by Dr. William P. Hall (Ph.D.)

WHY WE BELIEVE COMPUTER LITERACY IS SO IMPORTANT

What Do We Offer You?

When encountering a new publication such as this, you should ask three questions: "What do I get for my money?", "Why should I subscribe?", and "What does the publisher get out of it?". Answering these questions will explain why we believe you need to read the Computerisation Quarterly package.

What Do You Get for Your Money?

The $48.00 subscription provides two unique publications in a binder designed to facilitate reading by school staff, members of school councils, and concerned parents:

Computerisation Quarterly offers 48+ pages devoted to forecasting future computer technology and helping teachers, administrators and parents establish and effectively use computer installations in schools. In its pages we try to answer several kinds of questions:

- How can a teacher with no computer experience cope with the rapidly spreading technology and its strange vocabulary?
- What can be done with computers in schools?
- What problems do staff, students, parents or community have with computers, and how can these problems be resolved?
- How can installations be financed and maintained?
- What equipment/software is appropriate to particular school environments?

And so on . . .

Where possible these and similar questions will be answered by those who have first-hand experience with school installations. We also accept articles from suppliers about their products, but we accept no paid advertising.

International Computer Commentaries offers 160+ pages devoted to exploring the interface between people and computers in business and society. The scope here is much broader.

Special Commentaries cover a wide range of topics, and are written by experts ranging from providers and developers of the technology, such as computer industry scientists, academics and leaders—to end-users of the technology, such as businessmen and world leaders. The writers choose their topics—our main concern is that articles either attempt to forecast future changes in the technology or provide practical information on making the best use of present technology.

Supplier Commentaries tell you briefly in the supplier's own words about new products and how these may affect business and society. Again, we ask the supplier to forecast the future or provide practical information for the present. Supplier commentaries cover all areas of the computer industry from multinational manufacturers of mainframe computers to local software and stationary suppliers.

Additional articles/sections, intended primarily to help those with no computer background, will focus primarily on explaining aspects of the technology and its vocabulary.

In fact, as you will see from looking through the Quarterly package, the topics we treat are so important to Australia's future and our children that every teacher, school councillor and concerned parent in your school community should take the time to read both journals from cover to cover. Many schools may also find the contents appropriate for classroom use. To facilitate these uses, as described in the section entitled 'Multiple Copies for Every School' (p. 9) we offer a discount on bulk orders of the Quarterly made by schools.

Should Schools and Educators Subscribe to Computerisation Quarterly?

Computer-based tools are changing the nature of work more rapidly and radically than at any previous time in human history.

The control of fire and development of fuel burning engines allowed humans to extend control over the external environment vastly beyond the limited force of organic muscle power. This control over 'external metabolism' culminated in the vast social changes of the Industrial Revolution—which are still going on today.

An even greater revolution is resulting from the incredible new technology that shrinks warehouses full of electronic valves and components into microscopic integrated circuits on tiny silicon chips. This 'micro-electronics' revolution extends 'external information processing' vastly beyond the limiations of organic brains (see B. Cunnington's article, "The Cognitive Revolution", pp 13, C.Q.).

To place the present revolution in perspective, the first stationary steam engines of the late 1700's weighed about 10,000 kg and generated as much power as one horse. Today's supercharged automotive engines generate about 1hp/kg, shrinking the engine by a factor of about 10,000 in some 250 years. This shrinking has given the engine mobility, which in turn allowed a transportation revolution that has provided humanity with unlimited personal mobility.

Computers first used transistors about 25 years ago. Today's 256K memory chips shrink several hundred thousand circuit elements into a package only a little larger than that used for one transistor 25 years ago. By this measure, microelectronics technology is evolving at least 100 times faster than did the heat engines in the industrial revolution.

The great social changes resulting from the technological innovations of the industrial revolution took a century or more. Comparable changes caused by the microelectronics revolution may take no more than one or two decades. How much control Australians have over these changes depends very much on how we react to the new technology. If we fail to respond appropriately and in time, we clearly face some dangers from the growth and spread of microelectronics technology, as discussed by Sir Mark Oliphant in his article, 'Information Technology and Society' (p. 50 in International Computer Commentaries). As Australians, there are three main dangers we can address directly:

1. computerised power over information and knowledge can be concentrated in the hands of a few individuals or organisations—to facilitate their control of society,
2. we can easily become completely dependent on technology supplied and controlled by overseas sources—again losing control to the suppliers of that technology, or
3. over the short term we face the possibility of massive technological unemployment until people adapt to technological change.

