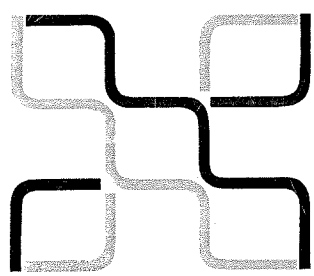
COMPUTERS AND PEOPLE



POLYCORP

New Zealand Limited

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COMPUTERS AND PEOPLE

C O N T E N T S

1 COMMUNICATIONS NETWORKS

1.1 Networks Meshing Society Together

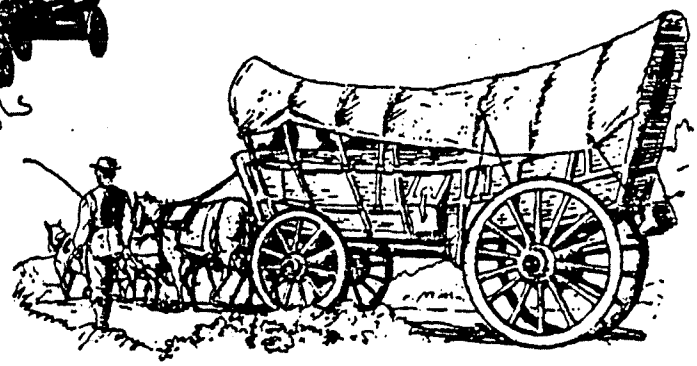
1.1.1 Society Laced Together

Civilization is made possible by communication in all its forms. Society is laced together by many networks. The methods of communication have become more complex as technology has developed and people have become more sophisticated. People communicate more often and faster than ever before. A brief look at three types of network follows:

1.1.2 Transportation Networks

Ancient

Bullock Team

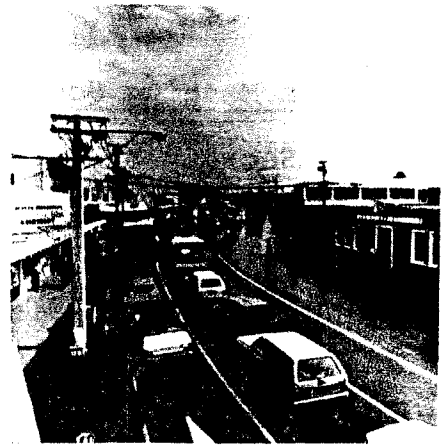


Horse

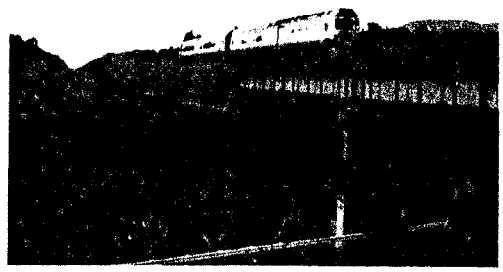
Foot

Modern

Plane



Car



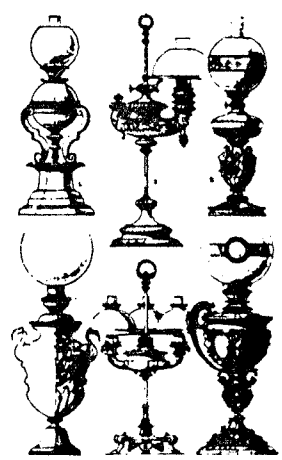
Train

Fast, cheap transport available world wide has broken the isolation of people and allowed the interchange of ideas and cultures.

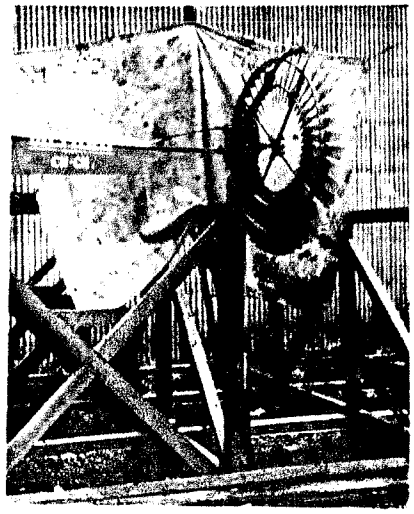
1.1.3 Utilities

Ancient

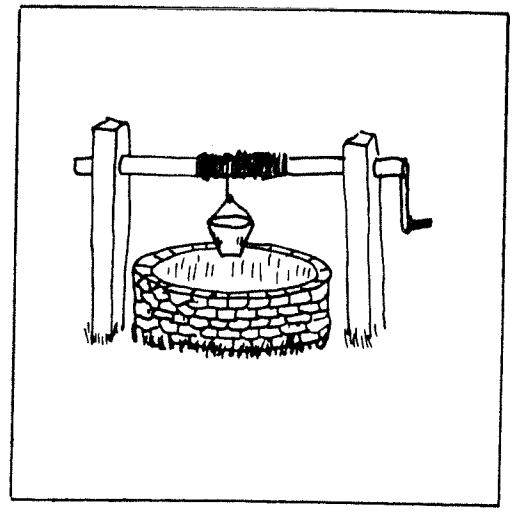
Fire



Lamps

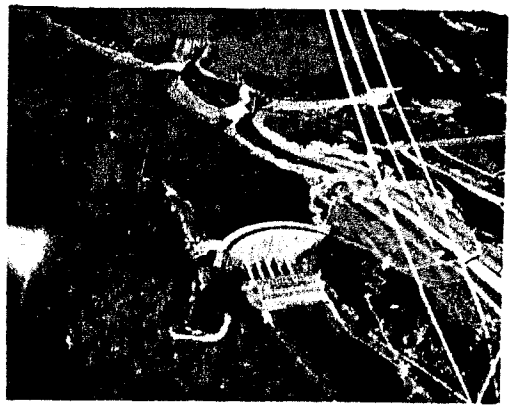


Water Wheel

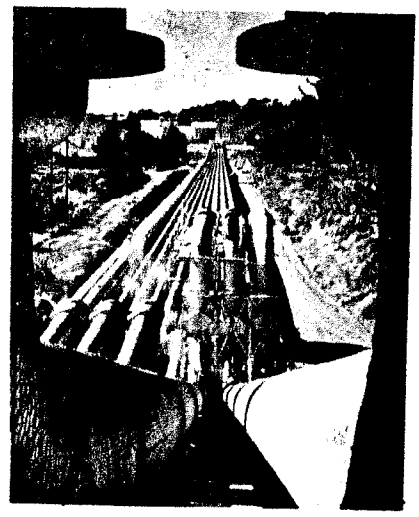


Well

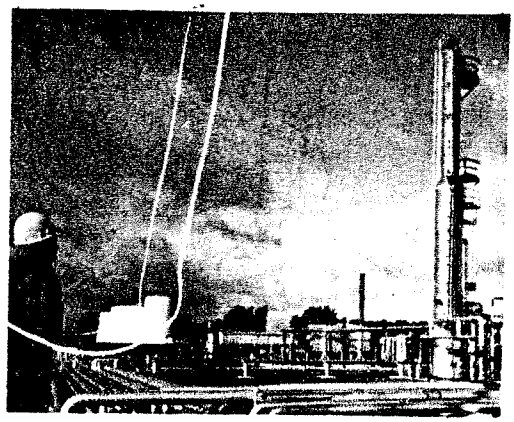
Modern



Hydro electricity



Geothermal power



Gas

Once utilities were independent unlinked resources.

- light	candle, lamp, fire
- power	fire, waterwheel, windmill
- water	wells, rivers
- sewerage	cesspits

Now utilities are a conglomeration of pipes and wires servicing home and factory. Our whole consumer-appliance orientated lifestyle is dependent on these networks.

1.1.4 Information Networks

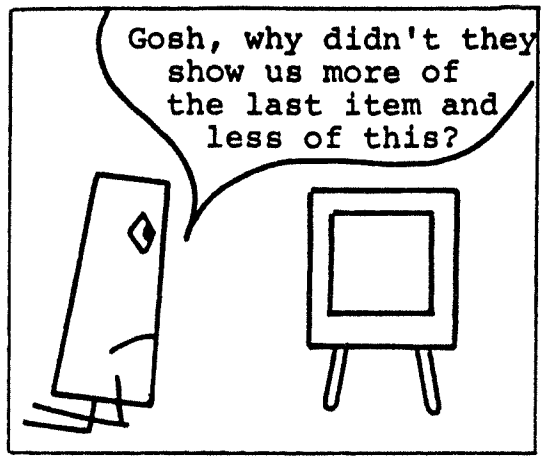
Ancient

Town Crier

Courier

Minstrel

In a customized news service the viewer would decide what was seen and the depth of coverage. View data can provide this service not only for news but also for entertainment and information.



- Electronic Meetings

At present it is often difficult to meet people who have similar interests and needs to your own. People prepared to share interests will be able to be put in touch with one another by computer networks.

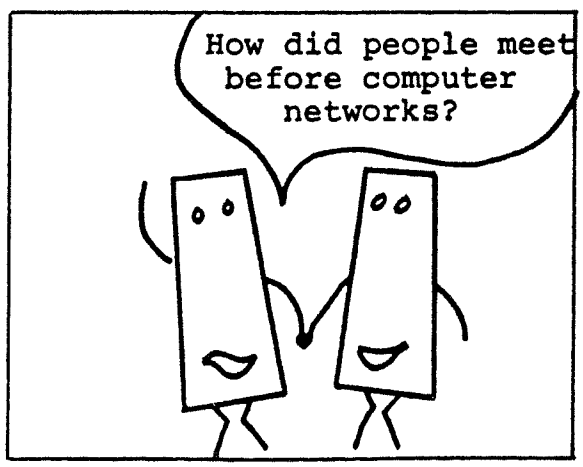
The possibilities include:

a Finding sports and hobby partners

b Finding a partner for a date

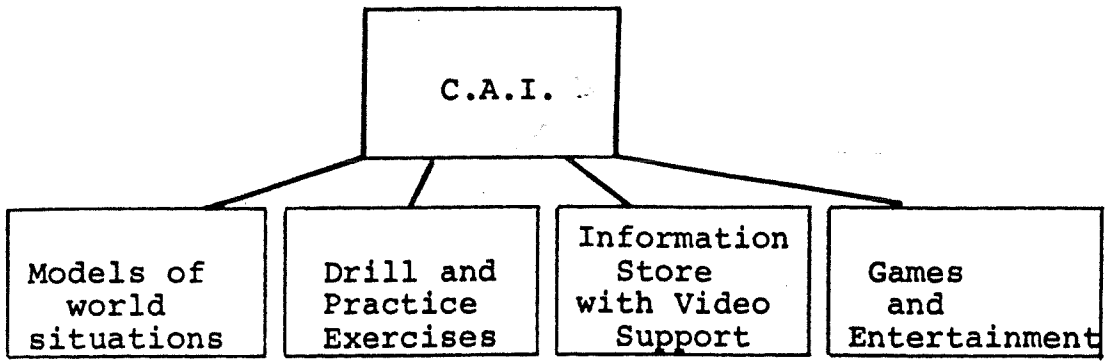
c Sharing personal problems and needs

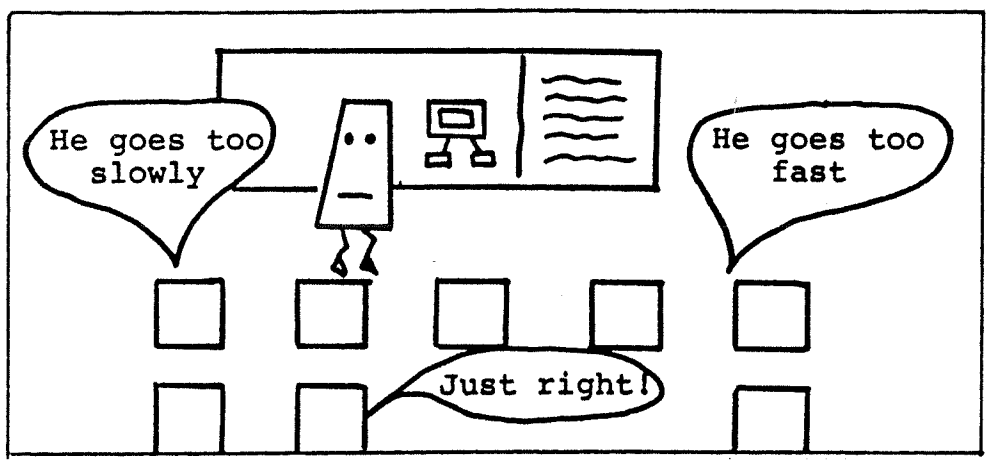
d Linking people who wish to buy or sell goods and services.



- Education - Computer Assisted Instruction (CAI)

Lessons are given to whole classes and are usually designed for the average pupil. Apart from discussion and project work most formal learning requires individual effort. School computer systems with video attachments to each terminal will allow teachers and pupil to design work programs for individual needs and interests.





Activities

1 a Make a list of the goods or services you know of that are customized now.

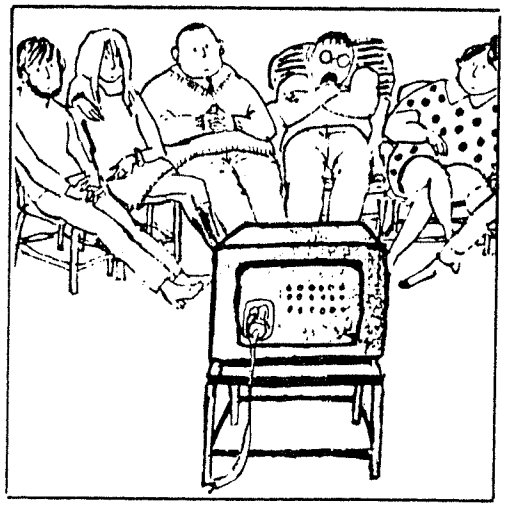
b What do people like to dislike about these items?

2 a Make a list of the goods and services the growth of computer networks will allow to be customized.

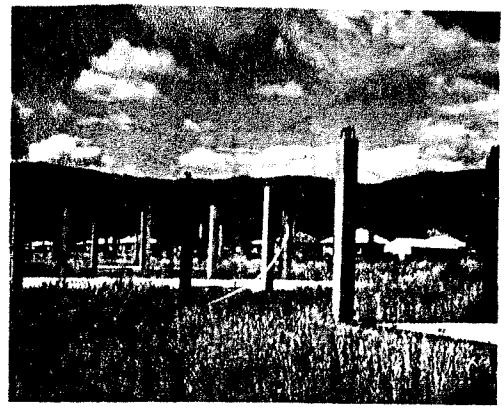
b Suggest advantages and disadvantages that will arise from the change.

3 Do you approve of customization replacing mass production?

Modern



Television



Radio

Satellite

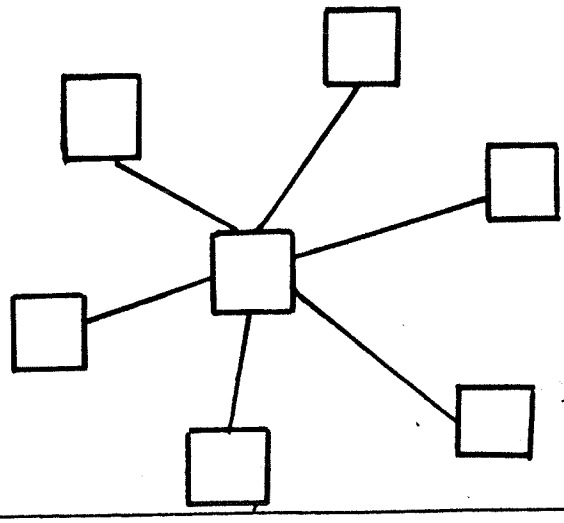
Telephone

Up to the mid-twentieth century, information networks could be divided into two distinct types:

- Mail, newspapers, magazines and books: printed on paper and delivered by people and physical transport or stored in libraries.

- Telegraph, telephone, radio and television: coded message, voice or image sent by waves through the air or by cable from person to person.

Modern technology is removing these distinctions and providing information users with new alternatives. The reason is the growing networking of computers by telephone lines, cables and microwave links.



A new network is starting to enmesh society.

The tentacles of linked computers are just starting to develop.

Activities

1 In the 1840's when New Zealand was first settled it took weeks for news of overseas events to reach New Zealand. Draw up a time chart showing how communication has improved.

2 Discuss the good and bad points about communication in society before newspapers, radio and television.

3 Find out how communication was carried out in traditional Maori and Polynesian cultures.

4 Discuss with your grandparents how radio, television and telephones have changed society during their lives.

5 Look at a local body plan for an area showing all the services - roads, wires and pipes.

1.2 Customization of Information

1.2.1 Customization

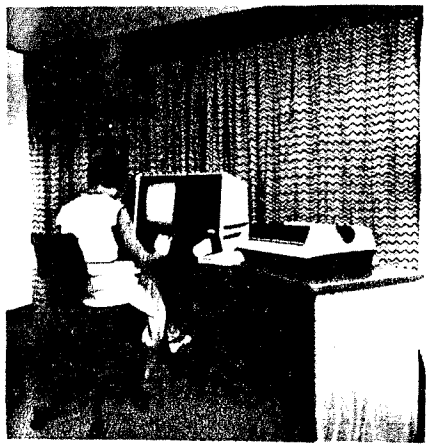
Customization means that a person can have a unique personal choice of a product or service. Today most products and services are mass produced and choice is limited. Computer networks will allow a change from mass production methods to personalized service.

1.2.2 Examples of Customization

- Electronic News

The television news is planned by a producer. Everyone sees the same news item regardless of interest. The time allocation and coverage of an item of news is decided for the viewer.

1.3 Word Processors



A word processor is a computer designed to do routine office tasks.

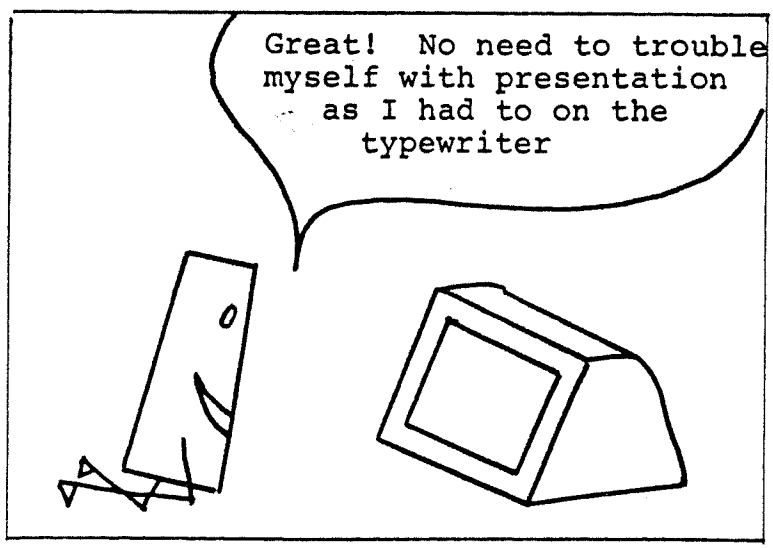
Some tasks carried out by word processing:

- Text editing

A passage of script can be typed into the machine in a rough form. Special symbols are used to tell the computer what the headings are and where new paragraphs start. The VDU allows changes, insertions and deletions to be made easily.

The computer is trained to edit the text and produce a copy type version. The grammar and logic of the item must be correct but the layout is machine controlled.

Some word processors have a dictionary of common words in memory. Spelling can be checked and corrected.



SAMPLE TEXT-EDITING PASSAGE

Unedited

@Text editing@ Text is typed ahd displayed on the V DU screen. *Corrections are made by backspacing an d overtyping. *Words or sentences can be inserted or re moved. *The computer presnts a copy version of the edited text. *This final form can be printed or stored or transmitted to another computer//

Edited

TEXT EDITING

a Text is typed and displayed on the VDU screen.

b Corrections are made by backspacing and overtyping.

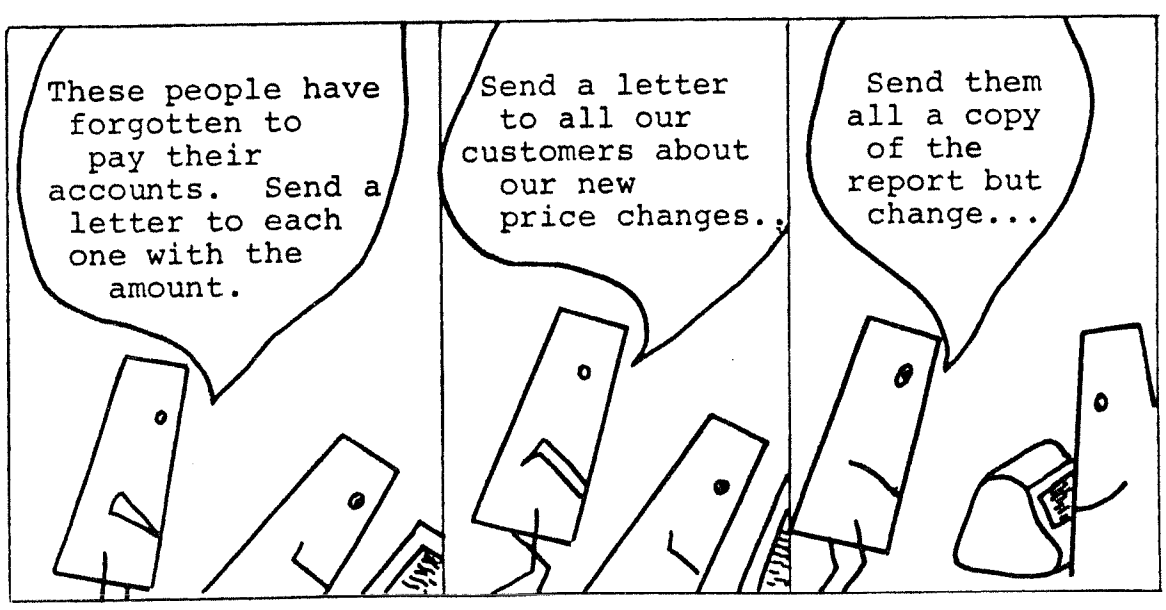
c Words or sentences can be inserted or removed.

d The computer presents a copy version of the exited text.

e This final version can be printed or stored or transmitted to another computer.

- Storage and Retrieval

Frequently used documents can be stored in the memory of the word processor. They can quickly be found by the machine as required and displayed on the screen. The text can have names and addresses added and be authored in any suitable way.



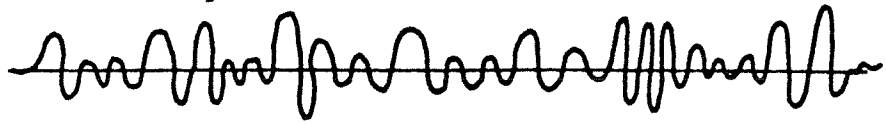
- Reproduction

An edited item can be printed out by the word processor in copy form. It could also be sent by electronic mail to another machine in a network.

