in_____ _____). h) What is the Chemical Formula for Boron?_____ (I found the answer in_____). i) What is a theorbo? _____ (I found the answer in _____ _____). j) What is the Capital city of Sierra Leone? _____(I found the answer in _____)

++

We have found out a lot about reference books and how many there are. If you counted up the number of facts in all the reference books in your library, how many would it come to do you think? _____ - ther's a lot of information about, isn't there?

1985 and all that.... ?

As we have seen in the other things we have studied, computers have had a big effect on the way things are done. It is the same with libraries and schools. Let us have a little peep into the future to see how things might change. This story might give you some idea of how your children will go to school and live in the future. It isn't necessarily true and it won-t necessarily happen in 1985, but it is certainly possible!

****

Dan Maguire whistled as he entered the large doorway which led into Pinchester County School and joined the milling throng of boys and girls. As he walked briskly down the long, wide corridor he wondered what might be in store for him today and how he could best make use of it. The same thought was going through the minds of every boy and girl there.

Pinchester County isn't so much a school, more a place for learning. Anyone and everyone, from grandmothers to Dutch uncles, from fathers to shopkeepers, is entitled to attend during all the time it is open to take part in the learning programmes, to browse through the material in the library,to attend the thousands of classes held each and every day. So that mothers with young children can also take advantage, some of the girls who want to work with children in later years operate a creche where they can leave babies and toddlers.

Dan reached his base-room, perhaps what we today would call a classroom, and turned left into it. He surveyed the scene thoughtfully. Everywhere was a jumble of activity. Along one wall stood a line of lockers, each one numbered - some of Dan's base-mates were putting their coats into these. At the sides of these and in each corner were two doors leading into a changing and shower room. Some of the children had already changed into football, netball and PE kit and were busily hanging up their everyday clothes in their own personal locker. These were those who had chosen to start the day with some strenuous physical activity to set the adrenalin flowing and prepare for a busy day ahead.

In the centre of the room there were tables and easy chairs, some of them occupied by children sitting around in informal groups chatting to each other and drinking coffee or squash from the vending machine set into another wall. No teacher was to be seen - the children were trusted to behave like intelligent people and did so. Along the other two walls were individual study booths, each partitioned from the other, and each with a chair and writing shelf overlooked by a television screen. At the back of the writing shelf was a typewriter-like keyboard. One set of booths could only be entered through doors which, when closed, made the whole booth sound-proof. Some of these were occupied, some children deep in study, reading books, tapping away at the keyboard, watching the screen programmes,or writing.

Dan put his overcoat in his locker, obtained a cup of hot chocolate and sat for ten minutes chatting to his friends at a table.He then went over to one of the study booths and took from his pocket a card made of plastic. On it were written his name and address and in the top left-hand corner was a photograph which had to be renewed

at the beginning of each school year. In addition there were a few holes punched into it in a regular pattern.

He inserted the card into a slot at the side of the keyboard. The television screen immediately lit up and displayed his name in the top left-hand corner.

DAN MAGUIRE?

Dan typed the 'Yes' key on the keyboard and the screen flashed back:

'Hello, Dan. Welcome to a new school day.'

'The time is 9.30 am. The date is Friday 15.3.85.'

'Here is a list of the General Activities taking place today.'

1. 10 am. The New Geography Teacher, Mr Ward, is giving a talk on the Geology of the Pinchester District. Harestock Room.
2. 10 am. Aeromodelling Club Workshop. Room 308.
3. 11 am. Football Match School 1st XI v Lateley School. Pitch 3.
4.

There were about ten of these activities all together, followed by the message:

'Type in the numbers of those you wish to attend'

Dan was particularly interested in Football since he expected to be playing in the school team himself in two years, so he typed in '3', made a note of the time and place, and read the next output from the screen which was:

'For the next hour and a half do you wish to pursue:

1. LEISURE Activities
2. LEARNING Activities
3. DISCUSSION Activities
4. COMMUNITY SERVICE Activities
5. NONE of these

In the early days when he was younger and less mature, Dan had been delighted with the prospect of spending all his time at school in leisure - he had participated in games and club activities all day long for a whole week. Then, somehow, it all got quite boring and it didn't take him long to realise that a healthy body does not go well with an empty mind. After a chat with his Teaching Adviser he had started to opt for the Learning Activities and found that this was just as much fun. This particular day he was keen to get on with some Physics, since he would shortly be sitting an examination in the subject. He therefore typed in a '2', and on the screen came the following question:

' Which subject?'