If Australians remain too proud or too afraid and ignorant to dominate the tools based on this technology, these consequences are inevitable. The article by The Hon. S. Rajaratnam, Deputy Prime Minister of Singapore ('To Be or Not to Be—The Challenge of Computer Based Technology'; p. 5 in International Computer Commentaries) uses a fascinating historical example to show some of the risks Australians face if we remain complacent.

International economic competition ensures that some people, somewhere will take advantage of the powers the technology offers—and use these powers to benefit them rather than us. Professor J.M. Bennett in his article, 'Information Technology and Australia's Future (p. 63 in Commentaries) shows how far we have already gone down the path towards failure, and suggests the

important roles Australia's educational system can take towards rectifying the situation.

Computer literacy offers Australians the best protection from these dangers.

Computer literacy does not necessarily imply fluency with a programming language. It does imply that everyone should understand computer applications well enough to be able to use them for personal benefit, and that at least some Australians must remain competitive with the rest of the world in their capacity to design, build and maintain this technology.

A population that understands the computerised tools that they work with daily will also know enough to democratically regulate the use of such tools.

Would the Average Person Benefit from Using Computerised Tools?

Today, neighbourhood computer stores sell computers including a complete range of business software and connection to your home telephone for less than $3000 ($1800 in the USA). I share premises with a shop retailing such a package for $2756, tax paid! (i.e., the KAYPRO II and Sendata Modem). A printer adds $420.00. Tax exempt, the package—plus printer—sells for $2795. Within a year, more powerful packages might sell for under $2000.

For only a few more dollars and a little knowledge about using database facilities already connected to the other end of your telephone line, you can have virtually instant access for recovering or contributing to almost any aspect of human knowledge. Over eight years ago in the US I started using computerised data banks to find information for academic research projects. Others will consult similar systems for airline schedules, finding and buying products, transferring funds and a multitude of other tasks.

Public access data banks are already growing rapidly in the US and Europe, and have been established here. For instance, a $100 keyboard and telephone connection package for electronic funds transfer is being developed in Melbourne. It will be given free to account holders of the bank funding the development. Australians need to learn about computer technology now!

The personal computer is a communicator of unparalleled power—using telex, telephone and other networks to communicate anywhere in the world. It can even interconnect with the largest computers in the world through such networks. An interesting example of this kind of use in an educational environment is discussed in Paul Butler's Paper, "Communication and Change" (pp. 21 in Quarterly). The rate knowledge is generated within such networks will undoubtedly grow geometrically as more people learn how to use the many different ways computers can work to facilitate creative work and the exchange of ideas.

Consequently, the publishers believe that computer literacy is now as important to good citizenship as is literacy in English. Tomorrow, when today's primary school children leave school to find places in a society where most communication will involve computer networks, computer fluency may well be more important to success in life than literacy in our spoken language.

Facing this future, every school has the critical responsibility to provide each student with a basic literacy in the new technology comparable to that in English. Similarly, all teachers have a responsibility to learn enough about computers to guide the children under their care in their use. Those helping others prepare for the future (as near as three or four years from now!) must now be concerned, personally, to become computer literate—points that are also emphasised in the N.S.W. and Victorian policy documents included in this issue (see pp. 24 and 27). We also recognise that the physical and intellectual tasks of computerisation are truly formidable, particularly if they are to be achieved over the short time demanded by the rate of technological change.

Capital Requirements for School Computerisation

Installing the technology will require massive investments of capital from the community. It is seems to be beyond the capacity of governments to provide or demand such investments in the form of taxation revenues. If schools are to computerise as rapidly as we believe they should, each can best find the required capital resources within its own local community. This should not be an insurmountable task.

The capital investment required for computers is huge when considered as a national or state cost. Yet, the investment is clearly manageable when the cost of providing the children in a given school with adequate computer access is examined at the community level.

To demonstrate this I will take Victoria as an example, and set an hypothetical goal of providing $2,500 in computer facilities for every 8 pupils in the state within a year's time. Based on the Victorian Yearbook for 1983 (published by the Victorian Office of the Australian Bureau of Statistics) the present population of the state is about 4,000,000, of which some 800,000 are school children. Given that students frequently work in pairs—this goal would provide each student with direct access to a powerful work station for 12 to 25% of his/her hours in school—probably sufficient for the most ideal educational goals using the existing software. However, to provide every school with the proposed computer facilities in one year would cost Victoria approximately $200,000,000!—more expense than any government would ever be likely to approve.