1.4 Electronic Mail

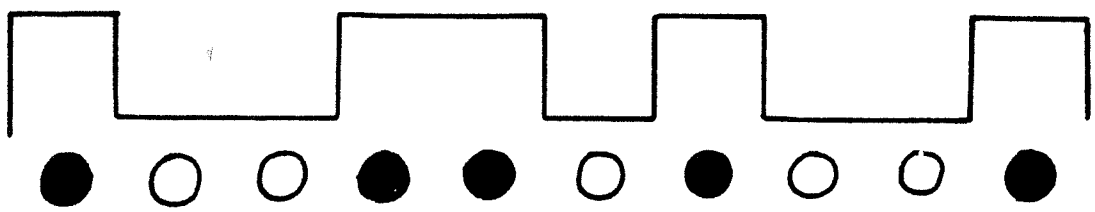
Information can be sent along cables in two ways, either as analogue waves or digital waves.

Sound moves through the air as waves.



These waves travel down telephone wires as electrical waves in the same way as through the air. The telephone lines are designed to carry these analogue waves.

In a computer, information is moved as a series of on and off pulses called digital waves



It is like a pipe with tiny balls travelling down it. Every ball is identical except some are black and some are white. The pulses are called bits. All information can be changed into an on and off code. Morse code is one example.

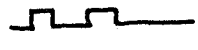
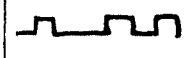
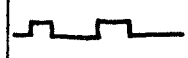
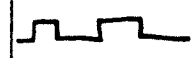
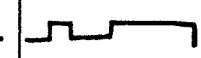
The computer changes each letter, digit or symbol into a code made up of eight of the digits 1 or 0. 1 means a pulse of electricity or a black ball flows. 0 means no electricity or a white ball.

The word "hello" shown in three different codes:

a As 1-0 code

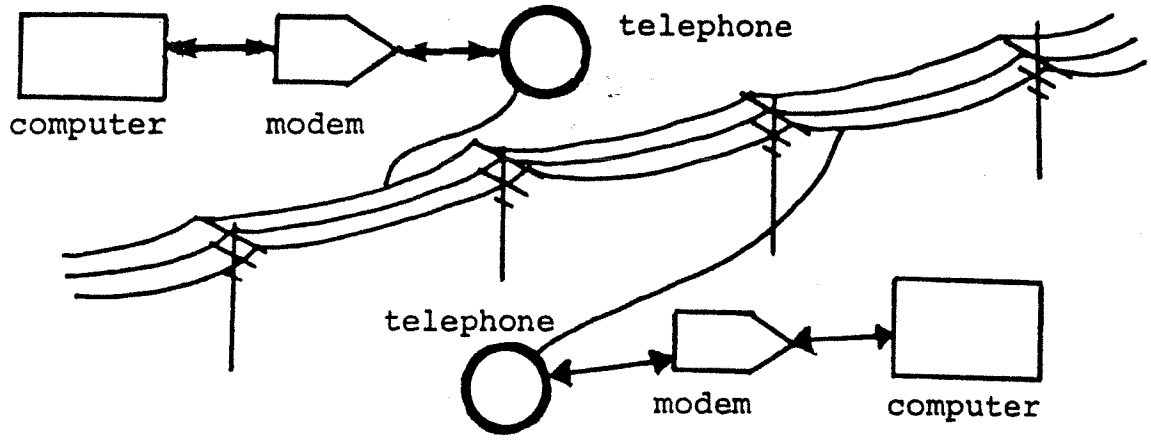
b As ⌐ on ⌙ off pulses

c A ● ○ balls in a pipe.

H	E	L	L	O
01001000	01000101	01001100	01001100	01001111
				
				

Present day telephone lines unfortunately are not designed to take digital on/off pulses. A device called a modem is attached and changes the pulses into an analogue form to suit the wires. A modem at the receiving end converts the waves back to computer usable form.

In time many networks will be renewed so they can carry digital pulses. Voice and video will be sent digitally. The method results in more accurate reception.



Two computers linked by public telephone lines

Activities

1 Speak to people who have worked in an office with and without a word processor. Find out the differences they have noticed.

2 Discuss the following suggestion:

"Electronic storage systems and electronic mail will replace paper".

3 Find out how morse code works.

1.5 The Future

As with all change there is the possibility of good and bad futures. Here are two extracts from well known books.

- A good future

This extract is taken from: 2001: A Space Odyssey by Arthur Clarke

There was plenty to occupy his time, even if he did nothing but sit and read. When he tired of official reports and memoranda and minutes he would plug his foolscap-sized Newspad into the ship's information circuit and scan the latest reports from Earth. One by one he would conjure up the world's major electronic papers; he knew the codes of the more important ones by heart, and he had no need to consult the list on the back of his pad. Switching to the display unit's short term memory, he would hold headlines and note the items that interested him. Each had its own two-digit reference; when he punched that, the postage-stamp-sized rectangle would expand until it neatly filled the screen, and he could read it with comfort. When he had finished he would flash back to the complete page and select a new subject for detailed examination.

Floyd sometimes wondered if the Newspad, and the fantastic technology behind it, was the last word in man's quest for perfect communications. Here he was, far out in space, speeding away from Earth at thousands of miles an hour, yet in a few milliseconds he could see the headlines of any newspaper he pleased. (That very word 'newspaper', of course, was an anachronistic hang-over into the age of electronics.) The text was updated automatically on every hour, even if one read only the English versions one could spend an entire lifetime doing nothing but absorb the ever-changing flow of information from the news satellites.

It was hard to imagine how the system could be improved or made more convenient. But sooner or later, Floyd guessed, it would pass away, to be replaced by something as unimaginable as the Newspad itself would have been to Caxton or Gutenberg.

There was another thought which a scanning of those tiny electronic headlines often invoked. The more wonderful the means of communication, the more trivial, tawdry or depressing its contents seemed to be. Accidents, crimes,

natural and man-made disasters, threats of conflict, gloomy editorials - these still seemed to be the main concern of the millions of words being sprayed into the ether. Yet Floyd also wondered if this was altogether a bad thing; the newspaper of Utopia, he had long ago decided, would be terribly dull.

Activities

1 List the advantages and disadvantages of Floyd's newspad over today's newspapers.

2 Draw a design for how you believe a newspad would have to look to be useful.

3 Find out how close technology is to developing a newspad like Floyd's.

4 Newspapers are economical for the public because they have advertising. Personal information systems without advertisements would be very expensive.

a Find out from your local newspaper what it would cost the public to have a newspaper without advertising.

b How could computers be used to provide the service classified advertisements do today?

- A Bad Future

This extract is taken from: Nineteen Eighty-Four by George Orwell

George Orwell wrote Nineteen Eighty-Four long before computers were developed.

"... Behind Winston's back the voice from the telescreen was still babbling away. The telescreen received and transmitted simultaneously. Any sound that Winston made, above the level of a very low whisper, would be picked up by it; moreover, so long as he remained within the field of vision which the metal plaque commanded, he could be seen as well as heard. There was of course no way of knowing whether you were being watched at any time. How often, or on what system, the Thought Police plugged in on any individual wire was guesswork. It was even conceivable that they watched everybody all the time. But at any rate they could plug in your wire

whenever they wanted to. You had to live - did live, from habit that became instinct - in the assumption that every sound you made was overheard, and, except in darkness, every movement scrutinized.

Winston kept his back turned to the telescreen. It was safer; though, as he well knew, even a back can be revealing. A kilometre away the Ministry of Truth, his place of work, towered vast and white above the grimy landscape."

Activities

There is a saying:

"A man's home is his castle".

a What does this mean?

b In the extract from Nineteen Eighty-Four, how has a man's home been invaded?

c With computer networks just starting, what laws are necessary to prevent the situation described in Nineteen Eighty-Four from becoming possible?

Self Check

1 What networks lace society together?

2 How has improved transport changed society?

3 How has the improvement in utilities changed society?

4 How have improved information networks changed society?

5 How is the computer changing information networks?

6 What is the customization of information?

7 What is a word processor and what does it do?

8 What is electronic mail?

Project Starters

1 What is the history and the future of office work?

2 What is the history of the use of paper? What is the future of paper for books, newspaper, mail?

3 What is teleprocessing?

2 LEISURE

2.1 What is Work and What is Leisure?

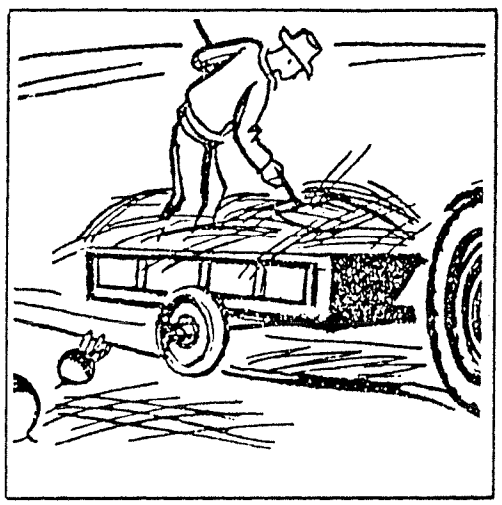
For many people, the answer to the question 'What is work, and what is leisure?' goes something like this:

"Work is earning a living, and leisure is the free time left over".

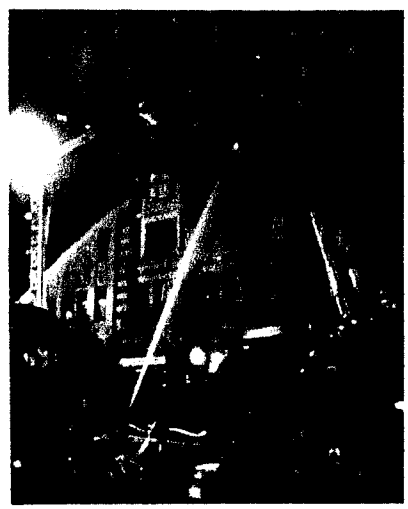
This type of definition is too simple and demonstrates the high value put on a career and money. This is a cause of many of today's social problems. A three-fold division is more useful.

Sector A

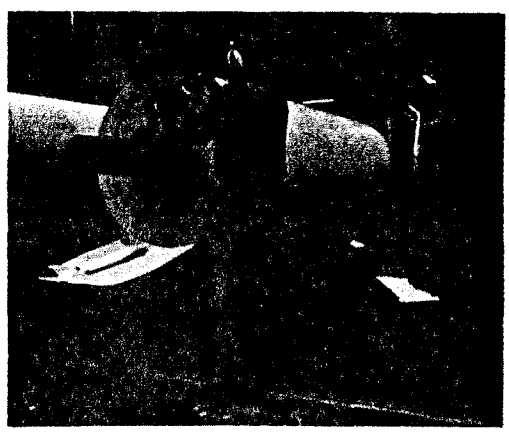
Employment in the production of goods and services for sale or exchange in the market place.



Farm Production



Service



Factory Production

Sector B

All the unpaid work done by people for themselves, their families or their communities.

Family Care

Welfare Work

Home Maintenance

Sector C

The time when people are free of routine and able to pursue their own interests.

Hobbies

Sport

Tourism

2.2 The Value Society Places on Employment

2.2.1 Unemployment

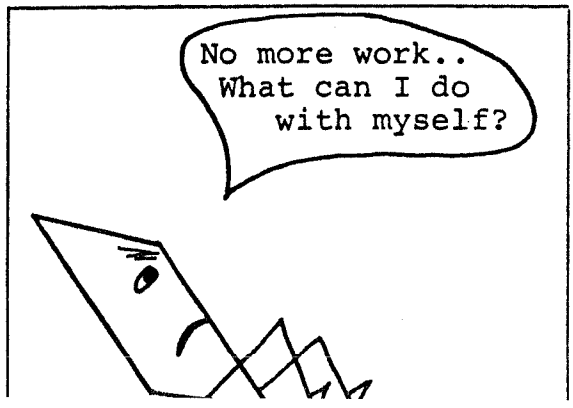
In our modern society sector A, working in a career, gives people money and status. People judge the success of themselves and others by their job and material possessions. Although people talk about and sometimes crave for more leisure time or time to do jobs for themselves, when in fact this time is forced upon them many of them are very unhappy.

a "Unemployed" persons often discover that empty hours day after day are demoralizing.

b Hard working people can dream of retirement and the bliss of doing nothing. They are disconcerted to find themselves bored and listless. Some even give up and soon die.

c Some people dream of winning or inheriting wealth. A little investigation soon finds the rich striving for stimulation and excitement.

Unfortunately, temporary relief can often be found in alcohol, drugs and violence followed by the disastrous consequences for the individuals and their victims. Other people develop mental illnesses and live lives that are far from rewarding.



2.2.2 Unpaid Work

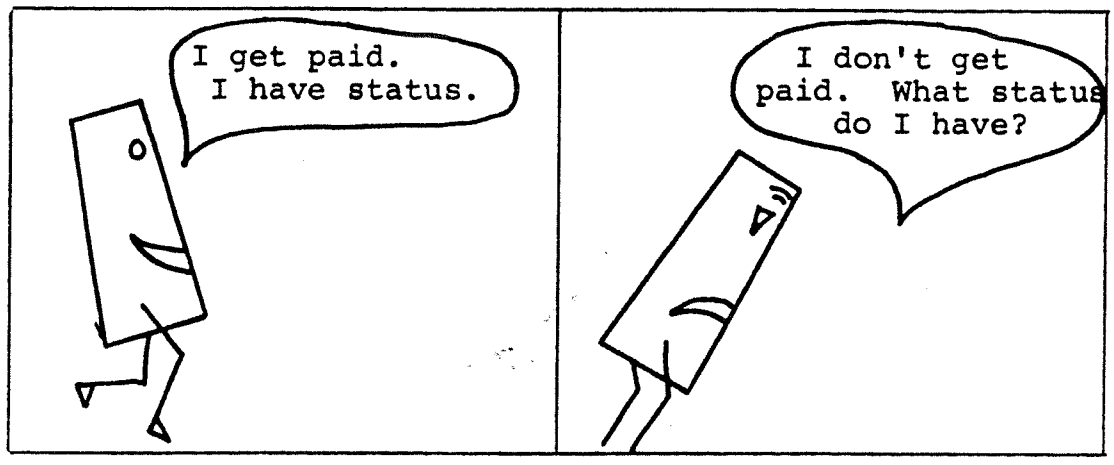
In our society unpaid work is not highly valued.

a The housewife restricted to the home and dependent baby can grow resentful. Urban neurosis is a result of feeling bad about oneself and one's place in the scheme of things.

b The volunteer worker who may do much to help patch up the ills of society is 'filling in the day'. There is no comparison with the doctor or nurse.

c The self sufficient handyman who can maintain the house and car, perhaps even grow most of the household vegetables may seem a little selfish. He is denying paid people the work.

The division of status for paid and unpaid work has developed greatly since the industrial revolution. It is interesting to look at other cultures and see that both types of work were integrated and that status and feelings of self worth were gained in different ways.



2.2.3 The Work Ethic

Society has a feeling that people should work as hard as possible. "The devil makes work for idle hands". To relax or to do something one enjoys is a luxury earned only after work and a repayment of a debt to society.

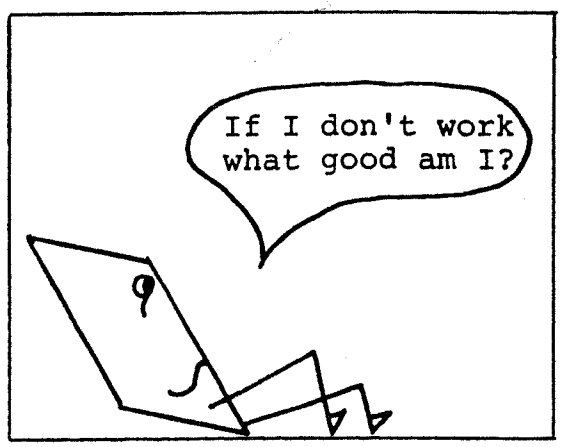
New technology certainly means that:

a Working hours will become shorter.

b The age for retirement will lower.

The very sector A that is so prized is changing rapidly. People will spend more and more time in the less valued sector B and C activities.

Some people may never work in the traditional sector A sense. Clearly if this is the case, the values society puts on work and the status people gain from it must change.



Activities

1 Under the two headings work and leisure make a list of the various day to day activities you do.

See if a friend agrees with your ideas of what is work and what is leisure.

2 Find out what gave people status in traditional Maori or Polynesian culture.

3 Speak to an unemployed young person and find out how they feel about life.

4 Speak to a retired person and find out how difficult it was for that person to adjust to retirement.

5 Discuss or debate:

a "A woman's place is in the home".

b "The devil makes work for idle hands".

6 Put yourself in the place of a disabled person. How would you feel if you had to get all your money from a pension?

2.3 Growth of a Leisure Industry

Increased leisure time will allow new industries to grow to cater for people's needs. This industry itself will provide new employment opportunities. Some of these commercial ventures are already established in the fields of:

a Entertainment

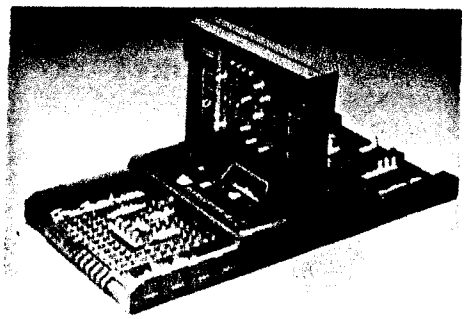
b Tourism

c Games and hobbies

d Arts and crafts

Professional sport will grow together with the services to present it to the public.

Travel, tourism and outdoor pursuits will need a vast increase in resources of equipment and people.



A vast variety of electronic games such as computer battleships can be expected on the market.

People will have the opportunity to be more involved in art, music and handicrafts.

Activities

1 Make a list of jobs that are available now to cater for people's leisure time.
How could more jobs in these areas become available if people have more leisure time?

2 Invent some new leisure activities that could entertain or educate people in a leisure society.

3 Suggest ways the world could be made more beautiful.
Why are many people concerned about damage to the environment of our country?

4. If you were to have a job in the leisure industry:

a What job would it be?

b How would you expect it to change in the next 25 years?

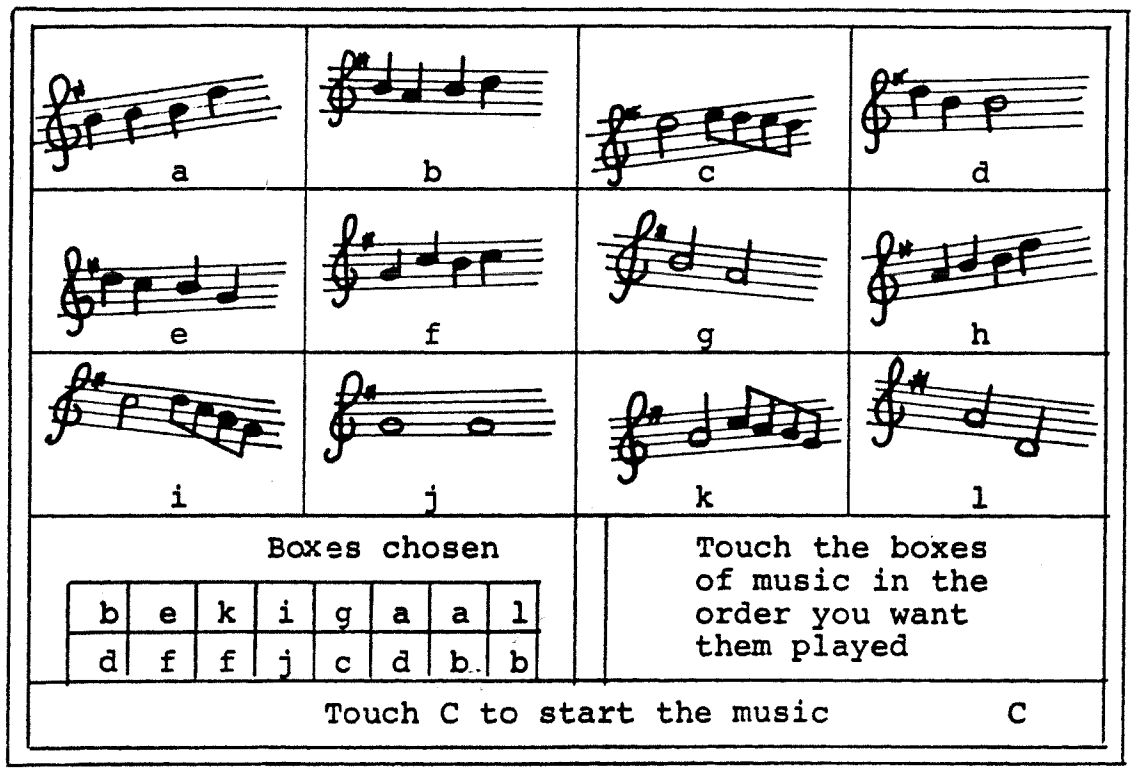
2.4 Computer Help with Leisure

The computer itself will be a resource available to people to help make leisure activities meaningful. In activities that require creativity people have different talents. Few people are great musical composers, poets or artists. The computer can be programmed to help people according to their abilities.

2.5 Examples of the Computer Used to Help Creativity

2.5.1 Simple Music Aid

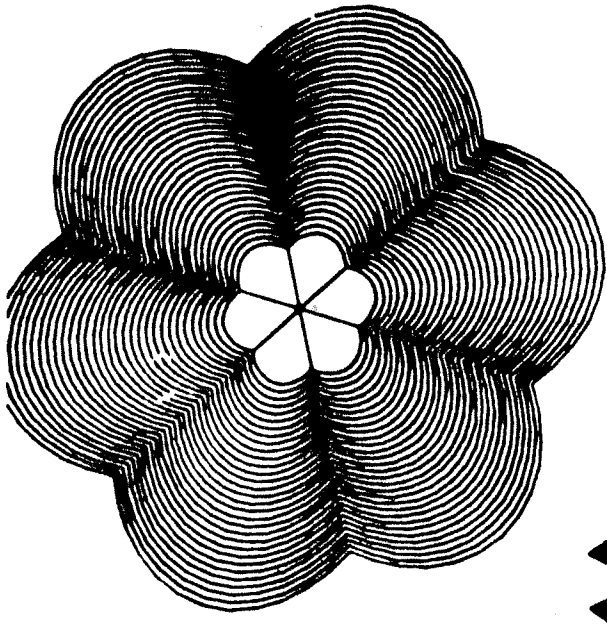
Few people have the ear to compose music. The computer could provide phrases of music. These could be played in any order by the computer as the user asked. The user could develop a pleasing tune by ear.