1. GEOGRAPHY
2. HISTORY
3. INFORMATION
4. PHYSICS
5. ARCHAEOLOGY
6. CHEMISTRY
7.....

1985 and all that.... ?

There were of course other choices but Dan typed in '4'.

Somewhere in the basement of the school hums a large computer. The whirling disks keep records of each pupil and every member of staff. The programs can offer lessons in many subjects, quizzes and examinations, personal timetables for children and teachers and directions about where to go next for information. In the record for each child is information about where he or she is in every course of study and what comes next, and this information can be obtained either by the pupil or by his teacher.

Dan's '4' provoked a lot of activity down in the basement, but none of it could be seen of course. Electronic messages flashed from processor to disk to tape to printer and back again. Dan could see nothing of this, but what he did see was a question on the screen:

'Last time in Physics you were learning about Basic Electricity.'

'Would you like to be tested on this?'

Dan tapped out 'YES' and received a number of questions about Basic Electricity which he answered by typing on the keyboard. At the end, the screen said:

'You have scored 8 out of 10.'

' This is a good mark but your knowledge of Ohm's Law is not good.

' This is important.'

Do you wish to:

1. Discuss this with the Physics Teacher. Mr Wright is free at the moment.
2. Go to the Library to Read it up.
3. Carry on to the next Lesson.
4. Take the whole lesson again.

Dan thought that his simplest course would be to go to the Library. He therefore typed '2' and pressed the sign-off button.

The base-room was still bustling with activity as it would be for the whole of the day.

Pinchester School is centred round the Library. It is hexagonal in shape and all the rest of the school buildings radiate from it like a six-spoked wheel. Dan entered from his own building. The thing that strikes the eye immediately is that there are no book shelves to be seen. This gives it a rather bare appearance. In the centre of the hexagon, hexagonally shaped itself, is the librarian's centre of operations. Here you can normally see two or three information specialists cataloguing, booking out and generally doing the tasks which information specialists spend four or five years training to do. Arranged around the wall between the six doors which lead into the library from its radiating buildings are more individual booths, again with television screens and keyboards, and between these and the centre area are six large tables each with six viewing screens on them. The library can be used as a study area by accessing the screens into the

school's basement computer, or into the library service's own network of computers covering most libraries in the country.

Since Dan's requirements were relatively simple and anyway all the individual booths were full of studying children and adults, he sat at one of the viewing screens on one of the tables. His first task was to look at the catalogue to find out a passage on Ohm's Law. This could be done by typing in the word'Cat' (which put him in touch with the catalogue index) and then 'Ohm' which made all the references to this word in the index appear on the screen. Each reference had a number by it. Dan made a list of the numbers he thought would answer his question and then typed it in on his keyboard. The microfilm of the book containing the chapter on Ohm's Law was then automatically made available by computer to the screen and Dan, by keying in the relevant page numbers was able to read what he wanted to know.

Dan's main hobby was space ships. He made models of them in his spare time and had read almost every non-technical book produced since the early pioneering days when the first astronauts landed on the moon. It was a passion with him and his dearest wish was to become a spaceship engineer after he had left school. The library had a system whereby everyone could register their names into the files of the computer and the subjects they were most interested in. Whenever a book or microfilm was printed, the interested persons received details of it as soon as it became available. Dan retrieved his card agin and fitted it into the slot at the side of the screen. What appeared interested him greatly.

Dan Maguire. Space Ships and Space Engineering.

New books since 8.3.85

'The Pluto Space Probe - Results' Raymond Cackett - Author
No. 85-7694523 Hedges and Butlin - Publisher

Dan had taken a great interest in this particular probe. There was obviously not time to read it there and then - the football match was soon due to start. He therefore made a note of the number, completed a request form for the book, which he wanted in microfiche form to read on his home microfiche viewer, handed it in to the Information Specialist and waited results. In fact the microfiche had been received that very day - the Information Specialist pressed a few buttons on his keyboard, and two minutes later it appeared from a long pipe leading to the ceiling. Dan's card and the microfiche were fed into a machine which had a tray at each end. Both card and microfiche appeared at the other end of the machine and Dan was able to take them away with him. What the machine had done was to update the computer with the details of Dan's number and name, give it a return date, check that Dan had not taken too many books out and link Dan's number to the signing out of that book. If Dan had wanted the book in book form, he could have had it but would have had to wait.

Dan's day was complete when Pinchester beat Lateley 3-1 to reach the semifinal of the County Trophy. The computer didn't have much to do with that - it didn't even pick the team.