On the other hand, looking at this expense at the individual and community level, the Victorian population would be divided into somewhat more than 1,000,000 families or income earning units. (In 1980/81 there were 955,706 male and 590,758 female taxpayers.) Thus, even if the total capital expense for computerisation was incurred in one year, the cost per family would be only about $200.

Putting this capital expenditure in perspective—five years ago, in 1979-80, Victorians spent $250,156,000 on alcoholic beverages, $264,916,000 on tobacco products and $197,852 on home entertainment products. These amounts would be even higher now. Presumably the ratios for Australia as a whole would be similar to the Victorian ratios.

Wherever average to affluent school communities develop the will to computerise, they should be able to finance this from within their own disposable incomes. One should also not lose sight of the fact that local communities can computerise their schools for considerable less cost than would be extorted from the community in taxes to support a Government bureaucracy committed to install the same amount of capital equipment.

The Intellectual Investment

Obviously, a massive computerisation effort will require intellectual investments comparable to the capital investments. Those who are to teach others to use computers will themselves need to make major investments in learning. However, since most teachers are also excellent learners, most schools should also be able to find the intellectual resources required to dominate the new technology. However, there is no doubt that both the capital and intellectual tasks are difficult ones requiring dedicated efforts at the school and community levels. Computerisation Quarterly is designed to channel appropriate information to schools to help them achieve computerisation.

Content

With these aims in mind, our content is selected to meet two important goals:

1. To transmit ideas, facts and motivation that will help in the formulation and realisation of school computerisation programs, and
2. to help teachers and parents understand enough about computers and how they work so they can lead children and others under their care into the new computerised age.

Computerisation Quarterly and International Computer Commentaries are designed specifically to help leaders in their respective school and business communities who have no prior computer experience. The journals attempt to forecast the future and provide essential information on the advancing technology to help you lead society through a smooth transition into this future.

Subscription 'Cut Out' application form
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Who Publishes these Journals

The value and reliability of information contained in a publication is greatly affected by biases affecting the selection, writing and editing of material included.

We won't try to disguise our interests. Both organisations involved in publishing Computerisation Quarterly are concerned to help Australians dominate the emerging computer technology. A run-down on the Publishers and Editor and our commitments to other organisations will make our interests clear.

The Publishers

The Australian Foundation for Computer Literacy Limited is responsible for editorial content in the Quarterly and contributes to the Commentaries. Computer Commentaries Trust owns and manages both journals. The Foundation and Trust are non-profit bodies incorporated in Victoria.

The Foundation and Trust have each sought to remain independent from major computer industry suppliers. We actively seek commentaries and articles from all areas of the computer industry, but neither journal accepts paid advertising. (If deemed appropriate, under some circumstances, the Foundation may accept industry support for other projects as dictated by the financial requirements of these projects.)

Our Sponsors

Three corporate sponsors from outside of the computer industry have contributed towards the costs and mechanics of publishing and distributing the Quarterly (CCH Australia Limited, McPhersons Limited, and Westpac Banking Corporation). They agree with our aims and will gain benefits as sponsors of the journals.

Historical Development of the Publications

The Quarterly package was conceived by Mr P. Barrie Sutcliffe, Managing Editor of both journals and Chairman of the Trust. Mr Sutcliffe has a long background in journalism, marketing, and creative consulting—mostly based on his ability to develop new concepts and to translate complex ideas and jargon into understandable English. Over the last three years, through his contacts with some of the original members of the Foundation, he learned of the growing revolution in computer technology and developed the two journals to help people understand the technology. As these ideas grew and took form, Mr Sutcliffe made a wide range of contacts in Australia and overseas able to provide material for the journals and organised the Trust to publish them.

The Foundation was approached late in 1983 to take a major role in developing the journals. Several other Foundation members, including myself, have been helping in that capacity since then.

The Foundation was incorporated in Victoria during May, 1983, as a non profit company limited by guarantee. Most of its founding members used personal computers and all understood that the spectacular proliferation and advance of computer technology simultaneously offers great opportiunities and great dangers to the individual. All believe that the beneficial opportunities will be realized only by democratising access to the technology.