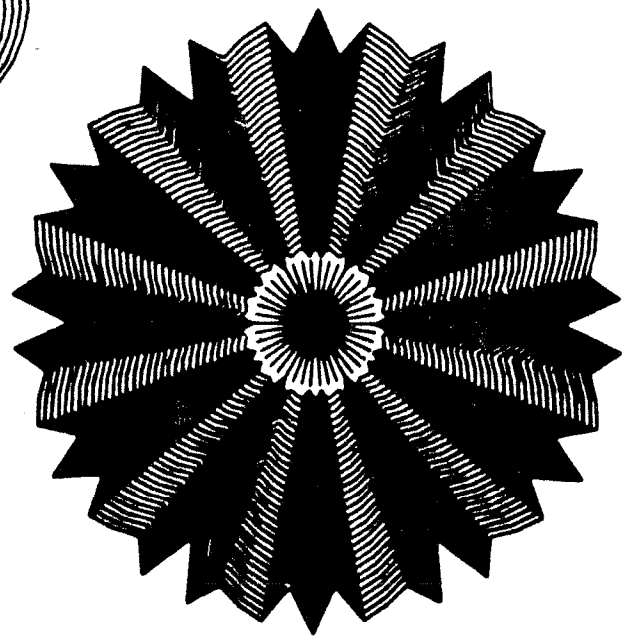


2.5.2 Computer Artist

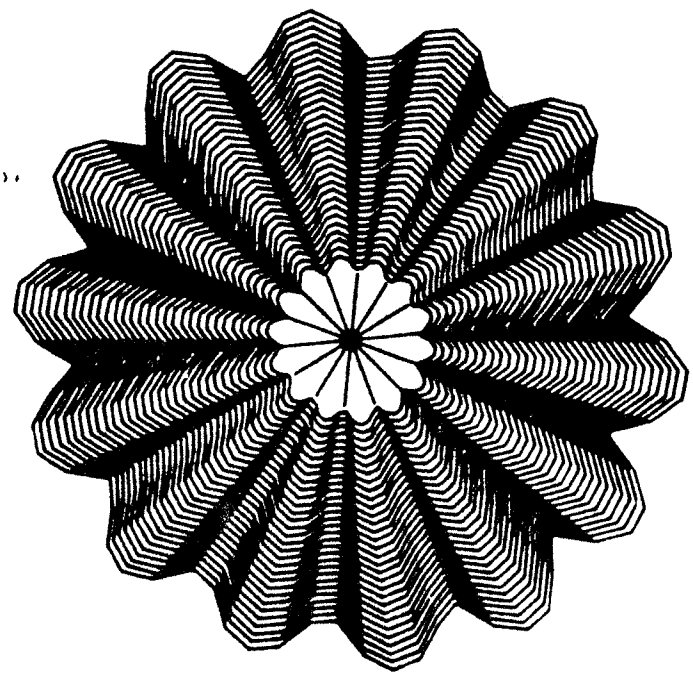
The computer can create and display designs. The variety possible is infinite. To plan the designs shown here you would need to have done Sixth Form Mathematics.

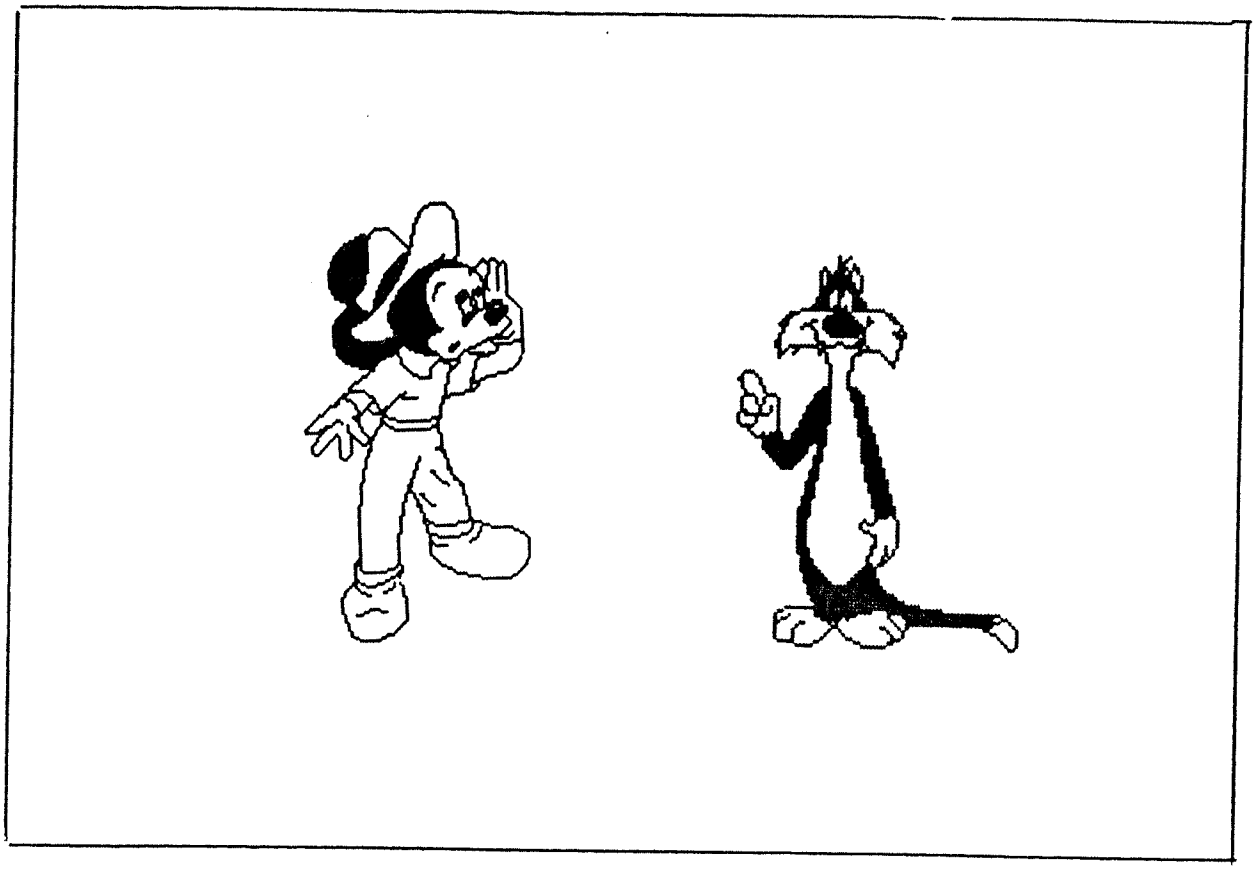
Grapefruit, continued...



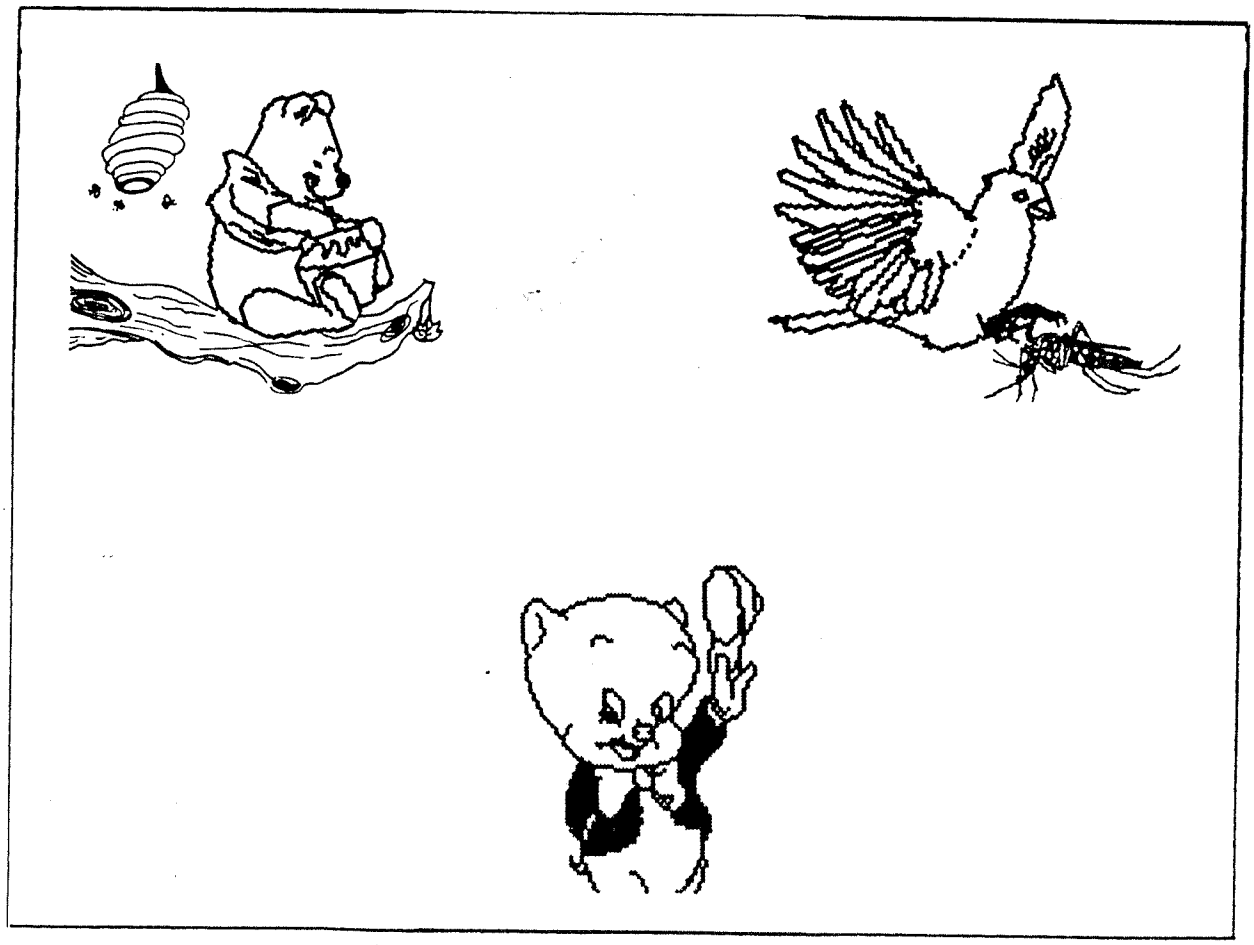


```
99 REM FLUTED SCALLOPS
100 PAGE
109 SET DEGREES
110 WINDOW -501,501,-501,501
111 VIEWPORT 15,115,0,100
112 PAGE
113 PRINT "ENTER L"
114 INPUT L
115 PAGE
120 FOR B=100 TO 400 STEP 10
130 FOR A=0 TO 360 STEP 5
140 GOSUB 180
145 IF A>0 THEN 150
146 MOVE X,Y
147 GO TO 160
150 DRAW X,Y
160 NEXT A
170 NEXT B
173 GO TO 211
180 R=B*(1+0.25*ABS(SIN(L*A)))
190 X=R*COS(A)
200 Y=R*SIN(A)
210 RETURN
211 FOR N=0 TO L-1 STEP 1
212 R=100
213 T=N*(180/L)
214 X=R*COS(T)
215 Y=R*SIN(T)
216 MOVE X,Y
217 X=R*COS(T+180)
218 Y=R*SIN(T+180)
219 DRAW X,Y
220 NEXT N
221 END
```





Interesting computer pictures can be made by using the graphics symbols on the computer keyboard. The drawings are usually planned on squared paper first and then entered into the computer a line at a time.



2.5.3 Robotic Ear

Training a computer to understand or write English sentences is one of the hardest programming tasks yet to be completely solved. English is a very complicated language.

a There are rules for placing words correctly in a sentence.

b There are rules for understanding themeaning of a sentence.

Examples of difficult sentences:

a A correct but meaningless sentence:

"The sharp corners on the round table".

b A correct but ambiguous sentence:

"George kicked the bucket".

c A garbled sentence:

"Kissed, the horse, the girl".

A robot trained to accept commands would have to have the following:

a A Dictionary of words it could understand

b All the sentence structures it would understand

c Training to obey a particular structure.

Examples of structures and sentences:

a

Keyword	Verb	Preposition	Article	Object
Robot	turn	to	the	left

b

Keyword	Verb	Preposition	Noun	Object
Robot	go	to	room	A

c

Keyword	Verb	Adverb
Robot	come	here

When a command was received the computer would have to:

a Scan each word

b Find the word in the dictionary

c Find the word's part of speech

d Find the correct sentence pattern

e Carry out the command by following the program for the sentence pattern using the verb and object in the command.

2.5.4 Computer Poet

When writing a sentence the computer would:

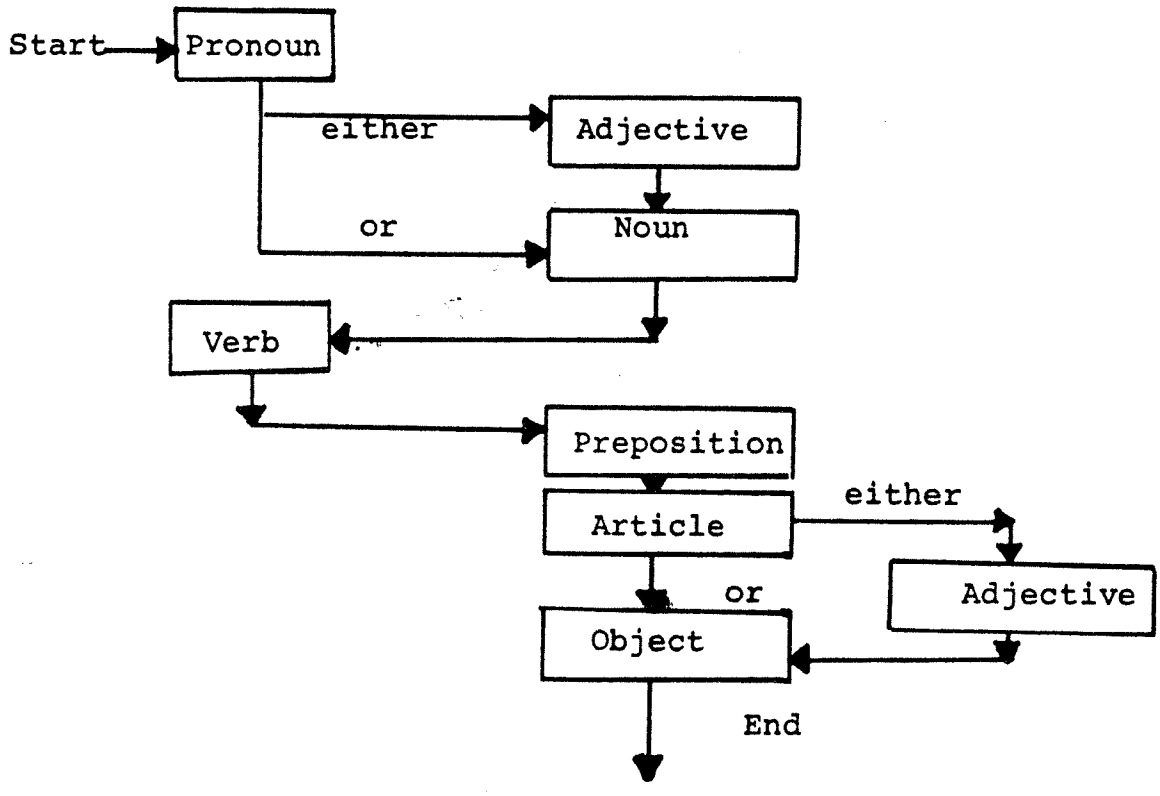
a Use a sentence structure

b Pick out from the dictionary words that fit the parts of speech in the sentence structure

c Write the sentence.

Here is an example of a possible sentence structure, dictionary and love poem.

Structure



Dictionary

Pronouns or Equivalent

1	Your	2	Love's	3	Hope's
4	Joy's	5	Dream's	6	Life's

Adjectives

1	Shining	2	Glowing	3	Sweet
4	Delightful	5	Fair	6	Hot

Nouns

1	Eyes	2	Figure	3	Radiance
4	Togetherness	5	Caresses	6	Beauty

Verbs

1	Glows	2	Beats	3	Lives
4	Throbs	5	Goes	6	Dies

Prepositions

1	Under	2	In	3	On
4	Near	5	From	6	Close

Articles

1	The	2	A

Object Nouns

1	Sigh	2	Bliss	3	Body
4	Sky	5	Nature	6	Oneness

Love Poem

Life's shining beauty dies in a sigh,
Your sweet figure beats near a fair nature.
Hope's figure glows near a dark body,
Joy's fair beauty lives under a sky.
Your figure lives in a sweet body,
Dream's radiance goes from a oneness.

The computer chooses each word at random. This is like tossing a die and choosing the word in the list corresponding to the die number. The computer has a list of random numbers built into its memory. When the computer has a choice of paths it does this at random too. Half the time it goes one way; the other half of the time the second way.

Activities

1 Use the poem structure, the dictionary and a die to add lines to the love poem in the text.

2 Find out what a random number table is.

3 Some people already may have a lot of free time to pursue an interest or it may be part of their employment. Discuss the positive effects of free time with some of the following:

a A professional musician

b A potter or other creative craftsman

c A professional sports coach.

4 "Leisure has to be earned". This is a widespread opinion.

a A musical instrument cannot be learned without practice.

b National sports people must put in hours of training.

Find out more about these ideas.

Decide if creative or sports activities are 'play'.

5 World famous pianist Arthur Rubenstein used to practice 8 hours every day. Somebody once said to him that nobody would know if he didn't practice. He replied: "If I didn't practice for one day I would know; If I didn't practice for two days my family would know; If I didn't practice for three days the whole world would know".

Comment on this statement.

6 The computer as an information store will be able to help people with leisure. Suggest how the machine could help with:

a computer dating

b activities and hobby partners

c sports information and ranking

d travel information and reservations.

2.6 The Need for Leisure Education

Suppose the computer revolution occurs as predicted and the mass of poeple are freed from drudgery and fear of poverty. Wealth can be created under computer control. People find they do have vastly increased leisure time. Will people know how to use this time constructively? People need satisfying creative interests and not just entertainment. People must have means of confirming and enhancing their humanity.

Many people fear that a leisure society will be a horror rather than a blessing. They write of television-fed zombies, drop outs, malcontents, and idle well-fed drones. The rapid rise in the last decade of anti-social behaviour in police statistics certainly seems to confirm this possibility.

The ability to use leisure constructively must be learned. Some people think that the ability to use leisure must be learned at school as a subject. Many teachers believe that at present leisure education is developing piecemeal as an extra, added on if there is room somewhere in a timetable.

Leisure Education Activities

1 Decide what is important in your leisure time. From the list:

a Choose the five most important needs for you.

b Are you meeting these needs and how?

c If a need is not being met, how could this be remedied?

It is important:

1 To do something meaningful
2 To be physically active
3 To be committed to something
4 To keep busy
5 To do lots of different things
6 To relax and take it easy
7 To do something different from everyday work
8 To be entertained
9 To be free to do what you want
10 To make and carry out plans
11 To compete with others
12 To compete with yourself to do better
13 To use your skills

14 To improve your skills

15 To have something to show for your efforts

16 To get approval for what you do

17 To be successful

18 To have a feeling of confidence

19 To learn about yourself

20 To have a personal friend

21 To be with groups of people and teams

22 To meet new people

23 To develop friends

24 To help others

25 To laugh and enjoy life

26 To be in attractive places.

2 Design your future home including facilities for leisure.

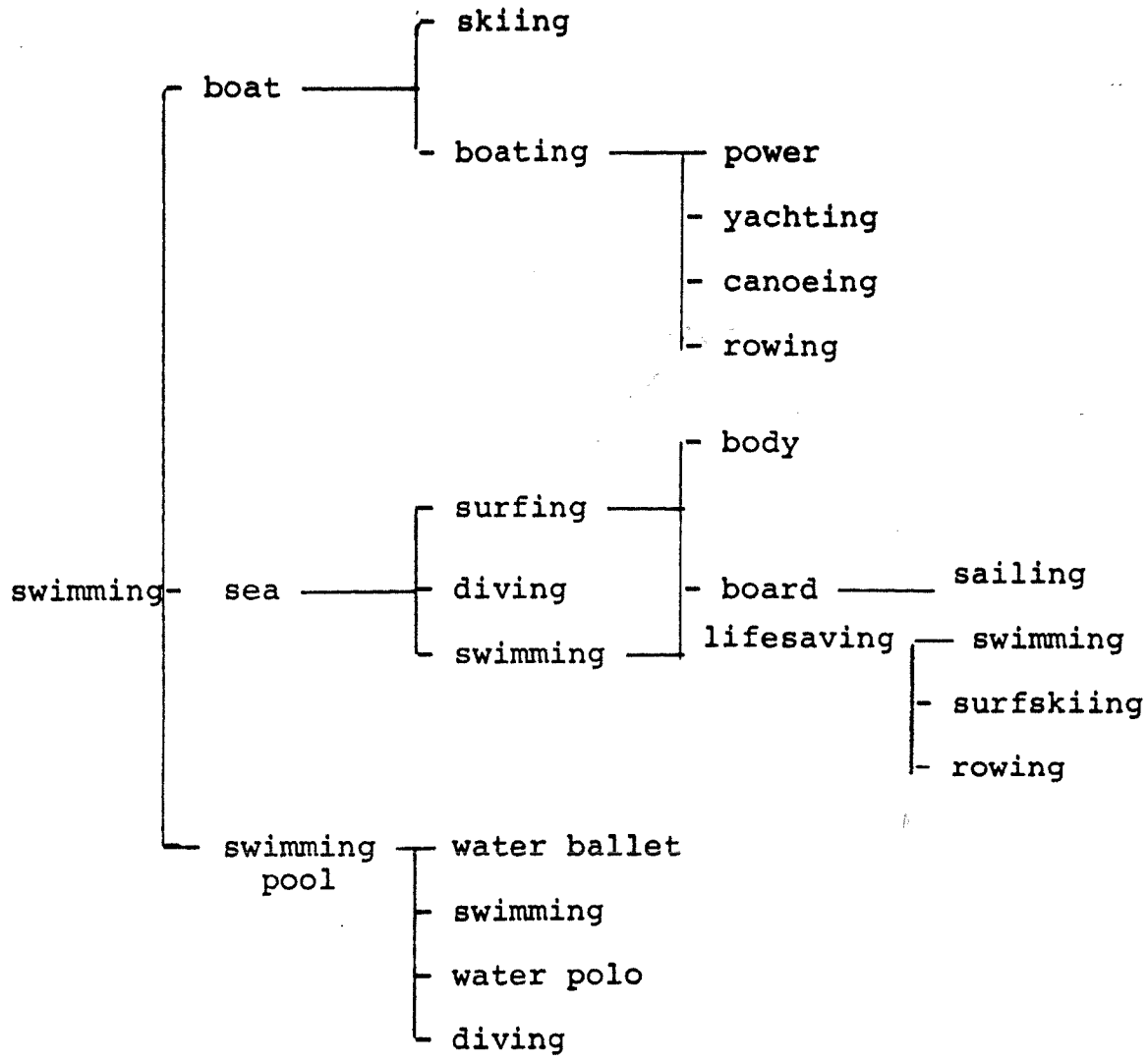
Design a housing suburb that has leisure activities.