S. u. Thesis Longworth
L. Lib. 1976

A/T/1

MODULE 9

INDIVIDUAL/GROUP/CLASS INFORMATION ASSIGNMENTS

SOUTHAMPTON UNIVERSITY LIBRARY

76 - 108563

Module 9 Individual/Group/Class Assignments

Introduction: Information Assignments are one way of enabling the children to carry out an information project of their own with a minimum amount of supervision and incorporating the ideas and concepts they have learned during the course. The Assignments can cover a variety of subjects and be organised by the teacher in a variety of ways. The Assignments suggested below may be presented as a class assignment, a series of group assignments or as individual efforts on the part of each child. The list comprises some suggestions for topics - it is by no means exhaustive and the decision whether another choice on the part of a child or group of children is viable will be up to the judgement of the teacher. It should be assessed under the terms of whether the children can collect enough information, whether they are able to complete it in the time available, whether they have the necessary access to the information they will require and whether there are enough variables in the subject to make it worthwhile. You should consider the choice of the children seriously before setting a topic of your own or from the list.

The following are suggestions which may be suitable for the children in your class:

a) An information system for dating. ie examining the questions to be asked in setting up a computer dating file (eg age, sex, interests, handicaps etc), designing a form for completion by the participants, recording the information collected (perhaps on edge punched cards) and processing the information (matching). A sample questionnaire for such a system is given at the back of these notes (A/T/7 (a)), but this should be for teacher reference only, so that ideas can be discussed by the children without preconceived leading.

b) A football information system. ie examining the different aspects of information about football (league tables, cup records, favourite football teams, spectators at matches. goals scored etc), designing questionnaires about some aspects of these and setting up an information retrieval system which answers questions. There are many aspects of this topic, but care must be taken to ensure that the assignment is about 'information' and not about 'football'.

c) A survey of television viewing habits involving perhaps the number of hours watched by members of the class, the types of programmes watched, the types of television sets by maker or colour or size of screen etc. The processing of the information obtained and presentation as tables or charts. Setting up a retrieval system.

d) A survey of pocket money. Information obtained about amounts and the relative factors which may affect this eg number of children in the family, what has to be bought with it, who supplies it etc. Setting up a retrieval system for the results and presenting the information in easily readable form. Conclusions reached.

e) A Homework information system. related both to consumer and manufacturer, and involving such questions as time spent in doing and marking, who sets most, favourite homework subject, when it is done, types of homework preferred. Might also involve the creation of a homework timetable taking into account the number of periods of each, days on which the subject is taught etc. Retrieval system and presentation of results.

f) A survey of a local company or office. Could involve parents and related to the information it processes, the methods used to obtain information, how it is processed and what is done with the information so derived. This is more difficult in terms of organisation, since it would mean that the child has difficulty in obtaining the information needed, and the people contacted may not see the problem in his/her terms. However, the suggestions for setting up your own information survey in the introductory teachers'notes to the course(page) could be used to help the child who wishes to do a survey of this kind.

g) A town information system for visitors. Putting the pupil in the situation of designing and setting up an information kiosk for visitors to your town or village.(If you already have one, a group of children could assess this as an alternative, discussing with the information officer at the council offices how he went about it, and suggesting ways by which it may be improved. If the officer is willing, your group may offer help, or bring him round to talk to the class). In the former situation, the pupils would be discussing how to set up the information kiosk, what information to include, how to present it and how to make the information which any sort of visitor may require easily retrievable and accessible.

h) A survey of newspapers. This could involve several aspects, such as which papers are taken at home, which order they are read in, whether the children read them and how much time they spend, how much time parents spend reading newspapers, a study of two different types of newspaper, counting column inches within broad classifications etc. Includes design of questionnaire, recording and preparation of information and presentation of results.

i) The local newspaper office. A survey of how your local newspaper collects, analyses, processes and organises the information it presents.(The childrens' project might be a future feature).

j) Setting up a school information system. This could follow the lines of the module on Headmaster Information Systems and involve the setting up of a system of school records on edge-punched cards - care would obviously have to be exercised about allowing children to have access to school records, but it need involve only that information in the class register so that more delicate information will be entered by others. You may wish to consult the Headmaster and suggest that this would be a good thing to do with school records.
Another project along these lines would be the setting up of an information desk for visitors to the school. This could include such information as location of rooms, the movement of classes and teachers, the extra-school activities taking place, the dates of important school events, names of prefects etc. It would be an information collection, presentation and retrieval exercise.