The Foundation was incorporated to help Australians gain access to computers and become computer literate. Early projects have included consultancy services and computer training—in situations ranging from intensive residential programs to group and individual tuition either on-site or on clients' premises.

The Foundation also favors development of indigenous computer technology. The present very high levels of international trade are fragile. After global war or major economic dislocation, Australia could not depend on overseas suppliers for high technology products. Although most of us are basically optimistic about the future, even optimists buy insurance policies. Australia must adopt the new technology to remain competitive, and—if only for insurance—Australians should dominate whatever technology they use.

Meet the Editor, DR WILLIAM P. HALL

The Australian Foundation for Computer Literacy is committed to organise and edit copy for Computerisation Quarterly. I am Executive Director of the Foundation and from the beginning I encouraged Mr Sutcliffe to develop Computer Commentaries and the Quarterly. Consequently, it has fallen on me to oversee most editorial tasks for the Quarterly. My personal views and experience will affect the contents—so I will introduce myself in more detail.

Some reflections based on my own experiences may help others in learning to use personal computers. I only recently encountered microcomputers myself, and like most adults, I found the learning process difficult. However, my teaching and research experience provided me with some ideas which I believe are worth sharing.

Science and Teaching Background

I am an expatriate American, married to a fourth generation Australian, and have lived in Australia for six of the last seven years. After studying university Physics for three years, my lack of aptitude for arithmetic (this was before the time of pocket calculators and personal computers!) caused me to shift to Zoology, Biology, Ecology and Genetics. I earned my Ph.D. in Evolutionary Biology in 1973 from Harvard University for research on chromosome variation, species formation and evolution. This was followed by four years of teaching Puerto Rico and Colorado.

I came to Australia in 1977 to begin a two year Research Fellowship in Genetics at Melbourne University, to study reptilian chromosome variation. Besides meeting my wife here, I also began to explore the historical and philosophical foundations of problem solving approaches used in evolutionary biology.

This was followed in 1979-80 by one very unsatisfactory year of university teaching in Washington DC. Among some 200 students in my courses, not one was optimistic enough about the future to show any real interest in learning. I couldn't blame them—neither candidate for the 1980 Presidential election seemed qualified, senior civil servants were dispirited, power blackouts affecting 30 to 40 million people for more than a day had occurred, trouble spots in Iran, Israel and Poland threatened global war, and potentially fatal stresses in the international banking system were becoming obvious.

In short, it seemed that the demands for resources had grown too big and too complex for advanced countries like the US to cope with the present, let alone to plan for the future.

From my viewpoint as a biologist, the long term prospect was no better. Yearly more people were each individually using up even more non-renewable resources.

My pessimism about the future seemed to be seconded by students, faculty and personal friends. In the community around the US national capital's largest university I found no one prepared to discuss the future—let alone working to make it better for people.

We decided to return to Australia, where I took a research fellowship at Queen's College, University of Melbourne, to develop a book on problem solving approaches in evolutionary biology. At first I saw no answer to my concerns for the future other than to stay out of the Northern Hemisphere and continue what I was doing. However, within a year of returning to Australia, I began to apply my apparently irrelevant experiences and concerns to problems of computerisation.

Experiences with Computerisation

My first brief encounter with computers occurred in a university calculus course in 1958. We gained access to an early 50's Burroughs computer using a magnetic drum (ancestral to floppy disk drives) for central memory and tape reels for storage. This machine sold then for several hundred thousand dollars, had a memory capacity of only 1024 words and at best could execute less than 1000 operations a second. However, it was programmable, and I learned some principles of programming (machine language only) by working with it.

To see how fast computers have evolved within my own personal experience, compare this 30 year-old technology with present-day computers: According to the May 1984 HIGH TECHNOLOGY, the present Cray supercomputers (no larger physically than the Burroughs), cost only about ten times more, hold 250,000 times more words in central memory, and optimally execute 500,000 times more operations per second. Even this unimaginable speed is expected to increase by 50 times within two years! At the other end of the computer spectrum, I am composing this essay on my KAYPRO II portable. This cost 1/100 as much as the Burroughs, has a memory 64 times larger and it is 2,000 times faster. Using the Cray as a benchmark, in 30 years the capital cost per operation decreased by a factor of 10,000, without considering other savings. Using the less advanced KAYPRO as a benchmark, the cost is reduced by a factor of at least 100,000.