3 Ask your grandparents or parents how they spent their leisure time when they were young. Predict how your children might spend their leisure time.

4 Plan a week's full time leisure imagining that you are unemployed permanently.

5 Find out about work and leisure in other cultures and times.

6 Look at the leisure tree for swimming.
Colour the activities you have tried.
Make a tree based on another skill you are interested in.
Have you experienced many aspects of the skill or just a few?

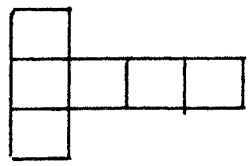


Activities

1 Find out how crime statistics have grown in the past decade.

2 Find out what your school is doing towards leisure education. Discuss ways in which leisure education could be improved.

3 Make yourself a leisure cube out of cardboard.



Hang it in your bedroom

a On one side paste pictures of leisure activities you enjoy.

b On one side paste pictures of leisure activities you have never done but would like to try.

c One one side paste pictures of leisure activities you would like to be involved in when you leave school.

d One one side paste pictures of leisure activities you would like to try but have not yet got the skills to do.

Self Check

1 What is work?

2 What is leisure?

3 Why is leisure education needed?

4 What is the leisure industry?

5 How can the computer assist people with leisure?

6 Why are unemployed people unhappy?

7 Why do many retired people take a long time to accept their freedom?

8 Why do many wealthy people work?

9 What type of work does society value most?

10 Why could increased leisure time be a problem for society?

Project Starters

1 Write two short stories or cartoons about the future:

a Increased leisure time has created a more interesting society where people live exciting, meaningful lives without serious ills.

b Increased leisure time has created bad social problems. People are unhappy and suffer from violence, drugs and mental illness.

2 Describe the growth of one of the following in New Zealand - professional sport, tourism, entertainment.

3 THE IMPACT OF COMPUTERS ON WORK

Situation Vacant

Filing Clerk

Qualifications sought:

Photographic memory capable of storing and retrieving multiples of 10 000 separate documents in seconds. Instant reprinting of all retrieved material a definite advantage. Intelligence and adaptability, must be able to be linked to existing computer. 24 hour availability. No coffee breaks, no sick leave, no holidays, no complaints. Must be self monitoring, self motivated and never seek pay increases.

NBR
7/4/80

3.1 Occupations in Change

It is impossible to forecast accurately the effect computer technology will have on jobs. Enough is known from overseas experience to predict trends. A few examples are given:

3.1.1 Professions

Doctors, lawyers, accountants and other professional people are trained to give specialist service. Even so, many aspects of professional jobs are routine; suitable for computerization.

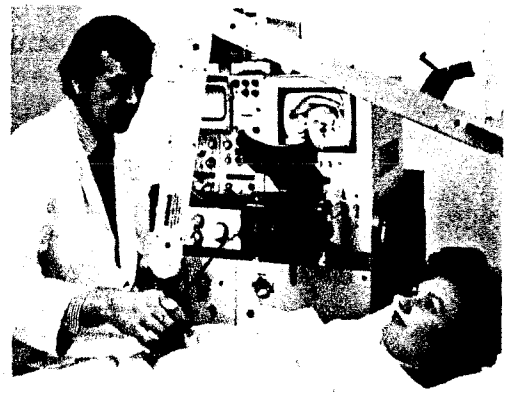
Work processors can do routine legal work with documents. Researching case histories can be very efficiently done using the computer's ability to use indexes and cross references.

Medical diagnosis and record keeping are suitable computer jobs. Patients may even prefer to be interviewed by an impersonal machine and be assured a doctor's appointment is really necessary. The equipment doctors are using is changing as

microprocessors are included.

pre 1900's hospital

1970's hospital



A body scanner
An example of Computer Controlled Therapy

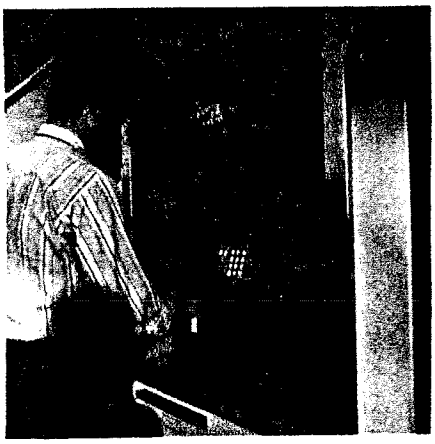
3.1.2 Retailing and Banking

In supermarkets bottlenecks tend to occur at the checkout counters. The checkout operator must punch prices and details into the cash register. Money must be taken and change given.

Point of sales terminals assist with stock control and the arithmetic of working out the customer's bill.

Systems already exist where product coding can replace price tags. Products pass before a robotic eye at the checkout. The product is recognized and the price automatically put onto the bill.
Credit cards can pay for the goods electronically.

Once all aspects of shopping involved face to face contact between customer and shop assistant.



The Northern Building Society was the first organization to use electronic funds transfer for the public.

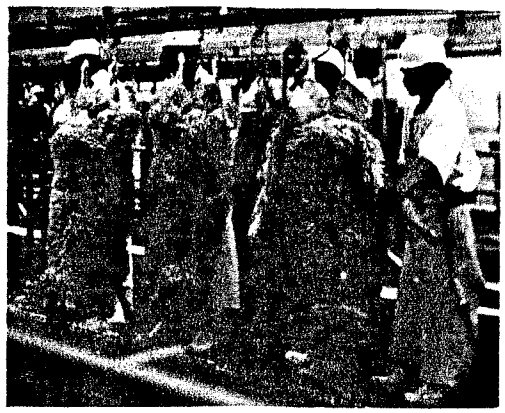
In the future a society without cash is possible.

Many transactions of banks and insurance companies will be handled electronically.

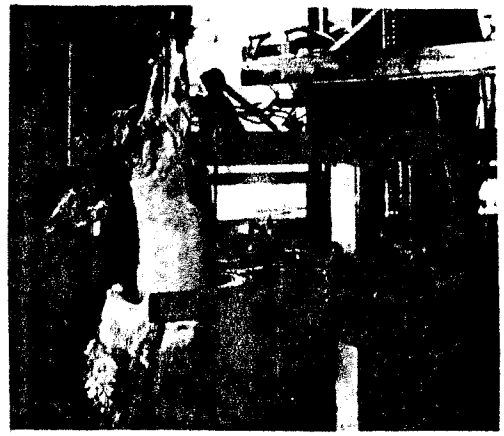
The service given by people will mainly be advice.

3.1.3 Manufacturing and Assembly Processes

Industries such as motor car assembly and the freezing industry are rapidly being automated with microprocessor technology. A human skill is no longer necessary.



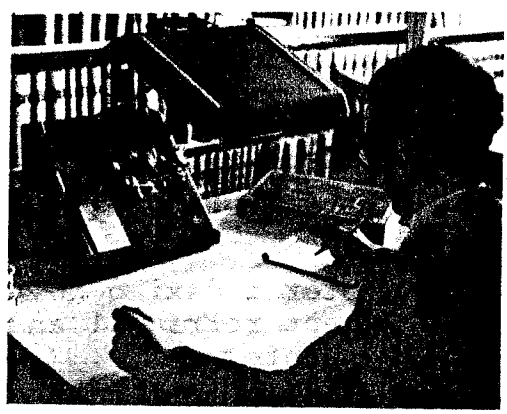
Slaughterman/Skinner
A specialised task



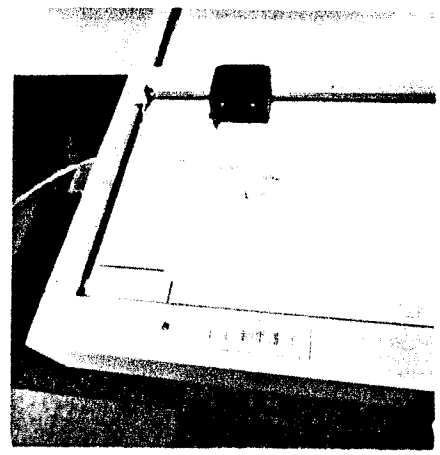
Slaughterman/Skinner
Computerized task

3.1.4 Drafting

Microprocessor controlled drafting machines are available. Human ideas and planning are still necessary to give data to the machine. Traditional drawing skills are not essential.

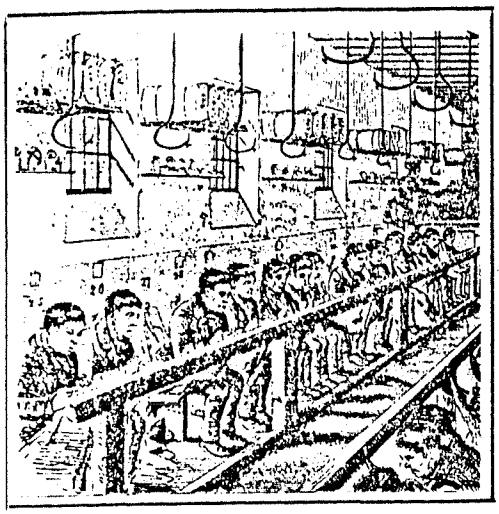


Draughtsmen at
work



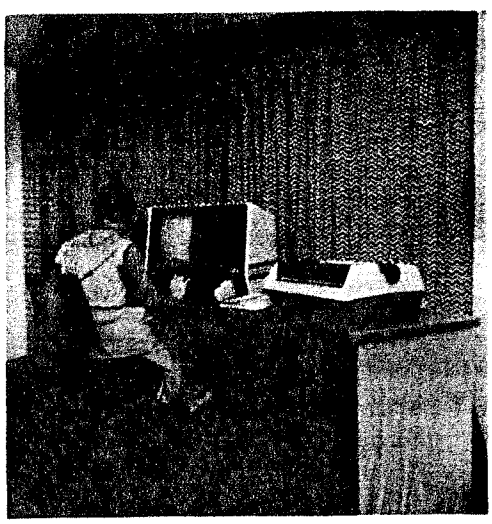
Graph plotter
attached to a
computer

3.1.5 Clerical Work



One hundred years ago office work was done in cramped conditions.

In modern times office work became a more important task in business. People processed a lot of paper work. In this situation many workers performed similar repetitive tasks.



Word processors are replacing typewriters. Microfiche storage systems or electronic data banks are replacing paper files.

Computer indexing helps document retrieval and cross referencing. Computers handle accounting systems. Electronic mail replaces post office and courier services.

3.2 Employment Changes

There is considerable disagreement about the effect new technology will have on employment. Some people think many jobs will disappear and there will be a lot of unemployment. Other people feel there is a great opportunity for new types of job and full employment.

3.2.1 Job Destruction

Jobs can be lost in two ways:

a Redundancy

People are replaced by a machine.

b Silent Job Elimination

People who already have a job are able to perform more tasks and therefore new staff are not taken on.

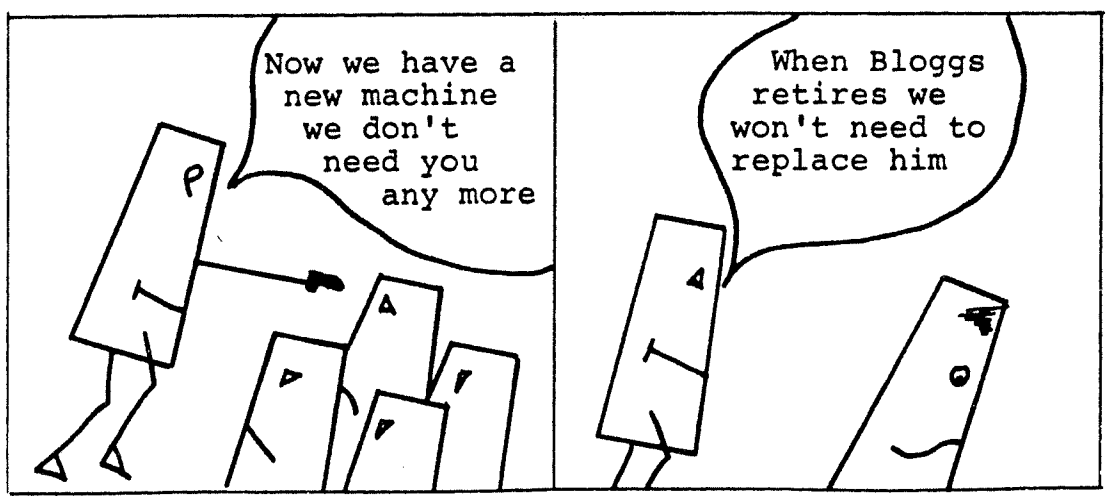
Examples:

If New Zealand follows international trends between 1980 and 1990 some 10 000 jobs in finance and banking will disappear.

In the United States a report to Congress stated that 75% of Post Office workers will be made redundant by electronic mail.

In Britain the computer industry has reduced its staff levels by 20% over five years by using new technology in manufacturing computers.

Labour and Unemployment Gazette
Volume 29 No 3 Sept. 1979



3.2.2 Job Creation

There are areas where jobs could be created by the introduction of computer technology. Entirely new products using microprocessors could be invented.

The Labour Department reported in 1979 that:

"There are now over 10 000 computer-related jobs in New Zealand and this number is expected to grow by 10% per year. In fact, production of software - the written instructions to the computer - presents a real growth opportunity for New Zealand. Its population is well educated and already some of the technology is exported.

Microprocessor technology will also result in more new jobs with computer installation, maintenance and development".

Example:

... Up to 500 000 people can expect to have job changes in five New Zealand industries in the next 30 years because of the effect of new technology.

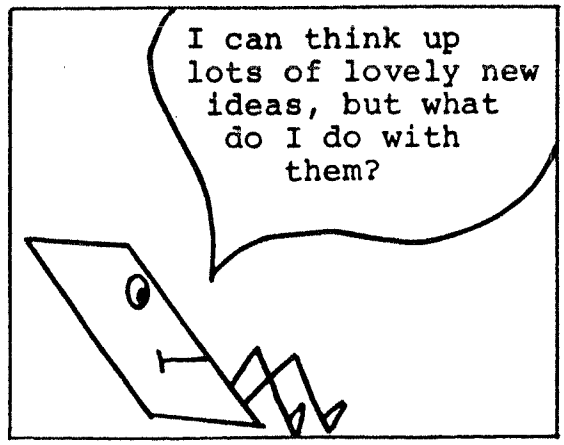
The five industries are:

manufacturing
transport
storage
communications
financial and insurance

... The challenge to New Zealand is that of a great opportunity to create new industries, a variety of lifestyles and more free time to use one's energies creatively as one wishes, supported by an adequate income to look after creature comforts ...

... Failure to meet this challenge must lead to massive unemployment and social disharmony.

(An adaptation from J F Duncan - "Redeployment of the Work Force Consequent on the Introduction of Microprocessors")



Activities

1 Suggest some new products or processes New Zealand could use and export.

2 How can New Zealanders with good ideas for new products or processes get them assessed and put into production?

3.2.3 Changes in Job Skills

In the past many jobs were complicated and the skills needed to do them took many years to learn. This usually meant that a person chose a job and made a career out of it.

Trandespersons would complete an apprenticeship and then stay in the same type of work doing the same tasks for the rest of their lives.

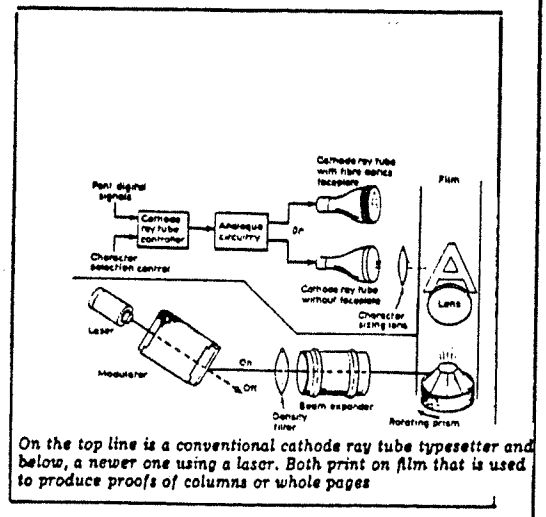
Doctors, lawyers, and architects would expect some changes in the knowledge they used. (New medicines, new laws, new materials etc.) However, the initial university training in the basic skills of the profession were expected to last a working life.

Computer technology may reduce the need for skills and the length of training required. Machines will have the skills built into them. Once computers were mysterious and only very clever people used them. Now the skills of a secretary are generally sufficient.

Example:

The Printing Industry - With the linotype operator you had to have a long apprenticeship. With the latest technology a secretary can learn to use modern equipment in two days.

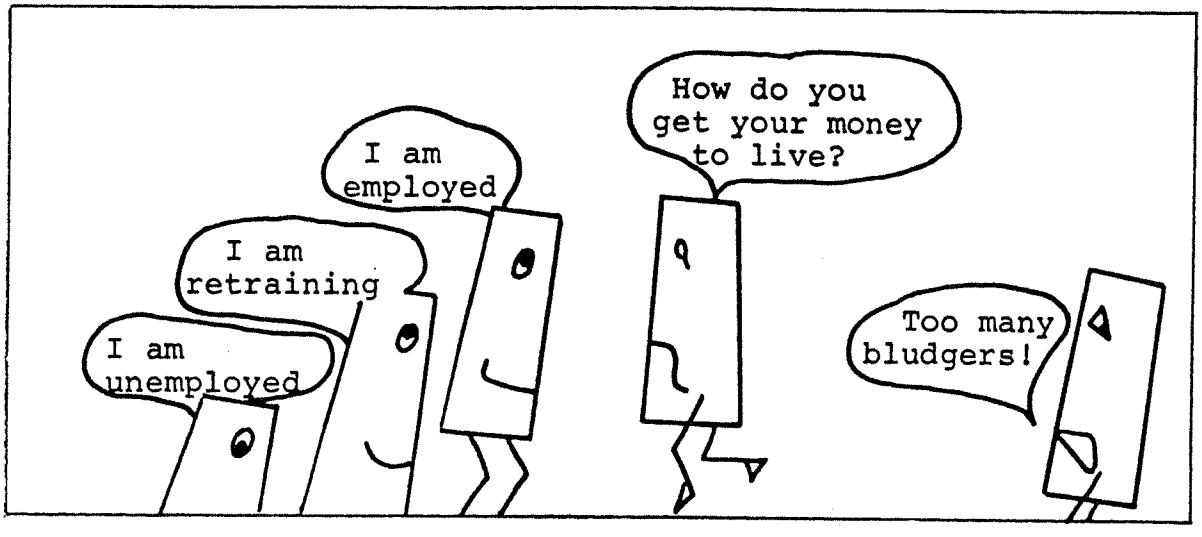
Old linotype machine



On the top line is a conventional cathode ray tube typesetter and below, a newer one using a laser. Both print on film that is used to produce proofs of columns or whole pages

Computer Typesetting

Instead of thinking in terms of a career in a particular field lasting 40 years, people may have to think of several jobs. A working life made up of periods of employment, periods of unemployment and periods of retraining. Some method of providing an income during unemployment and retraining will have to be found.



Activities

1 Discuss the following claims:

a Unemployed people are bludgers

b New technology which replaces people in dangerous, dirty and heavy jobs is sensible.

c Working at a VDU is unhealthy. There is eye strain, headaches, backaches, and fatigue.

d Computers reduce the social contact people have with one another in the work place.

2 Suggest jobs where the new technology is causing boring repetitive and unsatisfying work which formerly needed initiative in the routine.

3 Imagine you are an employer of skilled tradespeople.In the past your main concern was to employ highly skilled workers. List other things you would look for now in your job applicants.

4 Some people have always worked from home. (Freelance journalists, farmers, some shopkeepers ...) Find out from such people the advantages and disadvantages of this type of work.

5 Many jobs have always had refresher courses as part of the job. (teachers, doctors ...) Most jobs now require regular courses and retraining to keep up to date. How do you feel about the idea of having to continue to learn after you have left school?

6 complete the table by listing jobs in the spaces.

	Likely to be changed by computer technology	Unlikely to be changed by computer technology
Professions		
Technicians		
Trades		
Manual skills not requiring advanced education		

3.3 Industrial Relations

Resistance to new machines has always existed. The most famous example is the Luddites. In 1810-12 workmen in England under a mythical leader "King Ludd" destroyed textile machinery which they saw as threatening their livelihoods. Poor, hungry and desperate people felt their very existence endangered. Harsh government legislation followed.

History shows that in most cases of worker resistance to machines, it was not the opposition to the machines themselves. It was opposition to:

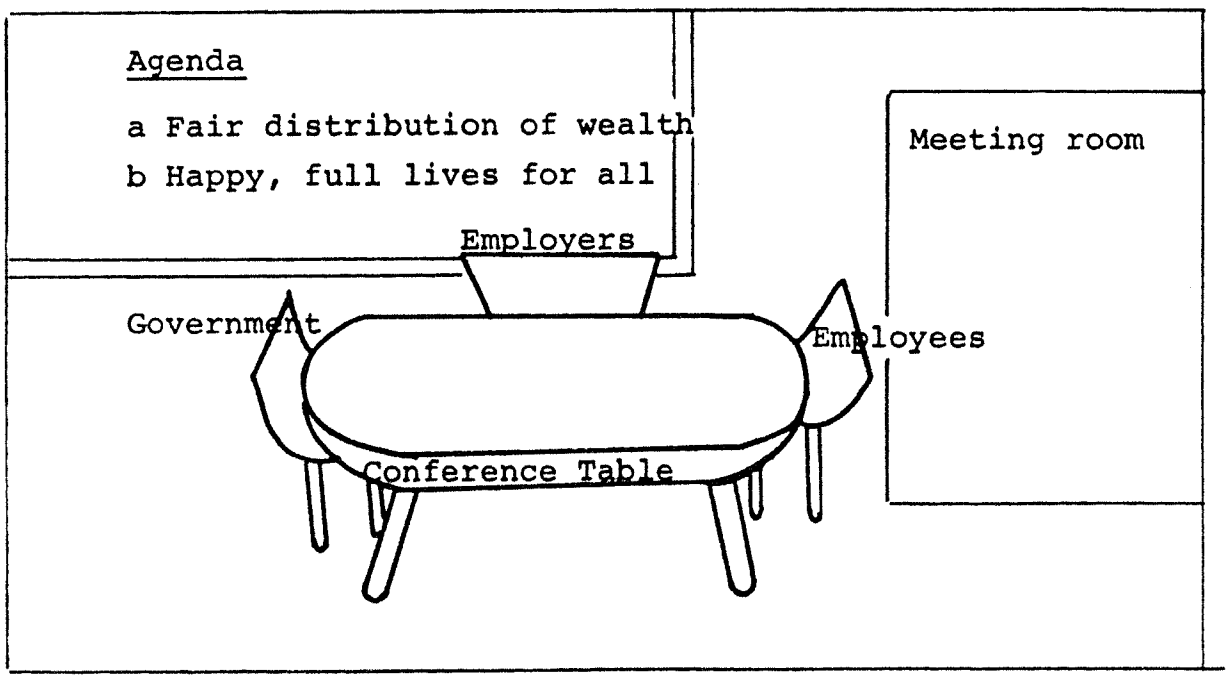
a The uncaring, unthinking way they were forced into the work force.

b The disruption caused to lives and livelihood and the resulting misery.