K) A Pop records information system.Examining the different aspects of how information is obtained about the sales which affect the charts, the changing tastes in pop music, the different classes of music in the chart, the organisation and information needed before a pop concert can be put on, the publicity methods used. The design of questionnaires, the setting up of a retrieval system, the problems of keeping up to date and the contact with outside bodies such as record shops, hall managers etc may be involved in this project, but, as with the football project, care must be taken to emphasise the information aspect rather than the opportunity to plaster pages with pictures of pop stars.

l) Setting up an exhibition of computer bits and pieces. This would be a follow-up to the module on the computer as an Information Machine. The bits and pieces used in that module show up well in an exhibition, and you may also wish to obtain permission for the results to be shown in the school foyer. This project would involve the identification of the bits and pieces, their relation to the function of the computer and the labelling and writing of explanations for those who would see the exhibition. This project could form the basis for a much larger exhibition on computers and computing, material for which can be obtained from the various manufacturers and from local sources.

m) Other topics which may be considered are

. A School Library Information Service (As a follow-up to the module on the Library)

. A survey of book-reading habits - authors, time spent, no. owned etc.

. A survey of vehicle ownership in your school

. A favourite subject survey

. A survey of some information services- speed of reply, amount of material, to whom available. Postal and/or local collection.

And there are, of course, many others. The problem with assignments of this nature is how much help should be given. In this case, the object is to encourage the child to do as much as possible to solve the problems encountered, but some children require more help than others, and occasionally children will chase down a blind alley and have to be led gently out of it. To help with the general organisational problem of the assignment the class notes produced for some of these mentioned above will serve to alleviate some of the excesses. It is, however, up to the teacher to produce the ideas and judgements needed from time to time to make sure that interest is maintained, and to offer light where the child is struggling in the dark. In projects of this type ideas for lines of enquiry are more useful than didactic instructions, but it is essential that the child should have at the back of his/her mind the essential objective of the research being carried out.

In surveys where data needs to be collected (the majority of them) it is left to the teachers discretion whether the class would provide enough information to make the assignment worth while, or whether it is necessary to obtain a wider sample, and from where this can be obtained.

Materials required: Project work of this type does not require much teacher generated documentation. The main difference between this and any other type of project lies in the sophistication of the information storage and retrieval equipment at your disposal. Some schools may have a computer terminal or access to a mini-computer - most will not. Many schools will have available the batch-processing facilities of a local technical college, Polytechnic, University or Local Authority computer - whether you choose to use these will often depend on your own knowledge of the necessary techniques or your ability to rely on others to teach them. However, as we have seen, particularly in the Headmaster Information System Module (Module 2), computers are not the

only means of storing and retrieving information. Edge-punched cards may also be used for this purpose and you should make these available to the children for this storage and retrieval exercise which succeeds the collection of data. Other things which may be useful are:

- Edge punched card planning forms (H/P/6)
- Reprographic equipment for the duplication of the childrens' forms
- The general sheet on 'Your Information Assignment' (A/P/1)
- (If any of the children are doing assignments on 'Football','Dating' or 'television',) the hints sheets 'Your assignment on.....' (A/P/2 to A/P/4)
- squared paper for form design.

Lastly, some of the brighter children may think of other ideas for storing and retrieving information - they should be encouraged in this and if it is within your power, do so in a practical way by making the wherewithal available to them.

Teaching Notes: There can obviously be few of these. As with all project work, children should have a clear idea of what they are doing and how they are expected to achieve results. Your role in this lies in helping them to choose suitable subjects and in explaining what it is you require of them. The sheet 'Your information assignment' (A/P/1) encapsulates the general idea of the work and it is recommended that you read this through with the children and clear up any points they may raise. Also, try to generate enthusiasm for the projects, perhaps by showing how this sort of activity is an essential part of information processing in the outside world and what they are in fact doing is a piece of market research for their own class.

You will also find the 'dateline' questionnaire useful as a source of reference (A/T/7 to A/T/10). This is a sheet of questions produced by boys of the Royal Guildford Grammar School who reproduced this, obtained data from other schools and then wrote a computer program to process the data to find matches. Their main interest is obvious, but even if this standard is not reached by your own children, the activity of thinking around a problem in these terms is a valuable one, and one which brings home the value of information and information processing in our modern world.

(for our use) A/T/7

R.C.S. GUILDFORD COMPUTER 'DATELINE' QUESTIONNAIRE

This questionnaire is designed to find out as much as possible about you; and hence to match you with a compatible partner. Please be absolutely honest in your answers. You only muck up both you and us if you are not!
N.B. All answers will be held in strictest confidence.

DETAILS: NAME: .....