Before visiting Australia I had also learned to use the various computerised reference services to the biological literature. (By 1977 Lockheed Dialog already offered virtually instant computerised searches over telephone lines of over 5 million *indexed* citations in Biological Abstracts, plus access to more than 100 other reference services—some larger than BA). Also, because of my interest in new technology, I was aware that marvellous machines called word processors had been invented, and had ideas about how one might help my writing.

When I started working on my book at Queens, I looked at dedicated word processors (microcomputers sold with word processing software only) but found them to be too expensive. However, I was referred to some Australians who were developing a general purpose microcomputer here in Melbourne. They sold me a prototype for the cost of the components—about ⅓ the cost of a dedicated word processor.

Although not totally inexperienced, I still faced all the problems of a naive computer user. I began as a computer illiterate—and had to learn a new vocabulary, think in new ways, and master new tools for putting my thoughts onto paper. My typewriter had become a desk-top slave—able to do anything possible to its input and output devices and explainable in simple logic and language.

To help pay for my new toy, I started a word processing bureau—primarly typing technical theses, and soon became skilled with using several different word processing packages and other software from games to data base managers. None of these applications required me to learn any programming languages—and I see no need to do so in the future.

The open-ended possibilities of my own computer caused me to look at the potential impact of its technology on society.

My first response was to establish a computer club at Queens, so students could learn to use technology they would face after graduating from University. Yet, despite a visit by Barry Jones (then Shadow Minister for Science and Technology) to discuss his book, "Sleepers—WAKE!", and two computers loaned to the club, few students took advantage of the opportunity, and the club eventually collapsed.

Due to my growing concerns about the future and the apparent lack of interest by enough students, I eventually resigned my Fellowship to pursue computerisation interests full time. Since then I have extended into computer consultancy services and journalism. I provide advice and training on microcomputer-based word processing systems, and develop tutorial systems for microcomputers. Several of my articles on word processing systems have been published in microcomputer magazines, and I was interested in taking a major role in Computerisation Quarterly when this opportunity arose.

Computer People Are Optimistic About the Future

As soon as I looked beyond the ivy towers of academia, I met many people who were optimistic about the future and working actively to make it better. All were involved with personal computing.

While trying to develop the computer club at Queens, I got to know the people who made my machine and met many other non-university people also concerned with the effects of computer technology. Most believed the new technology would improve the lives of most people—once it was assimilated.

The optimists first came together as a group in June 1981 when I invited several acquaintances to Queens for Barry Jones' talk. Jones asserted that computerised technology would cause great technological unemployment and social dislocation. We argued that increased efficiency and new kinds of business the technology allowed would soon create many more new jobs than were lost to automation.

With many changes in 'membership', these computer optimists have continued to meet every week since then, without significant break, primarily to exchange ideas on developing and democratising personal computing. The meetings are held Tuesday nights at Bogart's Restaurant in North Melbourne and anyone with an interest in personal computing is welcome. The group accepts the name 'Bogart's Computer Club', but all attempts to formalise the association have failed. Attendance usually ranges from 5 to 30 people, with more than 50 people attending more than once a year. Attendees include computer science professionals, professionals from other areas who have taught themselves to use microcomputers in their businesses, and those like me, who have built computer-related businesses from scratch. All are entrepreneurial to some degree and most would agree that the democratisation of computers should be supported by users of the technology. We all believe that people will voluntarily adopt computers when they can see a clear personal gain to be derived from doing so.

Computer Literacy Ventures

Besides the Australian Foundation for Computer Literacy and the present journal, several other experimental ventures directed towards providing the public with greater access to personal computers have grown from ideas introduced at Bogarts' meetings. Those I have been associated with independently or through the Foundation include:

- A public access computing facility in a shop-front, where anyone could gain hands-on access to microcomputer-based applications for a low hourly rental fee.
- A computer training camp, where approximately 35 unemployed people worked intensively for a month learning to use personal computers, followed by an informal computer bureau/word processing cooperative to provide computer trainees who need it with practical work experience and continued access to computers. Most trainees who went through the camp and/or this program, and sought computer related jobs, found employment.
- The provision of group and individual tuition on microcomputer-based office systems—mainly word processing but also including some database and accounting applications.
- Peripheral involvement in school computerisation projects at both primary and secondary levels.
- A seminar for Victorian producers of computer technology products designed to help them improve their marketing skills to develop their businesses in the face of foreign competition.