The questions then are:

a Have government employers and employees learned enough from history to work together to avoid violent social upheaval resulting from computer technology?

b Can a means be found to fairly share the wealth computer technology could bring among all people?



Activities

1 Work in groups to research and prepare a "role play debate".

One group to take the role of computer salesman.

One group to take the role of union representative.

One group to take the role of employer.

After deciding on a stand to take, have one representative from each group role play a debate about the introduction of computer operated machinery in a factory.

2 Divide into groups of three. Role play the issues illustrated in the industrial relations cartoon above.

3 Choose a career you are interested in and assess the impact of the computer on it.

4 a What part do unions have to play in the introduction of new technology?

b How can the unions ensure that workers benefit from new technology?

5 Discuss this advertisement that introduced this unit.

Why do you think it was written.

3.4 Example of a Job in Change - Design and Colour Schemes

It is possible to make a colour chart using a computer with a colour screen. The basic colours can be mixed in varying quanitites on the screen. Colours that appeal can then be stored in a colour chart in the computer's memory.

An example of the screen for mixing colours.

The procedure is:

a Touch the colour required

b Touch the quantity required:

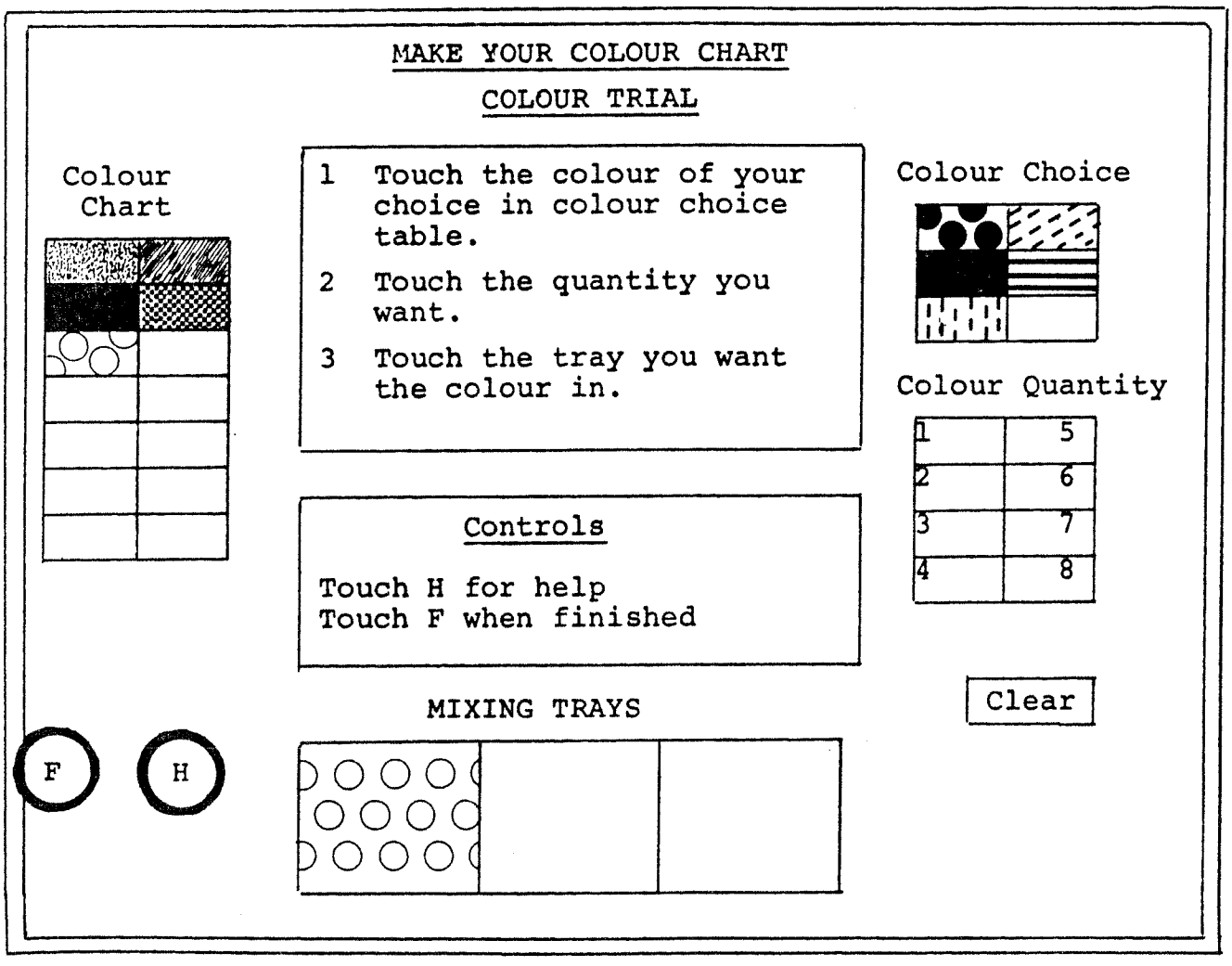
1 for a touch of the colour, up to
8 for a lot of the colour.

c Touch the tray the colour is to be put in.
The new colour is automatically mixed with any already there.

When a colour is to be stored:

a Touch the colour in the mixing tray

b Touch the place it is to be put in the colour chart.



The colour chart could be used to design a colour sheme for a house. The house plan can be put onto the screen and colours added to various areas.

Self Check

1 Name a few jobs and list the many changes that computers are causing in them.

2 What is redundancy?

3 What is silent job elimination?

4 What possibilities are there for computer technology resulting in new jobs?

5 How are job skills being changed by computers?

6 What does history show as causes for violent reactions to new machines?

7 Why do some people feel unemployed people are bludgers?

8 What is job retraining?

Project Starters

1 What is the history of union involvement in industrial relations?

2 Trace the causes and effect of worker opposition to new technology during the industrial revolution.

3 Interview local employer and union officials and find out their attitude to the introduction of computer technology and the effects on people.

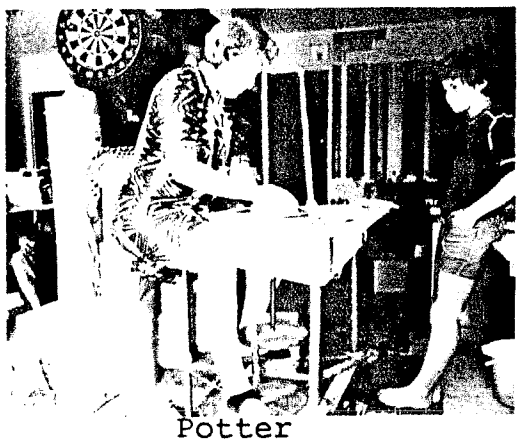
4 Interview Members of Parliament from each political party and find out their policies on the introduction of computer technology and the effects on people.

4 IMPACT ON THE FAMILY

4.1 Changes in the Family due to Industrialization

During the 1700's and 1800's great changes took place in the lives and work of people in several parts of the world. These changes were called the Industrial Revolution.

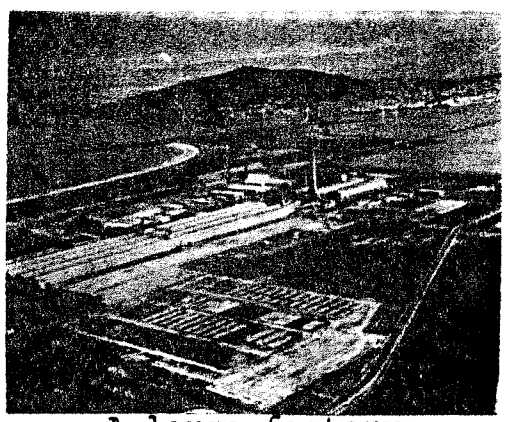
Prior to the revolution, most families were involved in agricultural work. Manufacturing was done by hand or simple machines. Craftsmen worked at home, usually in small villages. This was the Domestic System of manufacturing. The few articles each family produced were bought by merchants for resale, in market places or at other homes during the merchant's travels.



Potter

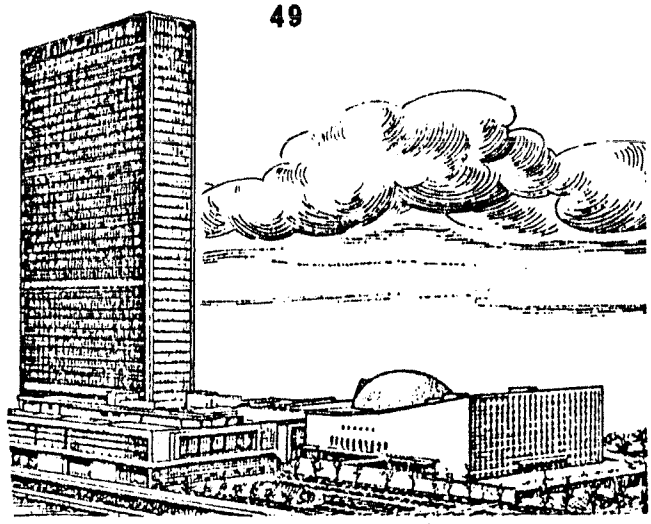
Some people like this potter are able to work at home today. They either have a room inside their house or a studio in the garden where they work.

The Industrial Revolution changed this way of life for most people. Cottage industries were replaced by factories. Power driven machines replaced hand craftsmanship. Mass production replaced goods produced individually. Factories and offices developed as the best way of bringing together machines, workers, and the means of marketing goods and services.



A large factory

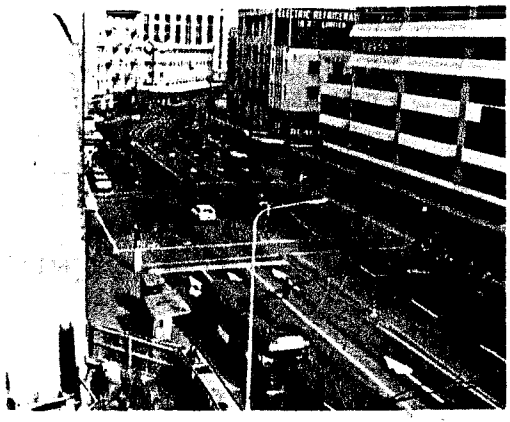
Modern society has big cities, mass transportation, small families, mass education.



A large, modern office block

Most people think of factory and office type work as normal. However, it is a way of life with big cities, mass transportation, mass education and small families quite different to life styles in non-industrial societies.

Before the Industrial Revolution less than 10% of people in Europe lived in cities. The rest of the population lived in small towns and villages scattered across the countryside. Now about 90% of the people live in cities and large towns and only a few people live in the countryside.



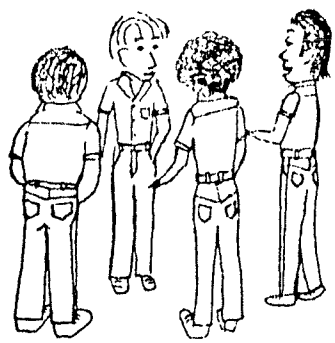
Despite New Zealand's dependence on primary industry, less than 20% of the population live outside the cities.

In cities, people travel long distances to work daily. The congestion and time involved is an industrialized society problem. Work at home usually meant:

- The craftsman did not travel. The majority of the population never travelled more than 25km from their home throughout their lives.
- The hours worked could be decided by the worker and the family themselves.
- The pace of work and the self discipline needed was self-controlled.

The time and energy used in travelling to work! The routines of the work place were all undreamed of in pre-Industrial Revolution times.

When people worked in or near their own homes the whole family was involved. The children, particularly the boys would generally take on the same job as their father, learning the same skills and being taught by their parents. If they were apprenticed to somebody else to learn a trade it was likely to be a relative or close family friend. Apprentices would usually go and live at their place of work.



The Sixth Formers seem to enjoy not having to wear a uniform any more.

Mass education developed as modern society formed. Schools not only teach essential knowledge, reading, writing and arithmetic but also the discipline needed for work. Punctuality, obedience and the ability to cope with routines are essential in our society.

Pre Industrial Revolution families tended to be large and close knit. Several generations would live in the one home, and many relatives in the same village. This changed and the nuclear family became the most common form of family life. The nuclear family consists of parents and a few children with no other relatives in the home. Specialized institutions cater for the majority of the sick and elderly. Families are highly mobile and relatives often distant are seen only occasionally.

Activities

1 Research a cottage industry. Write a short paragraph or make a drawing about each of the following:

   a The product manufactured.

   b How the family spent the day.

   c The equipment they used.

   d How it was marketed.

   e The economic well-being of the family.

2 Find out which inventions led to the Industrial Revolution. Write a short paragraph describing the impact of each.

3 Investigate the growth of mass education and the subjects taught to pupils.

4 On a graph show how much time each member of your family spends at home during the week.

5 Draw a plan of your home. Mark in one colour the areas used for work and in another colour the areas used for relaxation.

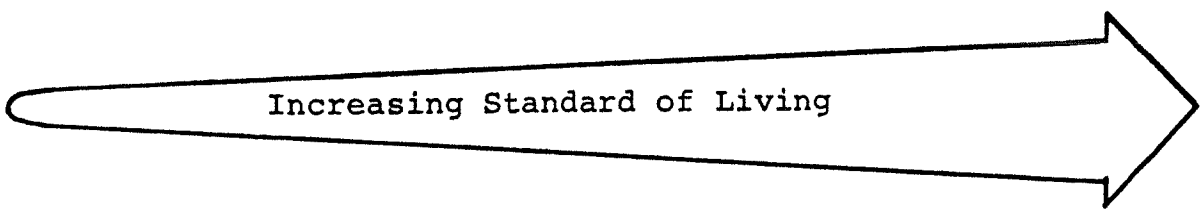
4.2 Changes in the Family due to Computerization

4.2.1 Computerized Cottage Industry

Increased use of computer technology in work places and homes has the potential to bring about changes in the ways families live. The changes brought about by the Industrial Revolution could be reversed. A highly computerized society could become a home centred society.

Cottage Industry	Centralized Industry	Computerized Cottage Industry
1 hand craftsmanship and/or small machines	1 big factories	1 Automated factories
2 Customization of goods and services	2 Mass production of goods and services	2 Customization of goods and services
3 Family involvement in the home	3 Workers moving together to work in factories and offices	3 Work centred in the home
4 Decentralized population - village and country lifestyles	4 Urban lifestyles predominate	4 Choice of lifestyles - urban or rural
5 Most families large and close knit	5 Most families nuclear families	5 Choice of family systems

Change I Change II



It is possible then, that a change in where work is done will have undergone two massive changes within 200-300 years. The second change will reverse much of the impact of the first.

Work centred in the home will allow people to organize their own routines. The discipline of the factory and office will not be needed.

The need for centralized urban communities will diminish. The information networks will allow a choice of city, village or country lifestyles.

In a home centred work society it is more likely that both parents or other relatives are available to help with child rearing and home maintenance. Sex stereotyping may be less apparent.

Families will have more time to deal with the tasks presently given to institutions. Education may return to the home. There will be less need for the discipline

that mass education imposes. Knowledge will be available in the information networks. Nursing the sick and care of the aged may be less onerous if more than one person is free to help.

Activities

1 If a home centred society does develop with computerization, suggest what the impact will be on the following:

a Traffic congestion

b Central city office blocks

c Schools

d Energy Problems

e Holidays

f Loneliness

2 Design a future house. Include spaces needed for:

a Work at home

b Increased leisure time.

3 Do you get on well enough with your parents and family to spend all day every day with them?
What things would have to change in the way your family acts if you were going to spend that much time with them?

4 Talk to someone who works at home now. Find out what they find as advantages and disadvantages.

4.2.2 Customized Families

What makes a person a good husband or wife?

In today's society it is important to be in love with the partner you are to marry. Love gives companionship, warmth and support. This emphasis on romance has not always been of first importance.

In peasant families, rather than asking the question

'Are they in love'

parents, relatives and friends would ask:

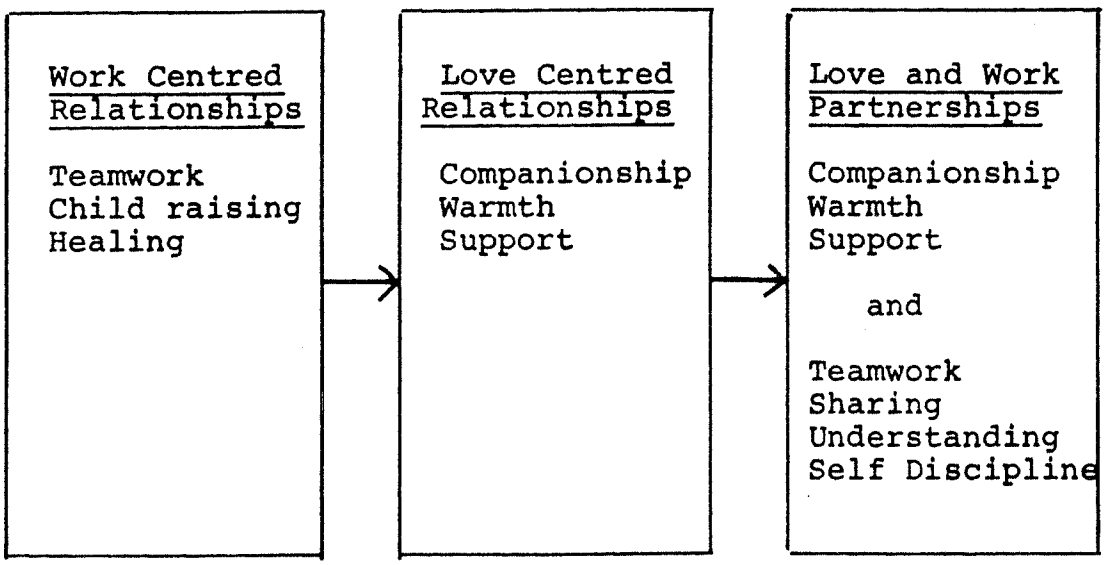
'Is he/she a good worker?'

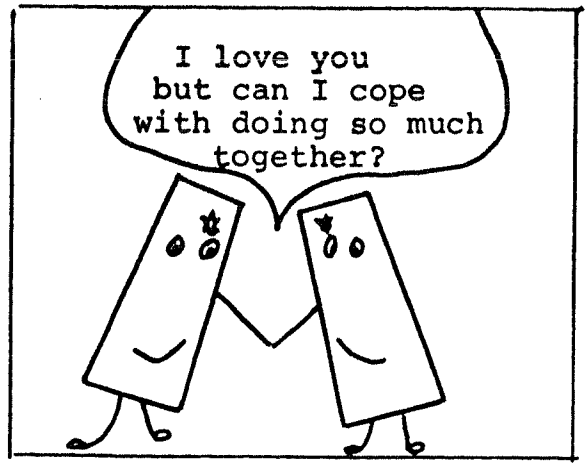
'Is he/she a good healer?'

'Is he/she good with children?'

'Will they work together?'

If in computerized industry work returns to the home, husbands and wives will be together much more than today. There will be a greater sharing of household functions. Both may work from home and have to accommodate one another's interests. Love alone will not be enough. The ability to work together will be of great importance.





Our society already has a greater variety of family styles than just the nuclear family. If society comes to expect customization in its goods and services, the variety in family styles may grow.

Nuclear Family Home

Mother, Father, Children

Extended Family Home

Mother, Father grandparents or other relatives and children

Solo Parent Family Home

One parent and children

Diverse Family Styles are Developing

Commune

Several Parents and several children sharing the home

Composite Family Home

Parents and children from previous marriages

Activities

1 Speak to some married couples. Find out why they married.

2 Speak to other pupils who have a different family style to your own. Find out what they feel is good or bad about these lifestyles.

3 Does our society approve of all family styles? How is society having to change to cater for a greater variety of families?

4 Do you approve of customization of family lifestyles?

5 Discuss with your parents and grandparents how family life has changed in their life times.

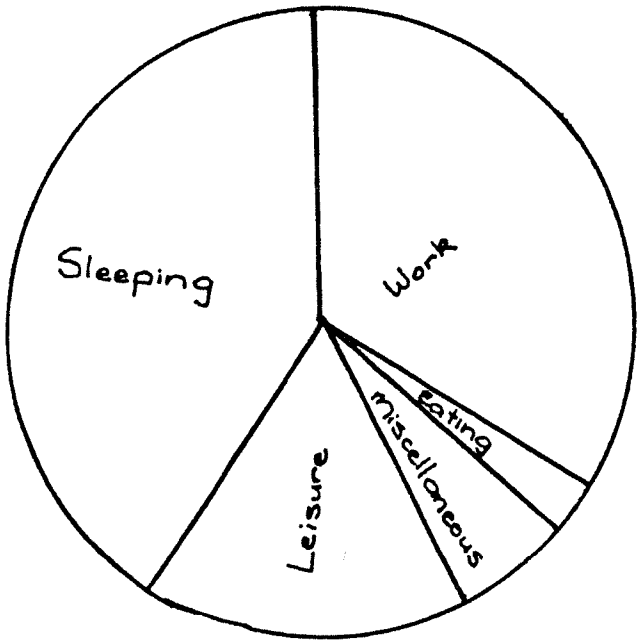
Do they feel the changes have been for the better or worse? Why?

4.3 Changes in Life's Activities

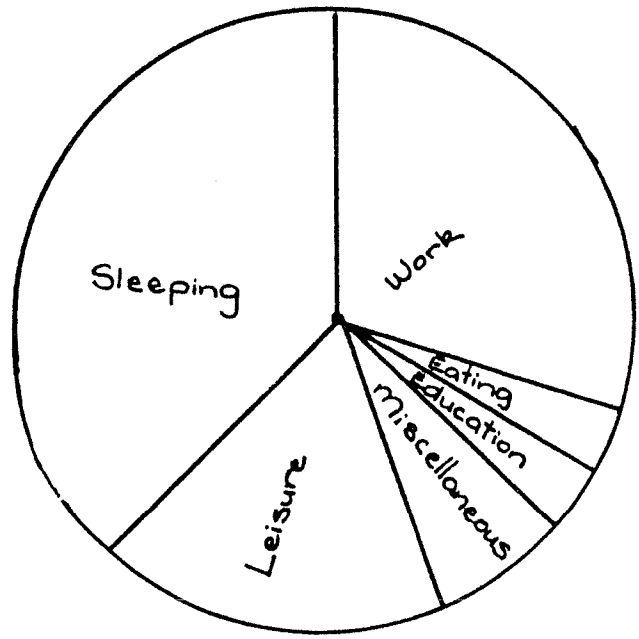
4.3.1 Historical Changes

The graphs show how the proportion of time people spend in the main areas of life's activities have changed.