ADDRESS: .....

.....

SCHOOL: .....

SEX: .....

AGE: .....(Please give answer to nearest half-year)

Give to nearest half-year the age you would like your partner to be(we will allow ± 1 year candidates to be considered. .....

HEIGHT: .....

What height would you like your partner to be ? (underline where applicable)
(1) Don't mind (2) shorter than you (3) taller than you
(4) same height as you

VITAL STATISTICS(girls need only answer!)

BUST: ..... WAIST: ..... HIPS: .....

In the above question boys should fill in measurements they would like their partner to have(*2" allowed). If you don't mind, write letters 'D.M.'

In column 1 answer the following questions:

	column 1	column 2
Do you smoke?	.....	.....
Do you drink?	.....	.....
Do you swear?	.....	.....

In column 2 put which of the following numbers fits your opinions
(1) You don't mind if thepartner indulges in the 'vice'mentioned
(2) You wouldn't go out with a partner who indulges in the 'vice
(3) You don't approve of but would go out with a partner who indulges in the 'vice' mentioned.
(4) You like a partner to indulge in the 'vice' mentioned.

PERSONALITY, CHARACTER AND INTERESTS

In the first few questions in this section we ask about aspects of your personality. We then ask what you would like your partner to be. These aspects are more important to some people than to others so we have added a 'priority'question. If the particular aspect is important to you, put a high priority number(maximum 5); if it is unimportant put a low number(minimum 0); or you may like to put one of the degrees between. The mark each candidate gets on each of these particular questions is multiplied by the number you put in the 'priority'box.
N.B. Priority 0 = absolutely of no importance to you
" 1 = quite unimportant to you
" 2 = not very important to you

Priority 4 = important to you
Priority 5 = very important to you

In each question put the answer for you in 'A', put what you would like your partner to be in 'B', and put priority number in 'C'. The answers in 'A' and 'B' will take the form of a number.

INTELLIGENCE

(A) Do you consider yourself (B) Would you like your partner to be

(1) Not very intelligent (i.e. failed 11+, bottom half in ability range at secondary mod.)
(2) Not particularly intelligent (failed 11+, top half at secondary mod.)
(3) Average intelligence (about 3 'O' levels)
(4) Better than average (4 or 5 'O' levels, leave school at 16)
(5) Fairly good (5 or 6 'O' levels, 1 'A' level)
(6) Pretty good (intend leaving school after 3 'A' levels)
(7) Good (intend further education; polytechnic)
(8) Very good (intend going to university; good 'A' levels)
(9) Extremely good (intend going to Oxford or Cambridge; 3 'A' levels)

Please be honest. Details in brackets intended as a rough guide, for purposes of our survey only.

A = ... B = ... C = ...

RELIGION

(A) Do you consider yourself (B) Would you like your partner to be

(1) Very religious (religion has prime place in your 'philosophy of life')
(2) Religious (have beliefs but do not support them particularly actively
(3) 'Interested' (interested in religion but not quite sure of beliefs)
(4) Agnostic (simply do not know)
(5) Atheist (do not believe in any religion)
(6) Strongly atheist (definitely against religion)

Put the numbers of your choice in the relevant 'boxes'

A = ... B = ... C = ...

AMBITION IN LIFE

(1) Not bothered to achieve anything but happiness, leaving school at 16
(2) Want good paper qualifications, 'O' levels,
(3) Taking 'A' levels to get a better job
(4) Want further education at polytechnic
(5) Want to go to university; need a worthwhile career
(6) Want to be best at everything; feel great need to achieve something in life; intend to go to Oxbridge perhaps

A = ... B = ... C = ...

PERSONALITY, CHARACTER & INTERESTS (CONT.)

In the following questions there is no 'priority'. Simply put in box 'A' what you consider yourself to be, and in box 'B' what you would like your partner to be. In case 'B', if you don't mind what your partner is, put B = 0.

(a) Do you consider yourself : would you like your partner to be
(1) shy, withdrawn (2) quiet (3) slightly introvert (4) 'just average'
(5) slightly 'forward' (6) quite forthcoming, lively
(7) lively, extrovert (8) very extrovert, zany!

A = ... B = ...

(b) Do you consider yourself : would you like your partner to be
(1) not at all sociable (2) find it quite hard to mix with people
(3) self-conscious but friendly (4) 'average' (5) fairly sociable
(6) sociable, finding it easy to make friends straight away
(7) very sociable

A = ... B = ...

(c) Sense of humour
(1) not strong (2) average (3) fairly good (4) very good

P.T.O.