These projects have provided me with considerable practical experience in helping people to develop computer literacy.

Microcomputers and the Individual

I have gained several insights from these experiences about how people cope with computer technology and adapt their lives to its powers. If society as a whole is to become computer literate, the process must begin with teachers and other natural leaders.

Within one to three months, almost any adult equipped with interest, motivation, and relatively unrestricted access to a computer can become computer literate. The process takes about the same time for anyone—whether unemployed or the managing director. However, if any one of the three criteria are absent—little will be learned irrespective of the time spent. Lacking access to a computer, there is little an individual can do to speed the learning process. However, the other two factors are under individual control, and a clear understanding of what is involved in the learning process may help the learner to preserve or generate the needed interest and motivation.

Personal computers are scary things because they subtly reshape the nature of those who use them.

Most new tools simply allow existing jobs to be done better, or faster, or with less effort. These tools do not change the nature of either the job or the worker in any fundamental way. However, rarely a tool is invented that does an existing job in a totally new way or does something which couldn't be done at all before. Adopting such a tool causes a revolutionary change, both in the nature of the job and in the person using the tool.

Most computer applications redefine the work being done, and certainly place the people concerned in new relationships to the work. The person using the computer must learn new concepts to describe both his relationships to the computer and the computer's relationships to the work being performed. (Please note that I am *not* talking about learning to write computer programs, but rather about learning a language of concepts, possibilities and relationships.) Many adults develop an irrational fear of computers because they don't understand what it is they need to learn. However, this fear can be eliminated if the nature of the learning process is recognised.

A learning situation similar to gaining computer literacy but more difficult than that, is that of moving to a foreign country and having to learn the new language and way of life. Like foreign languages, computer literacy is learned most easily when the learner is immersed in the new culture. Very few adults succeed in learning a new language without some form of concentrated contact.

Becoming literate with computers is work for an adult. However, with an understanding of the nature of the learning process involved, and a realisation that computer literacy is undoubtedly much easier than learning a new human language, the process should not be so intimidating.

Young children find computer literacy much easier to acquire. They are biologically programmed to assimilate new languages and relationships. Children easily understand and use the computer's possibilities, and integrate these with the rest of what they are learning about the world. After all, computers are still far more logical and predictable entities than are other humans.

COMPUTERS OFFER AUSTRALIANS A BRIGHT FUTURE

Although I doubt computers will eliminate all of the problems facing humanity, they offer a number of hopeful possibilities for increasing the time available for solving them.

Most crises humanity faces on a global basis derive from a growing population increasingly exploiting diminishing non-renewable resources. Not only is the per capita demand for resources rising, but an ever growing number of humans demand their share. Will humanity be destroyed by nuclear war growing out of a fight over dwindling oil supplies or some other scarce resource? or will we destroy ourselves through a runaway 'greenhouse effect' caused by industry and automobiles turning the planet's fossil fuels into carbon dioxide? (see box) Even if we avoid these catastrophes, we still face the final crunch when the last resources are used up.

The technological civilisation we know cannot survive unless the population/resource equation changes radically in the near future. Five years ago I saw no hope that such a radical change could occur without global war and famine—probably ending civilisation anyway. Today, I believe that microelectronics technology offers some very real possibilities for substantially reducing humanity's demands on the environment and limited resources.

Our present industrial civilisation depends heavily on the physical transport of massive amounts of raw materials, fuels, manufactured items, plus the infrastructure of heavy industry required to make the goods, to build and maintain the transportation network and to make the manufacturing plant itself. In turn, the heavy industry is operated by people, requiring huge amounts of transport for commuting to and from their workplaces. The infrastructure and transportation network are all intensive users of fossil fuels and other limited natural resources.

If humanity survives long enough for the transition to occur, microelectronics technology will lead inevitably to a post-industrial civilisation much more in balance with nature and available renewable resources.

In this new civilisation, the remaining factories will be largely automated and most people will work in information and service industries at inexpensive and easily portable workstations. Because there is no need to bring labour to centralised facilities, work can easily be done in or near the home, and people can readily live near the resources of food and water they consume. Access in the home to electronic funds transfer, information on goods and services, and the probable automation of home delivery services will eliminate most needs for private transport—along with the needs to manufacture and fuel this transport. By eliminating the personal need to carry goods home, the remaining individual transportation needs can be met very comfortably by foot, pedal and public transport.