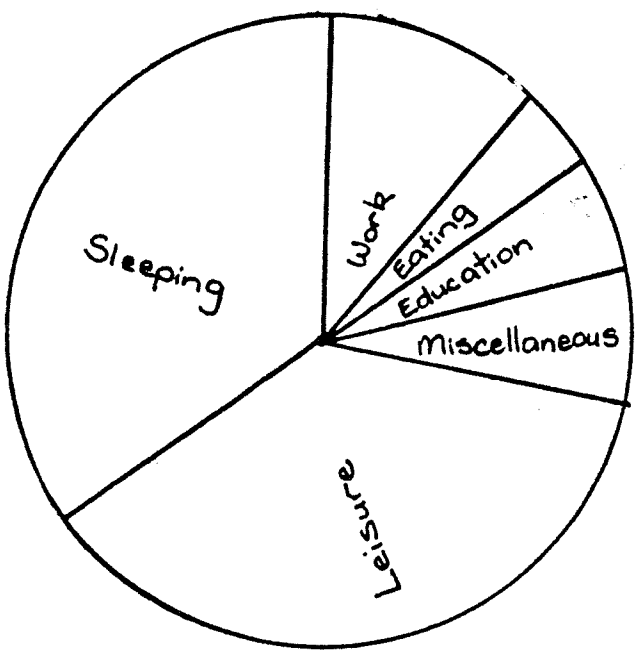
Primitive Man
(Average Life Expectancy was 18 years)



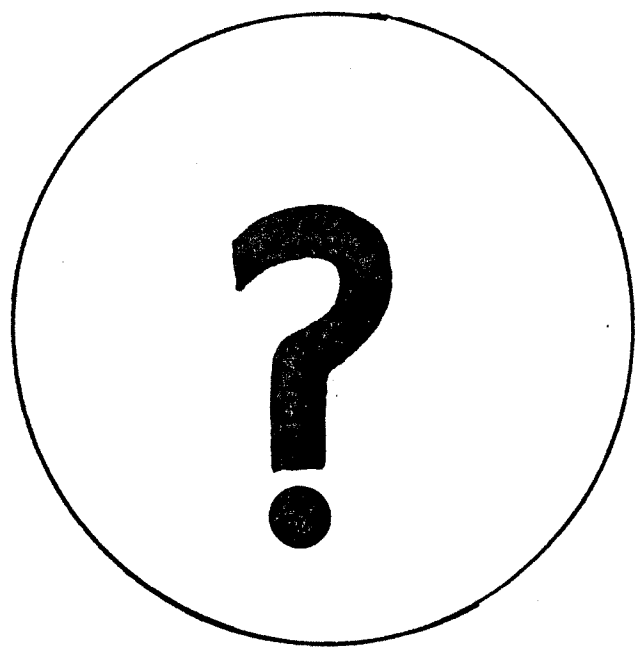
Pre Industrial Revolution Agricultural Man
(Average Life Expectancy was 35 years)



Modern Industrial Man
(Average Life Expectancy 70 years)



Computerized Industrial Man



4.3.2 Selecting The Future You Want

In April 1981 the NZ Commission For the Future questioned New Zealanders through their newspapers. Here are their questions. You may like to answer and discuss them.

New Zealand in the Future World

Right now New Zealand is at a crossroads. New inventions and technology and a quickly changing world scene will mean a future quite different from New Zealand as we know it now.

In the next few years a lot of decisions are going to be made which will shape our country in the next century. So now's a good time for people to be thinking and talking about what they want for themselves and for their sons and daughters (and perhaps grandchildren too).

We've got plenty of resources — in our land and in the sea around us — as well as in our people too. So New Zealand has a lot more choices than most other countries.

What New Zealand Televote is all about

NEW ZEALAND TELEVOTE is a public opinion poll which will:

1. Show you four **Points of View** of possible New Zealand Futures.
2. Help you express your feelings about them.
3. Help make your thoughts about them clear.
4. Help you choose or build your own future for New Zealand.

You've got plenty of time to look through the four **Points of View** and to play two interesting future games before deciding what future you want for New Zealand.

How New Zealand Televote works

Below are four **Points of View** that we think include many of the main ways people think on these subjects. To be neutral, we call them ONE, TWO, THREE, and FOUR. Obviously none of them will suit anyone perfectly. But one of them probably will come closer to your own personal **Point of View** than the other three. **Please read them through, think about them... BUT DON'T MAKE UP YOUR MIND YET AS TO WHICH YOU LIKE BEST.**

The Four Points of View

1.

A society that provides the necessities for all while encouraging equal opportunity for self development.

- As well as being individuals, all humans (other than hermits) live in social groups. People need support from one another to grow.
- The world around us is to be used. New inventions will make some resources (like sun and wind) useful before or after others (coal and gas) are used up.
- Central government should be strong and guarantee a job for all with equal pay for equal work. It must also allow people to develop private business too.
- New Zealand's geography still favours agriculture, and land will be put to many new uses. Maximum effort will be made to free ourselves from importing foreign fuel.

2.

A free enterprise society in which major economic growth provides great economic benefits for all.

- The people of any country benefit more where there is equal opportunity for each person to seek their own best interest. Government must not tell them what to do or not do.
- The land and sea around us are full of riches. They should be used to the fullest in making us all happy and prosperous.
- Central government should play a very limited role in our lives. Its main jobs are to keep the peace at home and protect us from attack.
- Large scale industry can best use and process the natural resources of our land and oceans. They are most fit to make the most wealth for New Zealand in a world eager to buy our products.

3.

A society in which people find personal ambition and build communities that are in harmony with nature.

- People must co-operate, not compete. They must blend their own self-interest into that of the greater good.
- It is vital to preserve the balance between ourselves and the land and sea around us. They belong not only to us but to those who come after us.
- Attention should be turned away from central government and towards local community. Smaller units aid social and natural harmony.
- Economy should grow in areas like the arts, crafts and the pursuit of knowledge. All who work should share in the decisions of the workplace.

4.

A society where independent people are given opportunities to develop themselves without harming the environment.

- The best society is where free and well-informed persons can satisfy their own interest. This will make great wealth for all.
- The land and sea around us is not a bottomless well. It is full of riches, but if we are not careful, it can run dry.
- Central government should give some support to its citizens. It should provide education and information and protect our natural resources.
- New industries with advanced equipment should be encouraged as well as new uses for our farmland. All new industry must be responsible for using our resources with care.

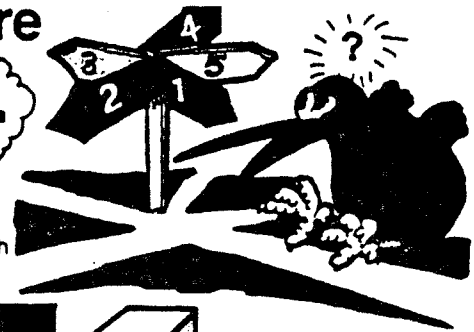
The "Your Turn to Predict" Game

Listed below are a number of possible things that may happen in the future (around the year 2001). Which **Point of View** do **YOU** think is **MOST LIKELY** to make each thing happen?

Tick only one point of view for each item | 1 | 2 | 3 | 4 | Not Sure |

A. Real growth in your personal income	81	82	83	84	85
B. Fewer government services	86	87	88	89	90
C. Greater emphasis on a more spiritual life	91	92	93	94	95
D. Preserving our natural resources	96	97	98	99	100
E. Full employment	101	102	103	104	105
F. Decent standard of living available to all N.Z. citizens	106	107	108	109	110
G. No need to import energy into N.Z. from foreign countries	111	112	113	114	115
H. Larger cities	116	117	118	119	120
I. Racial minority cultures become stronger	121	122	123	124	125
J. Greater participation by citizens in important decisions	126	127	128	129	130
K. The kind of work you want for your children	131	132	133	134	135
L. Less violence	136	137	138	139	140
M. Greater equality among the sexes	141	142	143	144	145
N. More co-operation among New Zealanders	146	147	148	149	150
O. A more important role for N.Z. in the world	151	152	153	154	155

Choose your own future



Now it is up to YOU to decide which way YOU want NEW ZEALAND to go. We know it may be a hard choice to make, but who said the Future will be easy?

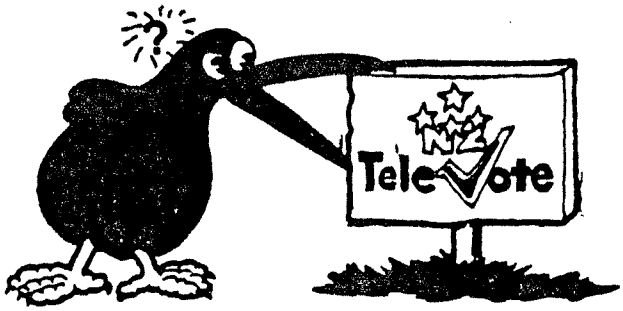
Please tick the box by the **Point of View closest to your own** beliefs and thought.
If you feel that none of the four **Points of View** is close enough to your own personal view of the future, tick Box FIVE.

Please tick single box only

1	2	3	4	5
156	157	158	159	160

For those of you who ticked Box FIVE you can build your own **Point of View**. However, we need to limit you a bit.
As you can see, each **Point of View** (ONE, TWO, THREE & FOUR) is made up of four building blocks.
One has the symbol —— another has the symbol of —
a third has the symbol of —— and the fourth has a symbol of — $
Your own **Point of View** must also be built of four building blocks, one with each symbol. Please tick your four boxes below as directed.

	1	2	3	4	
	161	162	163	164	There must be only 1 tick in this row.
	165	166	167	168	There must be only 1 tick in this row.
	169	170	171	172	There must be only 1 tick in this row.
$	173	174	175	176	There must be only 1 tick in this row.



The "Pictures of the Future" Game

In the diagram below are word pictures of the future that strong supporters of ONE, TWO, THREE and FOUR say will happen if they have their way. We don't know whether these pictures will really come true or not. We simply want to know whether you LIKE the future pictures they see, or whether you DON'T LIKE them. Read below and place a tick in one of the four circles in each square to tell us whether you generally like that picture or not:

= Like
= Neutral
= Don't Like
= Not Sure

	1	2	3	4
A Employment	• Full employment • Government provides socially useful work • Ample leisure time 1 2 3 4	• Large private companies manage profitable economy • 100% employment 5 6 7 8	• Personal skills key to quality production • Sharing leads to creative work for all 9 10 11 12	• Unemployment unknown as new uses for time develop • Part-time work more common 13 14 15 16
B Environment	• Government runs large-scale projects (energy, paper mills) • Full use of resources 17 18 19 20	• Some resources are used up • New resources discovered 21 22 23 24	• Conservation of present natural resources • Only technology that conserves resources is used 25 26 27 28	• Government policies carefully balance production and protection of resources 29 30 31 32
C World Scene	• N.Z. trades a lot with other countries • Foreign investment in N.Z. discouraged • N.Z. neutral in world politics 33 34 35 36	• N.Z. totally involved in world economy • Strong military alliances 37 38 39 40	• N.Z. withdraws from world trade • N.Z. withdraws from all military alliances 41 42 43 44	• N.Z. trades on world market in N.Z. specialties only • N.Z. remains basically independent, but some alliances 45 46 47 48
D Economic Development	• Greater emphasis on agriculture • Wide range of manufacturing and industry encouraged 49 50 51 52	• Larger, more modern, active cities • Growth of range in goods and services 53 54 55 56	• Small scale economy using own energy • Population shift to country and town areas 57 58 59 60	• Maximum use of modern, low-energy technology • Computers and telecommunications more important in daily life 61 62 63 64
E Government	• Reformed Parliament more representative of the people • More power to regional and community councils. 65 66 67 68	• Bill of rights to protect individual liberty • Private enterprise controls more public services 69 70 71 72	• The public votes directly on major national issues • MP's selected at random for short terms 73 74 75 76	• Government provides new educational system that stimulates and rewards original thought • Increased citizen participation with aid of new technology 77 78 79 80

Activities

1 a Complete the pie graph for how you believe the percentages will change in a computerized society.

b Write a paragraph giving good reasons for the changed percentages.

4.4 Computer Assisted Personal Help - Choosing a Career

Computer programs can be designed that use information stores to help people with personal decision making. For example, the computer could guide inquirers through a package to assist in a career choice. The user could call for help at any stage. Three areas would need to be covered. Some possible computer screens illustrate:

a Educational Level

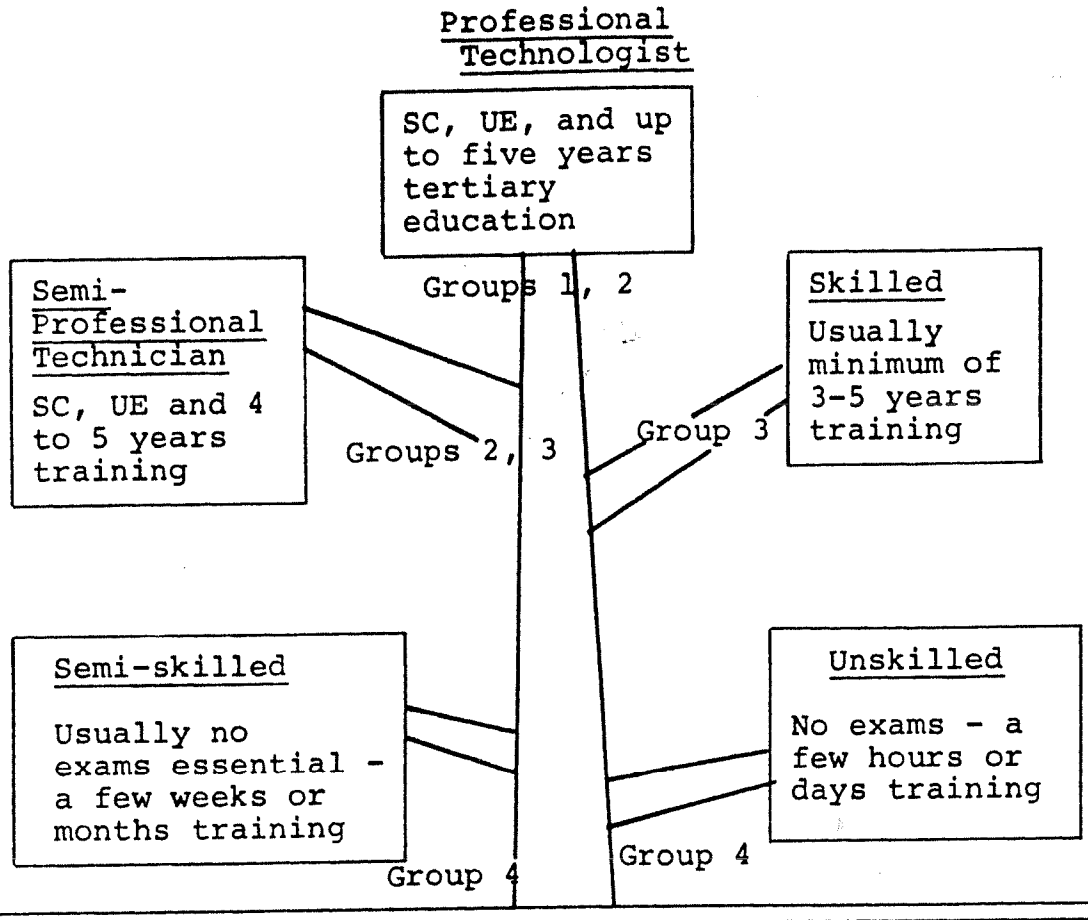
Educational Group

Touch the group that your long term educational plan and ability seem to fit

1 Professional highly skilled	2 Technician (Specialist responsible for seeing professional plans put into action)
3 Skilled trades and crafts	4 Practical ability not requiring special educational qualifications

If you require help touch H. (H)

Levels of Job



b

Choice of Interests

Artistic/ Creative Usually requiring ability in art, music, drawing or handicrafts	**Clerical/ Administrative** Helping keep an office running	**Computational** Working with numbers, figures or money	**Engineering/ Technical** Dealing with machinery or equipment
Literary Working with words written or spoken	**Manual/ Practice** Working with your hands doing practical jobs	**Medical** Helping those who are sick	**Outdoor** Working outside with plants or animals
Personal Contact with People Dealing with people	**Scientific** Working with science - often in a laboratory	**Social Service** Helping other people with their problems	H E L P

The computer will be able to provide a list of careers to consider from the combination of qualifications and interests chosen.

c Other Factors

Career consideration will depend on many factors -

personality
health
values

By providing questions for the user to consider jobs and factors could be judged. The computer would not make the judgement - this would be a user responsibility. However, the computer could guide the user's thinking. The computer would not replace the final guidance given by careers advisers and parents.

VALUES

Everyone has 'values'. They are often ideas or points about life, which you think are important for you, or mean a lot to you. Values may be tied up with things you do, or want to do. (For example, a keen sportsperson may value physical fitness very highly. A person who values the outdoor life may try to get a job where he/she is outside most of the time.)
There are several different kinds of values:

MATERIAL VALUES	Such as: money, owning a car, or a house, good wages, wearing smart clothes, owning antiques.
RECOGNITION VALUES	Such as: getting a good qualification, belonging to a club, having an important job.
SOCIAL VALUES	Such as: having good friends and/or workmates, wanting to help people, being a good family person.
SKILL VALUES	Such as: valuing a good hobby or an interest, valuing what skills (eg carpentry, fishing, golf, public speaking) you have learnt.
PERSONAL VALUES	Such as: living your life how you want to, becoming independent, being healthy, doing things which you really enjoy, having self-respect.

Working in a job can often be a large part of a person's life. Looking at what your values are, and which are more important to you, may help you on your way to finding the job you want. Assuming you want to work, ask youself:

"What am I looking for in a job?"

"What do I want to work for?"

"What do I hope to gain from working?"

"What do I value most about working in a job?"

Activities:

1 Suggest areas of life where computer programs and information stores could be designed to provide personal help.

2 a Do you approve of personal help coming from a machine?

b Should all personal help be person to person help?

c How can you get person to person help with personal problems from:

i home
ii school
iii society

3 Find out how the careers adviser and guidance counsellor at your school feel about a computer help service.

4.5 Home Appliances

Smart machines and computer controlled appliances may change the fittings and furniture we use in the home. The microprocessors are available, waiting for the people with ideas and financial backing to put the push-button home into practice.

Here is a possible future:

PUSHBUTTON POWER

(Adapted from Time Magazine 20/2/71)

The Computer Revolution may make us Wiser, Healthier and even Happier.

The Scene

It is 7.30am. As the alarm clock purrs, the bedroom curtains swing silently apart and the venetian blinds glide up. The thermostat boosts the heat to a cozy 70 degrees. The percolator in the kitchen starts burbling: the back door opens to let the dog out. The television set blinks on with the days first newscast: a selective rundown (ordered up the night before) of all the latest world-wide events affecting the economy. After the news on television comes the morning mail, from correspondents who have dictated their messages into the computer network. The latter-day Aladdin, still snugly abed, then presses a button on a bedside box and issues a string of business and personal memos, which appear instantly on the screen. After his shower, which has turned itself on at exactly the right temparature, at exactly the right minute Mr A is alerted by a buzzer and a blue light on the screen. His boss is on the way to the golf club, the only place they meet face to face. A asks his wardrobe for his golfing outfit, dresses and saunters out to the car. The engine of course, is running...

His wife B concentrates on the screen for a read-out of comparative prices at the local merchants and markets. Following eye-ball to eye-ball consultations with the butcher and the baker and the grocer on the tube, she hits a button to get supplies for tonight's dinner party. Pressing a couple of keys on the kitchen terminal, she retrieves her favourite recipes from the computer's memory banks, tells the machine to compute the ingredients for six servings, and directs the ovens to reach the correct temperature for each dish according to the recipe, starting at 7.15pm. B then joins the televised discussion of Byzantine art (which she has studied by computer). Later she wanders into the computer room where Al Junior has just learned from his headset that his period one lesson was "groovy".

The basic technology to do all this is already in existence. You may be living like this in 20-30 years time.

Activities

1 List all the different uses made of the computer in the story:

a When is it used for work?

b When is it used for leisure?

c What smart machines are mentioned?

2 Suggest other domestic tasks the computer could control.

3 Do you approve of the idea of a "push button" home.

4 Discuss or debate the story heading:

"The Computer Revolution May Make us Wiser, Healthier and Even Happier".

5 Do you think you would meet as many people personally in a computerized society as you do now.

6 Today many people lead unhappy lives through loneliness. Do you think a computerized society can change this? How?

Self Check

1 What were the major changes that industrialization brought to society?

2 How could computerization bring back some aspects of pre industrial society?

3 How has family life changed since industrialization?

4 How could computers change family life?

5 What is customization of family life styles?

6 How could computers affect the choice of a marriage partner?

7 How has the time man spends in the main activities of life changed in modern times?

8 How could the computer help people make personal decisions?

9 What changes can be expected to home appliances in the future?

Project Starters

1 What organizations are there in society to help people with family problems?

What sort of help do these services give?

Find out if a need is growing for the services provided?

2 Investigate family life styles in another culture.

Suggest ideas from this culture that would add a richness to our own.

5 PRIVACY AND SECURITY

5.1 Censorship

Change has always occurred and people have had to think about the effects resulting. Here is an account of the first use of movie pictures in a small New Zealand town.

A New Entertainment

by : Marion Rowan

It was in the year 1899, when I was nine years of age, that I first heard of moving pictures.

The wonder of it! Not only moving pictures, but a box that could capture sound, and would actually sing songs. It was called a phonograph.

If this was not enough excitement there was to be yet another attraction, which was to ensure that every man, woman and child would be present. This was a lifesize photograph of the whole school, complete with teacher.

That evening, the hall was full to bursting point. A large screen was already on the wall.

After we had sung the hymn 'Rescue the Perishing' without which no entertainment ever began, the photograph was thrown on the screen. There we were, all forty of us. True we were all afflicted with large blotches as though a blight had settled on us. I knew which I was, as I counted four from the end in the front row. No one could have called it a plain photograph, but the children were very much so. One dear old lady who sat next to me, kept saying 'That's no' my Annie', when I pointed out her granddaughter who was next to me on the screen.

There were no more disappointments that evening. On a table was an instrument hitherto covered by a cloth. Now it was revealed as a small box with a large brass trumpet. We were shown a record, not flat as they are today, but a hollow tube. We watched it being inserted. It was then wound up, and to our incredulous delight it really sang. In a wavering, metallic, and rather sweet voice, it sang 'The Last Rose of Summer' and 'Home Sweet Home', and for good measure it finished with 'Grandfather's Clock'.

Perhaps it was the last song, or the quaver in the voice, but I imagined an old man was singing that box.

This item was received with great applause. We all felt we were getting good value for our sixpences. More was to follow.