(3) quite absurd,zany,stupid!

A = ... B = ...

(d) Care of money
(1)like to save,love to be prosperous (2)watch carefully what you spend money on (3) spend moneywhen necessary but not extravagantly, giving to very good causes (4) fairly generous,perhaps not worried how much money you've got within reason (5) generous,spending money freely as it means little to you;perhaps even a little reckless with it.

A = ... B = ...

(e) Do you consider yourself(only one answer please)
(1) practical,down to earth (2) prepared to help people when you are sure your efforts are genuinely useful (3) pretty normal 'balanced' person in this respect (4) rather philosophical in attitude, prefering to deal with people rather than 'things' (5)idealistic, always striving for high aims

A = ... B = ...

(f) What is your taste in music(only one answer please)(state favourite)
(1) classical (2)progressive,classically orientated pop(e.g.Elp, Focus,Yes) (3)'heavy'pop(e.g.Deep Purple,Steppenwolf) (4)commercial pop(e.g.Slade,T.Rex) (6)'Balladeers'(e.g.Cassidy,Osmond) (7)'cabaret'(e.g.Bassey,Sinatra,Jones,Conniff) ( )'Folky'pop(e.g. Mclean,Taylor,Simon & Garfunkel) (8) Jazz (9) absolutely no preference.

A = ... B = ...

(g) What is your taste in clothes
(1)not bothered about appearance.practicality is what counts (2)Fairly conventional,don't like to 'stand out in a crowd' (3)Modern but smart (4) modern but 'scruffy',prefering to wear, say,jeans and T-shirt (5)Care a lot about clothes and appearance, try to be fashionable (6) Absolutely way-out taste in clothes, like to be noticed!

A = ... B = ...

(h) Do you like to have your hair
(1)short and neat (2)medium length (3)long,but not inconveniently so,and clean (4)long,because you don't worry about such things

A = ... B = ...

(i) Are you interested in sports?
(1)none (2)individual sports(e.g.Tennis,Golf,Archery) (3)Team games(e.g.soccer,rugby,cricket) (4) all sports

A = ... B = ...

(j) How do you get on with the opposite sex?
(1)not very well (i.e.never been out with anyone)
(2)fairly well (i.e.been out with a few people)
(3) very well (i.e.been out with 5 or more boys/girls)

A = ... B = ...

The last few questions in this section do not incorporate a box 'B'.In these questions you are marked according to how well your interests correspond to those of each prospective partner.As before you are asked to fill in the box with whichever number <u>best</u> fits your choice.

(k) Where do your interests lie at school ?
(1) Music and/or Art (2) Languages (3)'Arts'e.g.History ,Geography (4) Science (5) Mathematics

A = ...

(l) How do you spend your spare time(or how would you like to!)
(1)Doing as little as possible! (2)Quiet occupations at home(e.g.

reading a book,chatting,listening to music (3) doing something practical(e.g.making something,keeping busy (4)performing some sport or lively activity (5)leading a hectic social life!

A = ...

(m) If you had a day with nothing but one of these books to read,which one would you choose
(1)The Bible (2)classic or poetical work(e.g.Dickens,Chaucer, Wordsworth) (3)'The Lord of the Rings'etc. (4)'Quality' modern novel(e.g.Hemingway,Forrester) (5)popular novel(e.g.'James Bond', Alistair MacLean,Nevil Shute) (6) Sexy love story (7)dirty Swedish magazine.

A = ...

(n) Which would you choose to watch if these T.V. programmes were on at the same time
(1)Kenneth Clark's 'Civilisation' (2)Lively intellectual discussion/argument with controversial politician (3)Chat show(e.g. David Frost,Michael Parkinson (4)An old Western (5)'Coronation Street' or 'Crossroads'

A = ...

(o) If your political dream could come true,which one of the following would you like to see happen ?
(1)The end of the war in Vietnam (2)The end of all space exploration (3)Enoch Powell made Prime Minister

A = ...

The final section is on opinions.Again you are asked to fill in the box with the number of the answer which best fits your views.For instance,if you strongly disagree with abortion put a '1' in the box against the relevant question.
Answers: (1)strongly disagree (2)disagree (3)have a balanced view between the 'pros' and 'cons' or 'don't know' (4)agree (5)strongly agree

OPINIONS

Censorship of films is a good thing .....

Capital punishment should be reintroduced for murder .....

Homosexuality should not be a legal offence .....

Abortion should be made illegal .....

People who refuse to serve when 'called up' for military service should be put in jail .....

Soft drugs should be legalised .....

No more immigrants should be allowed into this country .....

Coloured people should be treated exactly like white people .....

Men and women should have equal opportunities .....

Britain's entry to the common market is a good thing .....

Sex before marriage is a good idea .....

Participation in sport at school should be compulsory .....

Religious instruction for 6th formers should be compulsory .....

Britain should increase its aid to underdeveloped countries .....

More money should be spent on O.A.P's and less on Defence .....

Thank you for taking part in our program.We remind you that all answers are in strict confidence,and since we deal with your answers in terms of a series of numbers,no-one will know what you put for any question. We hope you have filled in all the answers in complete honesty,for your sake and ours.Anyway....Thank You!

Your Information Assignment

This may help you to plan your information assignment. We have learned during our course on information that all information systems (and this is what you are going to set up) follow the same pattern. This is repeated below to help you.

1. Analyse the problem. Sit down and think about it, discuss it with others and make sure you understamd it. Make lists of all the things you could ask about in your assignment subject - think of people and facilities and how the two come together. When you have decided what area you want to cover (choose three or four different topics to ask about) design a form so that everybody answers the same question and so that you do not forget to ask an important question.

2. Collect the information. Decide what your sources of information are - make a list and obtain what your sources have to offer. For your survey collect the information from your classmates. When you have got all the information you can then

3. Store the information. You will need to find a means of storing it (edge- punched cards are useful if you have no computer). Decide how to go about putting the information on to the card (plan it by using a planning sheet)or the order it will go in and then enter the information into the storage.

4. Retrieve the information. Make sure that you have entered it onto the card and punched the correct holes by testing it on single pieces of information which you know are right. Then try it with combinations of the information to see if it works.

5. Write about your System. First show it to others, including your teacher to explain how your system works, then put down in writing what it is about, how you analysed it (show all your lists and forms), collected the information and entered it into the store. Show how your information looks in store.

6. Explain your conclusions. What has your information system proved? What results have you obtained from it. Draw tables and diagrams to show the facts and figures you have obtained. Experiment with your system to produce more facts and figures. Explain how your system could be improved, and whether you think the information you have obtained from it is reliable.

If, at any time, you are stuck, ask your teacher.

A/P/2

Your Assignment on 'Television' information

In this assignment you are making a survey. You are collecting facts and figures from other people in the class about various aspects of television and then setting up an information system which will enable other people to retrieve and 'use' the information you have found. There is a lot of information about various aspects of television. These notes will help you decide what it is you want to write about and how to plan the work you will need to do to set up your system.

1. Forst of all, sit down and think about the problem. Use a piece of paper and a pencil to help you. Before you decide what to make a survey think what it is about television you could make a survey abput. Think of all the people involved, from the actors you see to, the people who watch television - there are a lot more of them. Try to make a list of all the people who may be in some way connected with television. What else is there? Try to list other aspects of television which you could do a survey on, things like make of set, type and the programmes people watch - there are lots of other things if you think. Now that you have made your lists you can see that there are lots of questions to ask. So decide on two or three different sorts of things you can ask questions about - it might be number of hours your classmates watch television and a few other things like that.

2. You have now made a first analysis of the problem. Now is the time for some action. You have decided what you want to collect some information about. To get this information you will have to design a form so that the questions you ask your classmates will be all the same. Design it with all the information you want and then obtain your information from them using the form. Get as much information as you can. Are there any other sources of information? Make a list of them.

3. So now you have your information - you need now to think about setting up your system so that others can use it when they want. For this you will probably use edge-punched cards. Get one and a form to help plan the information you are going to put on it. This is your storage. Enter the information into the storage and test it with single pieces of information. When you are sure that all your information is entered test it with combinations of information.

4. You have now set up a system for the storage and retrieval of the information you collected. Describe it to someone else or your teacher. Tell them what it is about and show them how it works.

5. You are now ready to write down what you have done. Explain what you are trying to do, show all your lists and forms to explain how you did it and write about your system and how it works.

6. Lastly write about your conclusions. What did you learn from your assignment and what do you think of the results. Explain the results, draw tables or diagrams to help others understand. Comment on the figures and facts you learned from processing the information you collected.

A/P/3

Your assignment on 'Dating'

What you are trying to do in this assignment is to match people who think along broadly similar lines and who you think would be 'right' for each other. There are many agencies who do this by computer and if you look at the adverts in the paper you are bound to see one of them. Your assignment will probably cover your class or school. These notes will help you to go about setting up your 'dating information system'.