A machine stood in the centre of the hall and after lights were put out, there appeared a moving picture called 'Fun in the Kitchen'. There was no doubt about movement. Two very galvanic men, a large box and a great deal of crockery were presented to our gaze. Those men chased each other in and out of the box in the craziest manner. One would get in and then reappear, no one knew how, and push the other in. They knocked the dresser over and broke every piece of china. They threw pies and custards in each other's faces. They created a shambles of that kitchen, then bowed to show they were still intact. No matter that a continuous rain seemed to run down the screen, that they jerked rather more than a little. Everyone clapped and stamped at the end.

The best was yet to come, however. This was a journey on the bumper of a train. We rushed along highways, up mountains, and down valleys, into tunnels which took our breath away. We passed meadows with fleeting glimpses of sheep and cattle. I still remember the snowcapped mountains, deep ravines and forests, all in a magic dream. Mrs Brown who sat in front of me clutched her hat on her head with both hands; her thin anxious face had a do-or-die expression on it. When that breathless journey across America was over, she looked as though she'd seen visions.

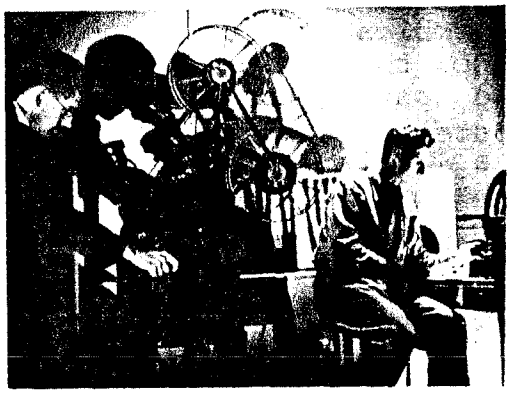
After the show was over we were loath to separate. The men gathered round the machine, eager to see how it worked. Just so, in a few years' time, they'd be found with their heads under the bonnet of a car.

As was the custom, the women came together to talk it over. The general view was that now 'they could believe anything'. Mrs Harris, who had what is misnamed a 'comfortable' figure, declared that you could have knocked her down with a feather. I looked at her ample proportions and thought that this was one thing I could never believe. Mrs Smith resolved my doubts by saying innocently 'that with God all things were possible'.

It took all kinds to make a world, and she didn't suppose it would make any difference to our world. She laughed and added, 'If someone invented a machine to milk cows it would be more to the point'.

The mention of cows caused a general exodus, as the thoughts of early morning milking intruded, and with hearty laughter at this final jest, we separated in great spirits.

Adapted from 'Open Country'
AH & AW Reed
1965



Early Movie Projector

Phonograph

Unfortunately the simple pleasures provided by early cinema developed harmful aspects. Films showing excessive violence, sadism and other undesirable qualities were produced. Many people felt these films encouraged the audience to react in the same way. It was felt necessary to control what the public saw, particularly young people.

Films which are considered entertaining and educational are open for anyone to see. Those that show or encourage people to act in ways considered harmful to themselves or society are restricted to older age groups.

CENSORSHIP OF FILMS AND POSTERS

10 Censor of Cinematograph Films

(1) There shall be appointed under the provisions of the Public Service Act 1912 a Censor of Cinematograph Films.

11 Films to be Censored

(1) No person shall exhibit any film, unless it has been submitted to the Censor for examination and has been approved for exhibition or exempted from censorship by the Censor in accordance with the provisions of this part of this Act:

12 Powers of Censor

(1) On the completion of the examination of any film, the Censor may -

(a) Approve the film for exhibition; or
(b) Refuse to approve the film for exhibition; or
(c) Approve the film for exhibition subject to such excisions from the film as he thinks proper.

An extract taken from the law that controls censorship in New Zealand.

Here is an extract taken from the New Zealand Listener of 13 September 1971.

As long as films have been made - whether to entertain, persuade, express artistic ideas or experiment - they have had to contend with censorship, official and unofficial. The history of cinema is one of ups and downs of what could and could not be seen.

... From their crude and primitive origins, they (films) were immediately considered by those who made it their business, to be an evil and corrupting influence. Because they offered cheap, easy to understand and

accessible entertainment, they were singled out for particular attention from moral guardians.

Objections were raised on several counts. Films depicted things authorities weren't keen on; they attracted people generally thought to have loose morals or who saw there was money to be made (the founders of Hollywood were largely of central European origin, and anti-Semitic criticism wasn't unknown); and they were shown in darkened theatres.

In 1917, a National Council of Public Morals inquiry in London, made up of priests, teachers, social workers and others, called for tighter censorship and brighter lighting in theatres. In the United States, church and social organizations also were not slow to advocate stronger controls.

The introduction of sound in the late twenties brought additional problems. Now what was said had to be scrutinized along with the visual. The Depression also brought a change in social attitudes. Films were now the mass entertainment.

We are in a situation with computers today similar to the situation society was in with the introduction of movies. Cinema is a powerful tool for moulding people's thinking and needed to be controlled. Computers are also powerful tools in that they can be used to gather and store information about people which could be used harmfully. They too need to be controlled to avoid abuse.

Activities

1 Debate the following topics:

   a Film censorship should be dropped

   b People should be able to see what they want

2 How will people write about the introduction of computers in 50 to 100 years time?

5.2 Data Banks

Information about people and things has always been collected and stored for future use.

Some records kept in New Zealand

Births, Marriages and Deaths
Car Registrations
Weather Patterns
Land Ownership
Court Proceedings
Traffic Accidents
Social Welfare Benefits

All these records are useful and important for our society to organize itself and to be able to provide information to help people make decisions. In the past these records have been written on paper and filed away in many different places.

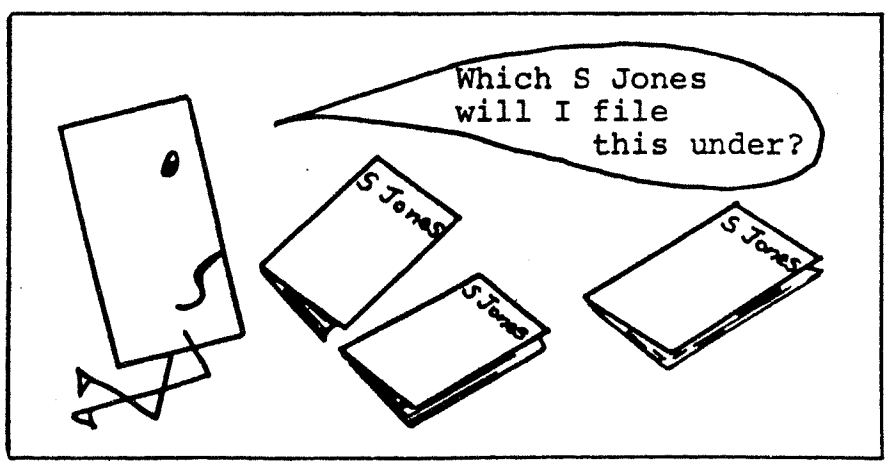
The computer has allowed many records to be stored in one place. The information can very easily be retrieved. Information can be managed more efficiently by computer.

Because of this ability to store all sorts of information and retrieve it rapidly, people have realized that very important controls have to be put on the use of computer data banks.

There are two main areas of concern:

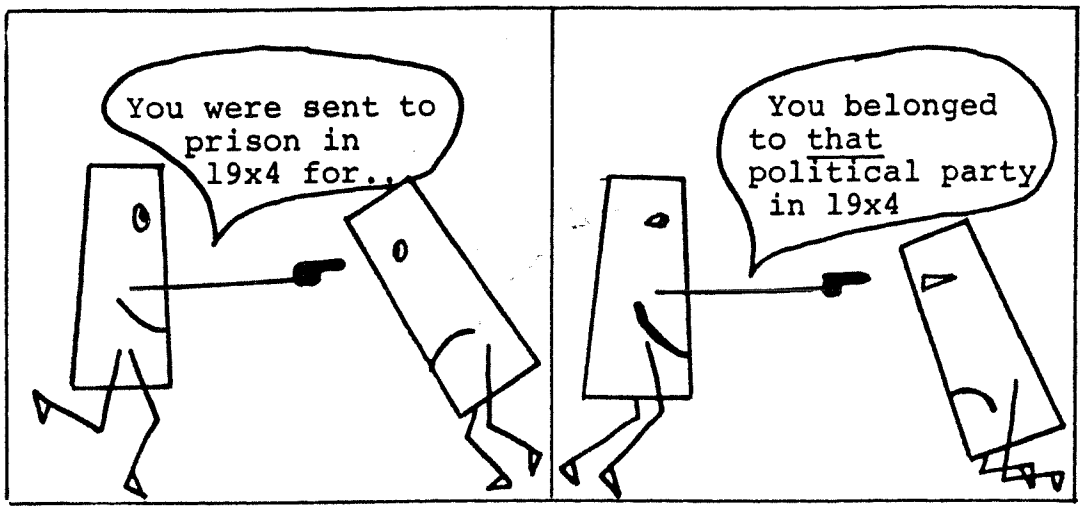
1 The accuracy of the information

It is important that no mistakes should be made in entering information into computer data banks. A lot of damage could be done to somebody's reputation before a mistake was found.

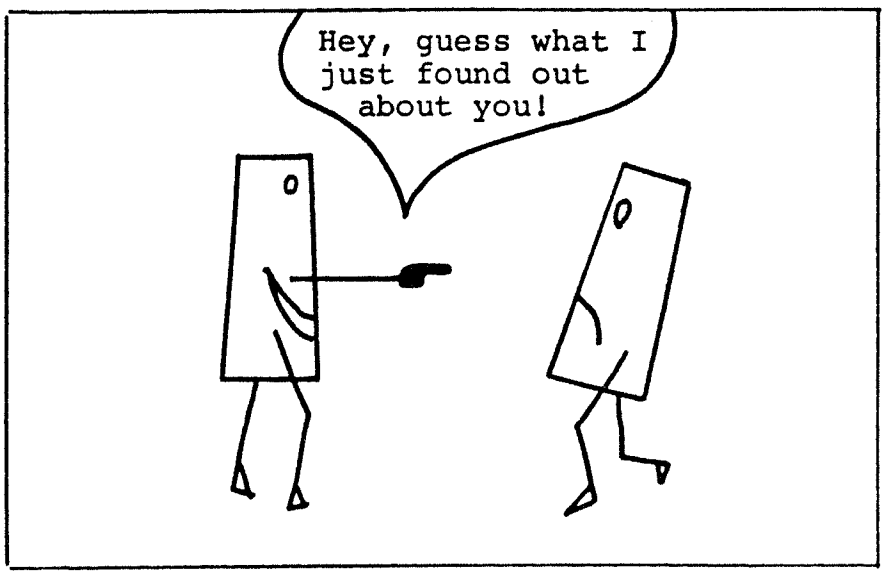


2 Who has access to the information?

Some information recorded is not very important and there is no need to keep it secret from anyone. Other information is very personal.



It is because of such divisions in the importance of information that data banks are not open to everybody. They have security controls on who reads the information.



5.3 Ways in Which Security of Data Could be Breached

a Accidental Disclosure

Extra information being included with other items of information given to a user.

b Protection from Casual Entry by Unskilled Persons

Casual browsing of files by a clerk or other employee at a terminal.

eg a secretary looking up confidential reports.

c Protection from Casual Entry by Skilled Technicians

Technicians may be challenged to beat the system and find clever ways to access data.

d Protection from Financed Exploiters

Infiltration of programming staff.

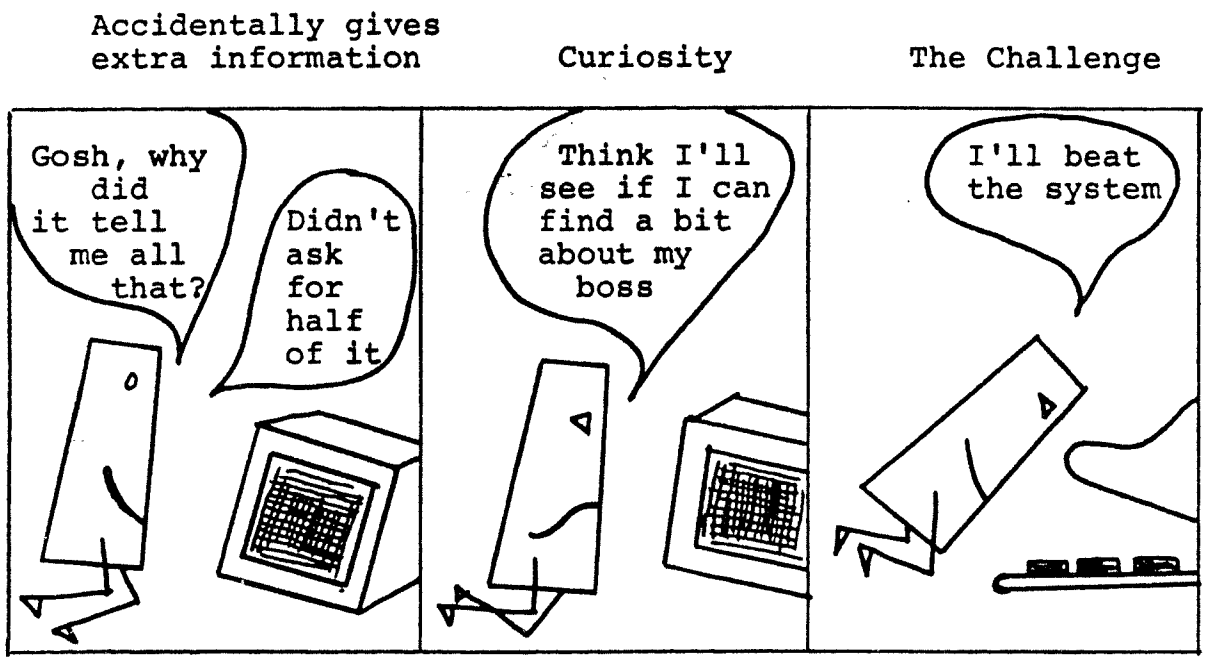
Use of wire tapping

Plant bugs

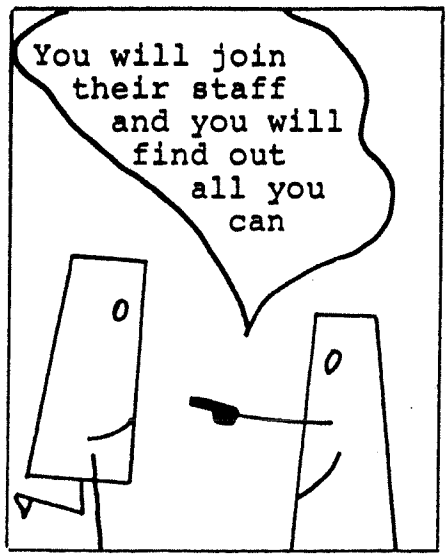
Make duplicate keys to the programming room

e Major Criminal Activity

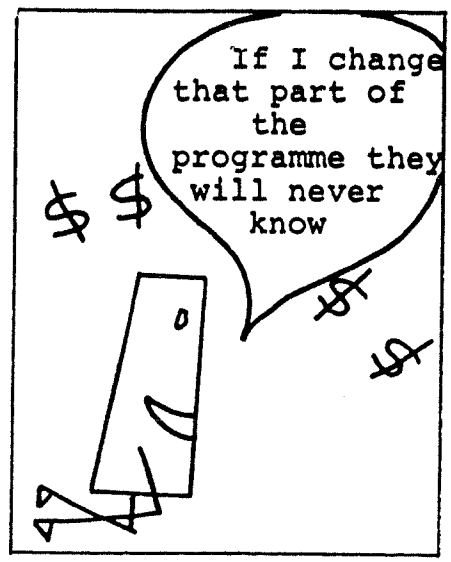
Changing the data files with theft in mind.



Spying



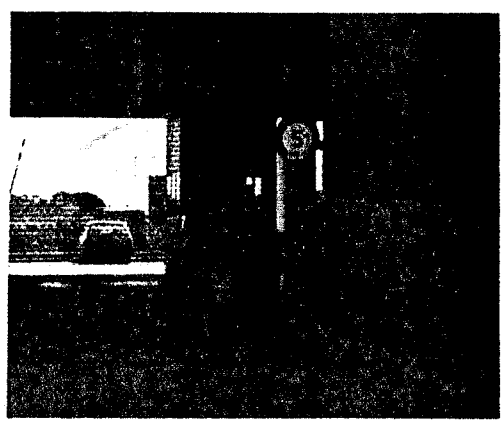
Crime



5.4 Overcoming Security Problems

5.4.1 Building Design

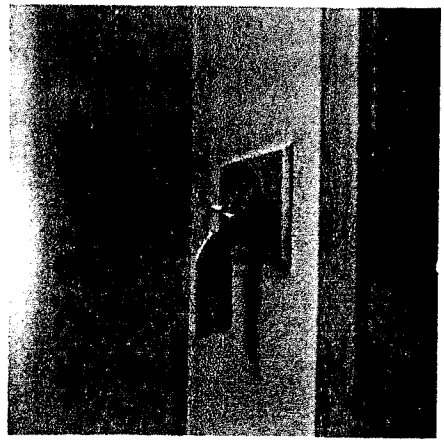
a The construction of the building can be made as secure as possible. Guards can control the movement of people into the building.



Data Bank Building in Auckland

b Buildings are usually divided up into areas which have different security clearances. It works in the same way as censorship. Those areas which only contain general information are open for everyone while areas which have more and more potentially secret material are only open to people with higher security codes.

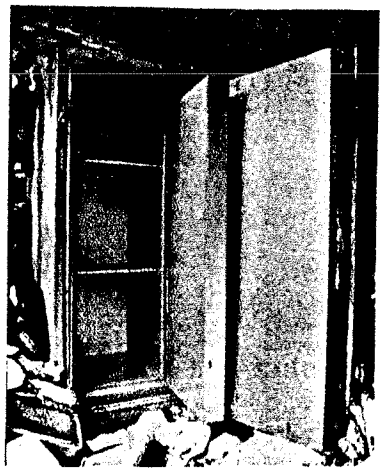
Card locks are often used.



The lock that is shown is made to accept plastic cards rather than keys. The card will have a magnetic code on it which will open the door.

c Great care is taken to ensure that stored information cannot be damaged by fire or earthquake. Tape and disc library may be kept in special cabinets.

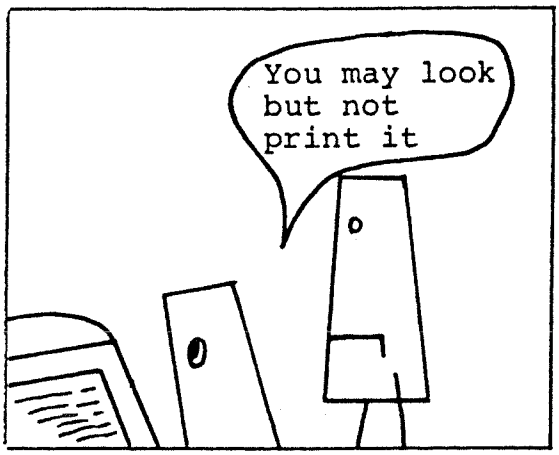
The computer data cabinet at Expandite NZ Ltd surrounded by the devastated stationery room after a fire in 1980.



The cabinet open showing the unscathed interior that housed magnetic tapes vital for the company.

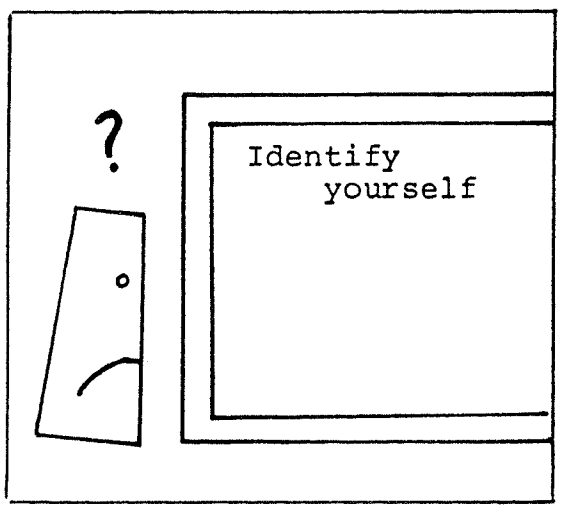
5.4.1 Technical Safeguards

a Use of VDUs



If private information is displayed on the VDUs make sure there is no print out to be lost or removed.

b Identity of Terminal User

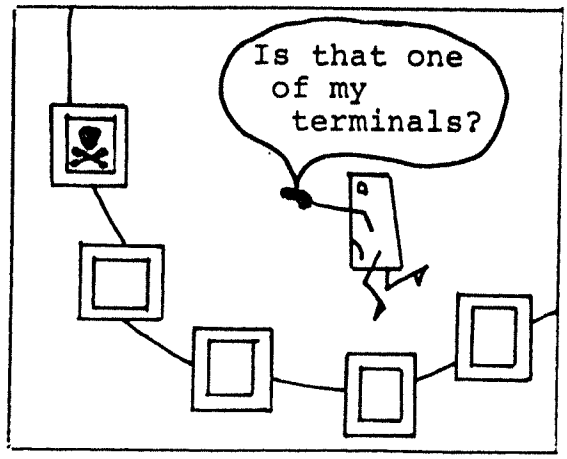


Until the person at a terminal is identified the computer will not give data or allow changes to be made.

Examples:

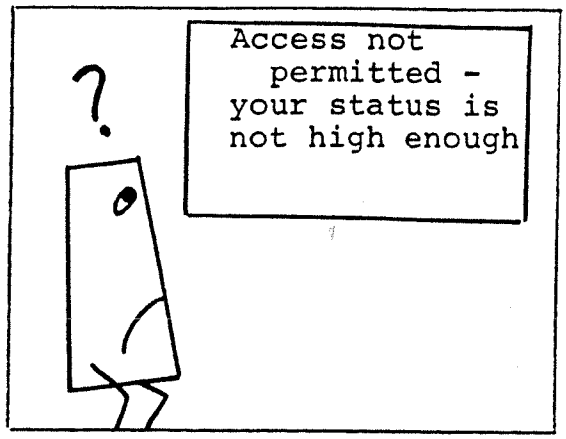
- Identification by physical personal characteristics
  ie computer recognition of a fingerprint or voice pattern
- Identification by a token
  ie a badge or card
- Use of pass words
  ie security code numbers.

c Identify the Terminal



A technical system is used to ensure the terminal that any data is being sent to is a legitimate one.