1. First of all sit down and think - analyse the problem. To enable you to match up people you will need to know a lot about them. Make a list of the things about people you want to know such as colour of eyes etc and the opinions they have about things in general. Make sure it is a full list because this is the basis for all your future work. There are many items on it.

2. Next you need to collect your information. For this you will need to make out a questionnaire for people to fill in. What other sources of information have you? Make a list of the places and people you could find who would give you information on this subject.

3. Now that you have your information you need to set up your information system so that other people can use it. You will probably use an edge-punched card for this. Get one and think of how you are going to enter the information onto it - you will need a card for each person you have asked to fill in a form and to decide which holes need to be punched to represent which information.

4. Set up your information retrieval system - punch the holes in the cards and test it on single items of information after you have done this.

5. Now that your syatem works , ask someone else what characteristics they look for in another person and what they should think if they are to have the same opinions as themeselves. You can also put in questions as to what they should definitely not have if they want to date someone. You will probably have to design another form for this part.

6. With the requirements for a partner you have just obtained, try your retrieval system to see whether there is a partner for him/her. Try this on several people.

7. Now is the time to write down what you have done. Explain how you went about setting up your information system on dating - show the forms you have designed and the lists you have made. Explain how the system works

8. Write down your conclusions. This might include a table of the most 'compatible' pairs in the class. Say how you think your system might be improved.

Your Assignment on 'Information about Football'

A/P/4

There is a lot of information about football. You can't possibly write it all down, and so you will have to choose which things you want to do your information project on. Remember, it is an assignment about information, and football is the subject you have decided to get information about. The following notes will help you go about deciding what you want to do and how you might set about doing it.. What you want to produce in the end is an information system that others can use - to make the information you have found available to everyone.

1. First of all, sit down and think about the problem. Use a piece of paper and a pencil to help you. To help in deciding what to write about let's think about what we could write about on football. Think of people - write down all the people involved in the game from players who play it to people who watch it on the TV. There are lots of them ;starting with'players' write them down. Next, equipment. Write down all the equipment needed. Think of other lists you can make such as facilities; then make them. These should give you some idea of the things involved in football and allow you to choose what you want to do a survey of like the number of boys and girls in your class who watch Match of the Day. Decide on four or five topics that you can find information about, either from your class-mates or from other sources.(Make a list of your sources of information).

2. When you have done all this and made your decisions you have analysed the problem and now is time for action. You need to find your information. For surveys of other people you will have to design a form so that they can answer the questions by filling it out. Do this and collect all the information you can from all your sources. This is the information collection time.

3. Now that you have your information you need to think how to present it to the others. You might want to write something down, to draw a picture, to devise a table or a chart which shows your information. Think about this and how to present it. Discuss it with your teacher or with members of your group. If you are in a group share out the work, so that everyone is doing something different.

4. To set up your information system you will probably need to use edge-punched cards. Get one and think about which information is to go on it and how you will enter it. This is your information store. Enter the information into the store.

5. Use your knitting needle or pointer to make sure that it works, that you can retrieve information from your store. Show your teacher how it works.

6. Write down your information and how you went about devising your information system. Explain how you got your information and produce examples of the lists you used and the forms you made up. Show how your system works by diagrams or pictures.

7. Lastly write down your conclusions. What did you find out about the information you collected. You might want to present some tables showing your results. You will want to keep on using your retrieval system to produce them

ODULE 9 - Individual/Group/Class Information Assignments

Time Taken: 4 - 7 hours Broad Objective: To give children the opportunity to plan their own informa projects, to carry out their own surveys and to make the information they obtain accessible by others.

Outline of Module:

For the most part this is project work carried out by the children and so there are no individual lessons. The Teachers Notes give information and suggestions for projects, and there are also some individual help sheets for children doing particular topics. These are:

Your information assignment (for each child, offering advice on how to approach their topics).

Your assignment on 'Television' information.

Your assignment on 'Dating'.

Your assignment on 'Information about Football'.

In addition, you will need to have some edge-punched cards available and perhaps some computer cards for those who wish to be more daring. Info Processing Systems are operating at several local centres and these could be a useful contact for the processing of the information collected by the children, in that they offer a well-documented set of procedures for the use of the computer.

Perhaps also your local schools computer centre can offer help and advice on how to present and process assignment information. Many Colleges of Technology, Polytechnics and Universities give such help.

Lastly, there is no real need to use a computer in these assignments unless you really wish to and also have the facilities you need. Edge-punched cards often provide a highly acceptable, and more appropriate, medium . Or perhaps your children will use initiative and think of some entirely different way of solving the problem.....