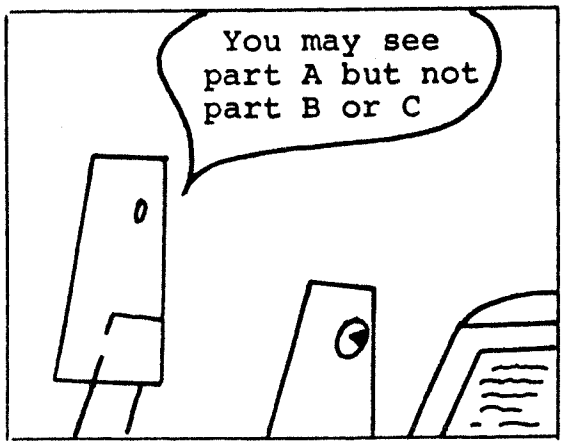
d Status of the User



The computer should be able to check on what type of file each user is able to use. The status of the user can be determined by password, badge or code.

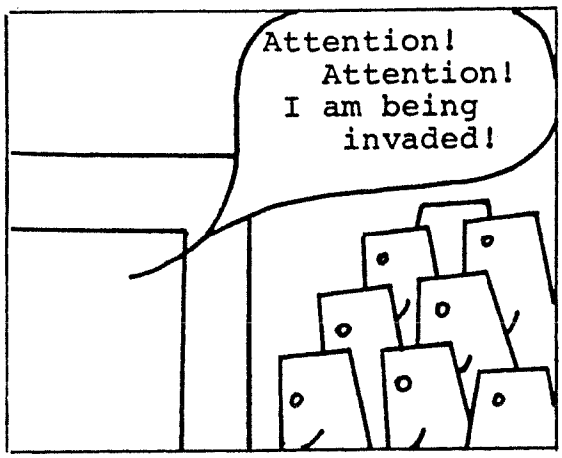
Some terminals use keys. The terminal will not work until the operator inserts the right key.

e Locks on Data Files



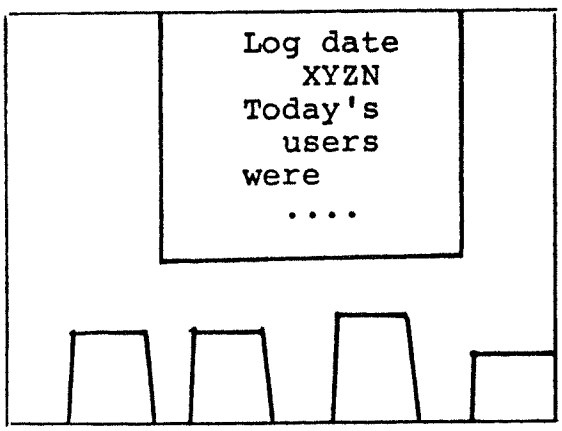
It is possible to have systems of passwords on each file or parts of files. (Like the codes on films for the age of people who may see them). These systems should be changed now and again.

f "Burglar Alarms" on the System



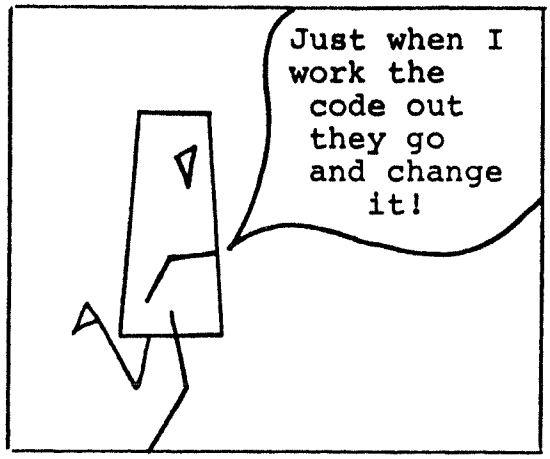
The computer should be able to notify security personnel of efforts to invade the system. Such a threat should act to put people off theft of data, eg any attempt to enter an invalid code or to access an unauthorized file. (In practice action is taken after a second attempt at violation in case the first was an accident). One method in such circumstances is to lock the system completely.

g Log Security Procedures



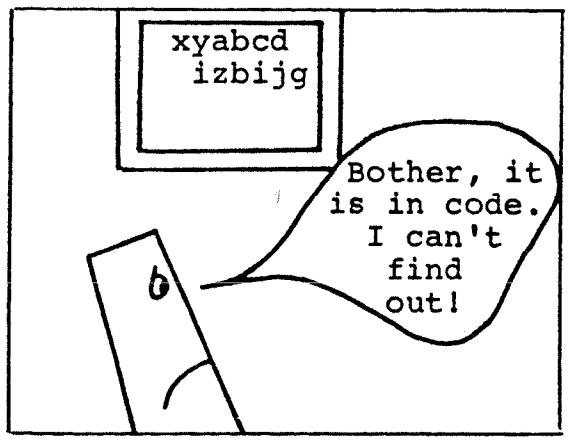
A log should be kept of all access. In particular wrong methods of using the equipment. eg use of a false security code or an attempt to access a file of high security. All users are likely to make mistakes. Any departure from the norm in this matter may indicate user tampering.

h Security on Codes, Passwords



Control of Codes, and Passwords should be excellent. A history must be kept which logs all changes in security records saying who made the change and where it was made.

i Prevention of Wire Tapping



Use of Scramblers

-Jumble the items of the message up. (In computer age translation is relatively simple)

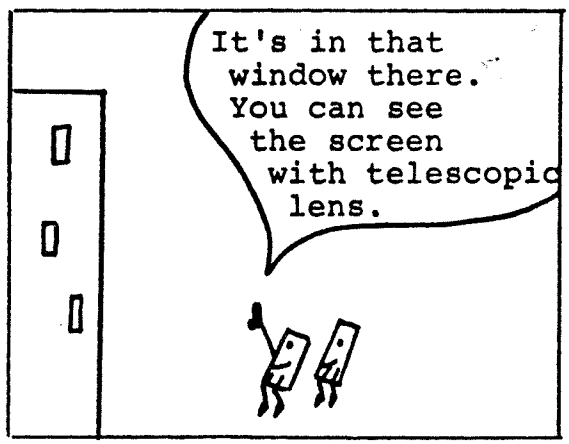
Use of Codes

-Put the message into code

Physical Difficulties

-Make tapping difficult by securing wires particularly in buildings.

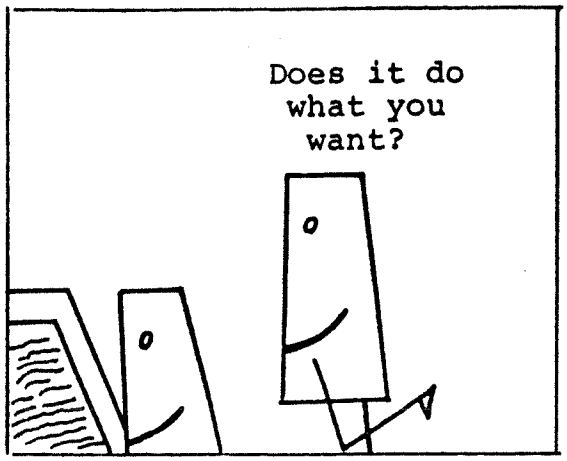
j Eavesdropping



Design buildings to make eavesdropping difficult.

Possible problems are:
Using cameras and telephoto lenses to observe screens
Examination of carbons and typewriter ribbons.
Examination of radiation emitted by equipment
Analysis of sound emitted by equipment

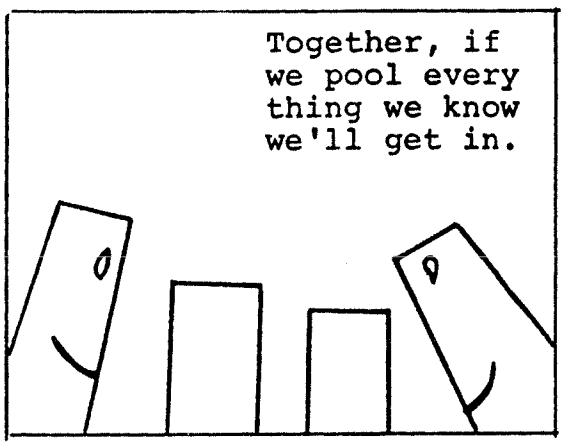
k Program Checking and Testing



All programs must be checked to see what they will do what was intended, that they do not access unauthorized data, that the programmer has not included loopholes.

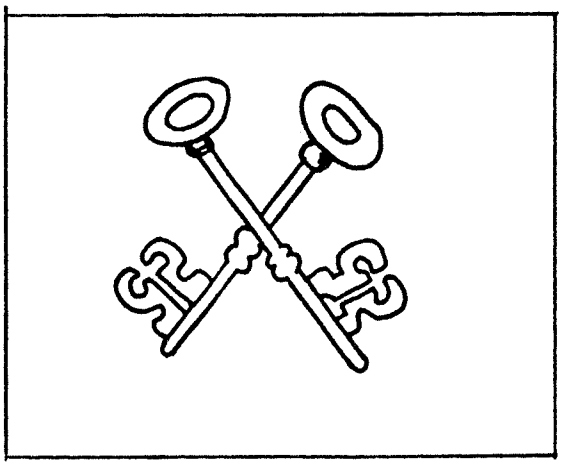
Programs should only be tested with "check data". "Live" data should only be used when management is sure they do what was intended.

l System Complexity



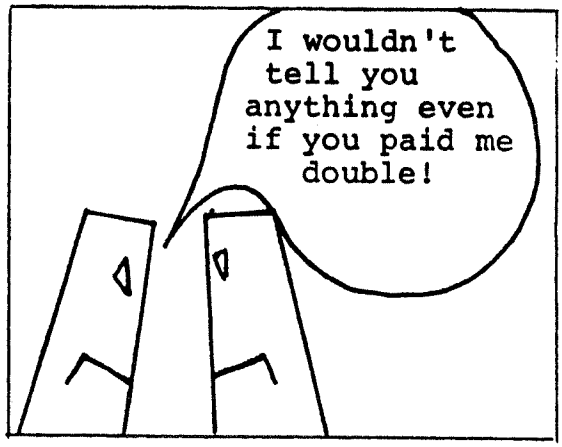
Permit no one man to have all knowledge of what is needed to break into the system. Details of how passwords, authorization procedures, file locks and audit techniques should be kept as secret as possible. If many people are needed to break in the probability of the culprit being caught is greatly increased.

m Good Physical Security



Locked cabinets and vaults
Burglar proof tape and disc stores
Limit access to facilities as much as possible
Use document shredders.

n Loyalty



Ensure the loyalty and competence of staff

5.4.3 Legal Safeguards

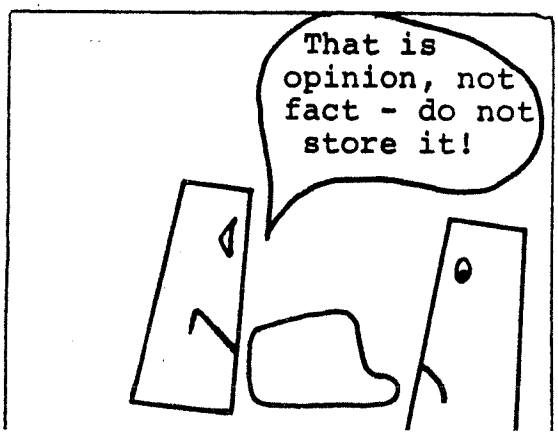
a Record of Data Banks

A record should be kept of all data banks and their purposes:

The type of data stored
The purpose data is stored for
Who is authorized to extract data.

If the registrar of the records feels these items are damaging individual privacy an order to remove the data could be made.

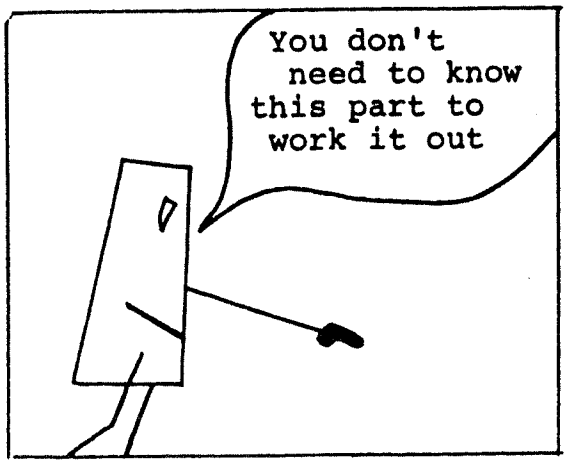
b Facts and Not Opinions Stored



Accuracy essential
Opinions forbidden.

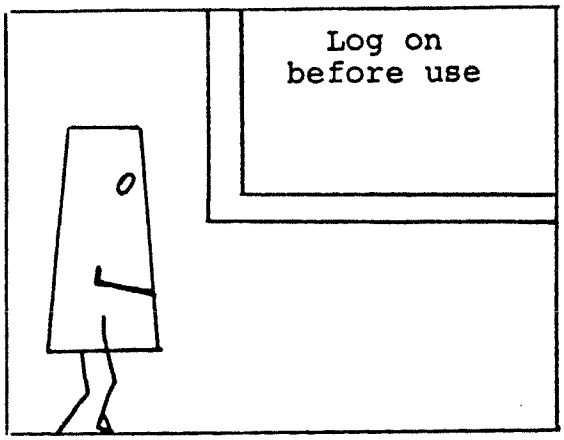
eg descriptions such as "beautiful" or "wealthy neighbourhood" would not be allowed.

c Relevancy of Stored Data



Any organization should only have access to the data needed by its operations. eg tax department should not have access to such records as race or colour or prison records.

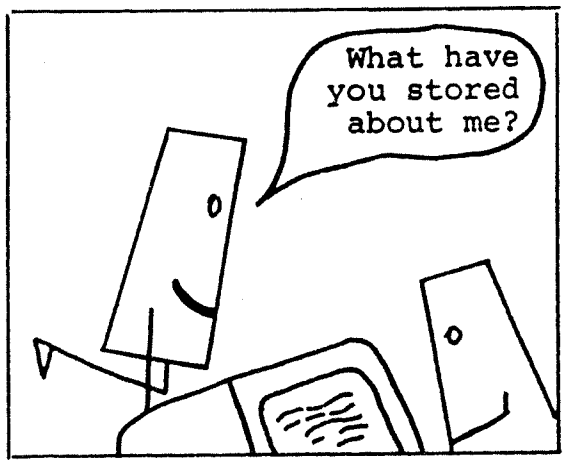
d Logging the Use of Data Banks



Whenever data is taken out of a bank a log should be kept of
- the date and time of the use
- the identity of the person requesting data
- the type of the data supplied
- the purpose for which it is needed

Checking the log may show wrong use of data.

e Public Right to Inspect Records

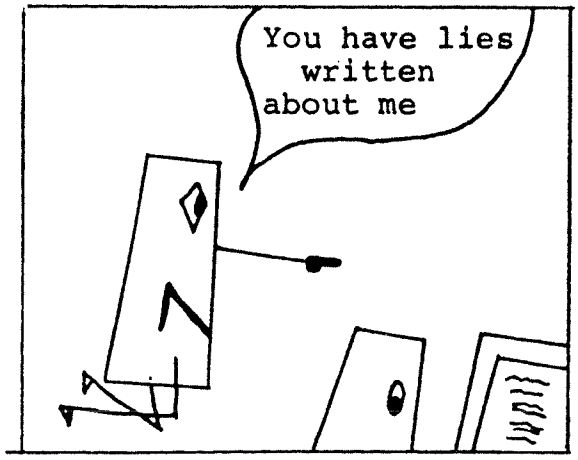


The individual should have the right:
- to find out what is stored about him/herself
- take issue with unfair or wrong data.

It should be clear to the individual:
- what the stored information is used for
- who uses the data

(Exceptions to this may involve police, military and intelligence data banks)

f The Right to Take Issue with Stored Data

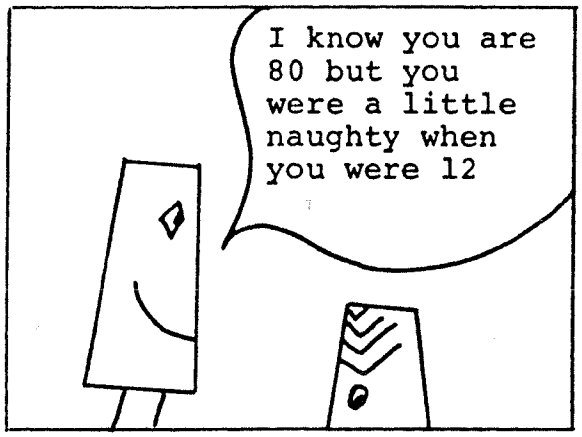


The individual should have the right to complain about any stored information on the grounds:

- it is incorrect
- it is unfair
- it is out of date

for the purposes for which it is stored.

g Removal of Aged Data



There should be some restriction on past history following us all our lives. eg a youth crime record when someone has grown older and wiser.

Activities

1 Design your own set of cartoons to illustrate the three aspects of computer security.

   a Building Design

   b Technical Design

   c Legal safeguards

2 What is privacy and what is security?

5.5 Example of a Security Code System

Information in a file can be stored or transmitted in code. Unless the right security pass code is used the computer may just print meaningless garbage.

Access to a file or part of a file usually depends on two factors:

1 The status of the person accessing the file

2 The status of the file being looked at

A file on a person consists of three parts:

a General information

b Identikit picture

c Personal information

Access to parts of the file depend on status.

The table shows a possible security clearance system.

A / means access is allowed

A x means access is not allowed.

Statuses		The File		
Status of Interrogator	Status of File	Part I	Part II	Part III
100	100	/	/	x
100	200	/	/	/
100	300	/	/	/
200	100	x	x	x
200	200	/	x	x
200	300	/	/	x
300	100	x	x	x
300	200	/	x	x
300	300	/	/	x

Tables like this can be made as complicated as necessary for the particular data bank.

Activities

1 Design a security code system of your own.

2 How are identikit pictures made and used?

3 How do computers assist the police to solve crimes?

4 Discuss computer crime.

Self Check

1 Why is censorship considered necessary?

2 Why does society need records?

3 What is different about computer records from traditionally kept records?

4 What are the two areas of concern?

5 List safeguards in data bank building design.

6 List technical safeguards for data banks.

7 List legal safeguards for data banks.

Project Starters

1 Arrange a visit to a data bank. Note all the different types of security procedures.

2 a Find out how security code numbers are designed.

b What error checks are included in the code numbers?

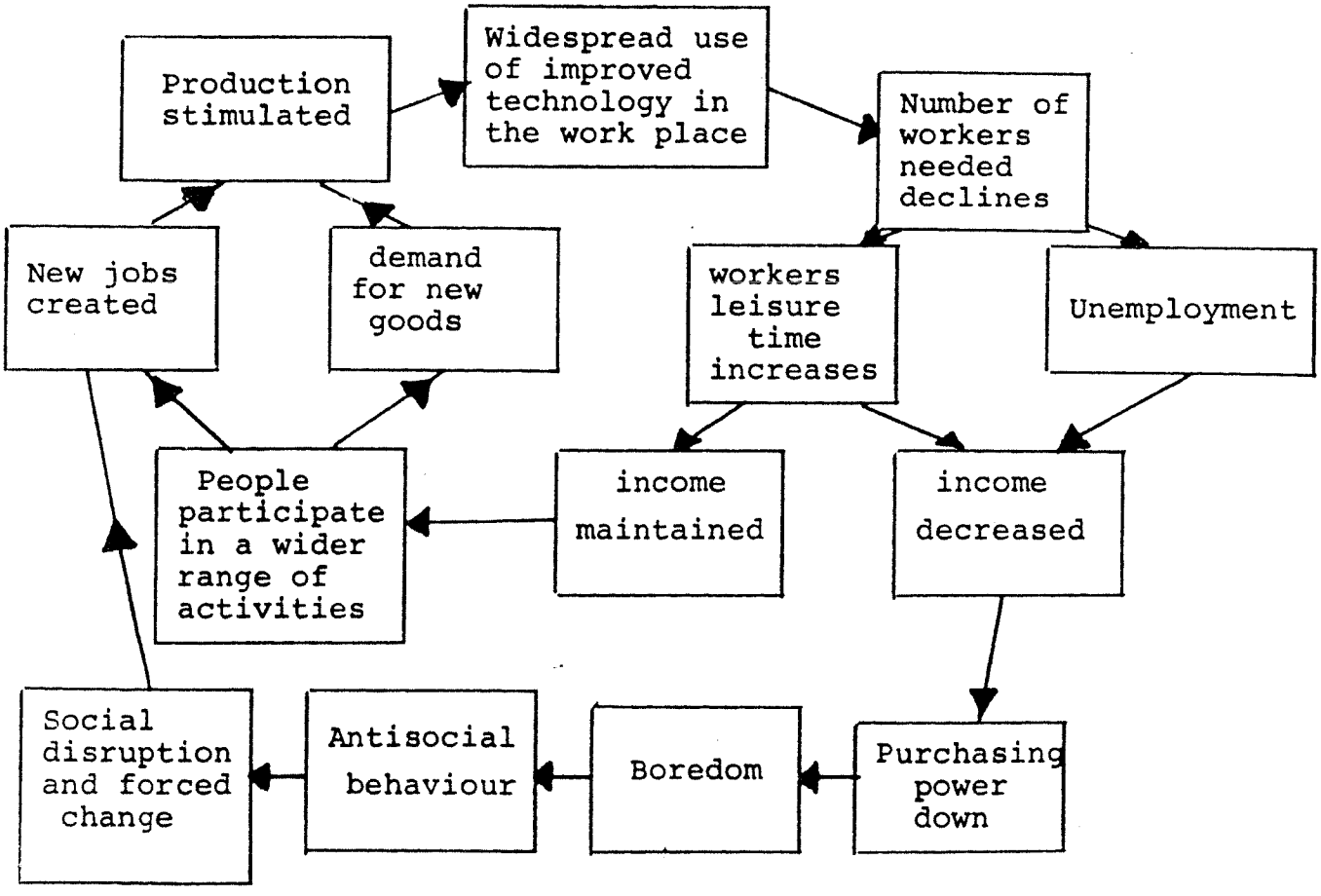
c How does the computer carry out checks on the code numbers?

6 EPILOGUE

This booklet has attempted to show the way computer technology may change our lives and our society. Many of the ideas suggested are speculation. When future possibilities are discussed it can only be speculation. However, to decide on what sort of future we want different possibilities must be considered and evaluated.

Change in one area of our society will automatically bring about changes in other areas. This is because human society is not made up of separate parts. Rather it is a complex web of interlocking relationships between people and the things that they do.

The computer is both the cause and the product of a cycle of change. The change is becoming increasingly rapid. The diagram shows some of the links discussed.



At each point in the cycle change could be automatic. However, with an increased awareness of the issues people can start to affect the path of development by making conscious decisions.

Do you have this awareness?

Activities

1 Colour the positive and negative paths in the cycle of change.

2 Divide into two groups. One group role plays the positive aspects of the cycle of change. The other group takes the negative side.

3 Construct cycles of change starting from the points:

a Increased use of computers in the home

b Use of large computer data banks

Show both the positive and negative sides of the system. Indicate where people must make decisions about the direction society should follow.