Since most heavy industry is involved in producing transportation equipment, tools and plant for building such equipment, apparatus for producing the raw materials and fuel, etc ... heavy industry will represent a far smaller share of the remaining industry than it does at present. The remaining factories will be automated, and automated factories are usually more efficient users of raw materials and energy than are manned factories—further reducing demands for materials and energy. By comparison to the energy and raw materials demand by heavy industry, microelectronic devices cost virtually nothing to produce and transport.

Adopting the technology would greatly reduce the demands for fossil fuel and thus decrease the likelihood of nuclear war or a runaway greenhouse effect.

Australia could lead the world in showing how a society can adopt and achieve the goals of computerisation and automation. However, a government cannot impose the changes and goals I have outlined here onto its people and still remain even remotely democratic. The changes must be desired, understood, and instituted by the individuals most directly concerned with their effects.

Our society is comprised of local communities, each community is centred around its schools. Teachers can bring new ideas to their communities. The microelectronics revolution presents society with a vast and exciting array of new possibilities to minimise and escape grave dangers faced by humanity. If teachers concerned about environmental and antinuclear causes would adopt and promote computerisation as strongly as they support these causes, this would do more than any march or protest demonstration to help society towards their goals of preserving the environment and avoiding nuclear holocaust.

In fact, for the reasons outlined above, I believe the computerisation effort should be adopted by every educator or community leader concerned with our future. The cost per family to equip every school desk in Australia with a powerful computer would be less than is presently spent on home entertainment, alcohol and cigarettes. The goal of school computerisation can be achieved with a shift in priorities, which should be within the resources of most families to achieve. Not only could the schools be properly equipped to provide our children with skills and understanding they need for the future, but school based computer centres should also be able to provide adults in the community with enough access to the technology so they also could learn to use it. Teachers are ideal people to communicate these ideas to their communities.

From the above discussion, it should also be clear why I regard our computerisation journals to be of such importance. If the journals develop as planned, they can provide the leaders in every community with the kind of practical information they will need in order to make their computerisation efforts successful. However, our editors and publisher cannot do this without your help.

THE GREENHOUSE EFFECT

For those who don't know about the phenomenon, the greenhouse effect results from increasing CO_2 in the atmosphere. Light penetrates easily to the surface of the Earth, where it is turned into heat and infrared radiation. Infrared escapes to space, and the balance between incoming energy in the form of sunlight, and outgoing energy in the form of infrared, maintains a relatively even temperature at the surface.

Panes of glass in a greenhouse, or increased CO_2 in the atmosphere block some outgoing infrared, causing the surface to heat up. So what? Minimally this would melt the remaining polar ice to raise sea levels by many tens of metres—flooding most of the world's most productive agricultural lands and many capital cities—to crowd the world's population into a significantly smaller area with a greatly reduced capacity to feed them. At worst the Earth's atmosphere could evolve towards something like Venus's, where high CO_2 levels have raised the surface temperature by several hundred degrees over what it would be with an Earth type atmosphere.

Given that CO_2 levels are presently rising at an ever increasing rate—we could see a flooding of the coastal planes within our own lifetimes if we don't act to drastically reduce the rates at which we burn coal and oil.

CALL FOR PAPERS

Our goal for Computerisation Quarterly is to provide teachers and community leaders with information that will help them to determine and achieve the optimum computerisation for their schools. We can best do this by publishing articles written by teachers, administrators and parents (or even students) who have themselves been involved in computerisation projects.

If your school has already installed some computers, YOU are the best source of information for those following you down the path to computerisation. Your first-hand experiences—good and bad, will be far more valuable than any number of pontifical statements by academics or suppliers. Commentaries from these latter sources will undoubtedly offer many ideas and products worth trying—but only your own practical experiences will be able to tell other schools how successful they may be in actual use.

Categories: We anticipate that most papers will fall into the following categories:

- **From the Editor's Console**—where I have the opportunity to discuss issues and circumstances that I believe to be relevant.
- **Letters to the Editor**—short notes and letters, hopefully raising issues worthy of general interest and/or continuing debate. We welcome controversial views, either as 'Letters' or as contributed papers—e.g., is the drive to computerise wrong? Do you see other practical choices society can make when faced with the growth of computer technology?
- **School Reports**—to let us know how computerisation is proceeding in your community. As well as telling us something about the history of your installation and the nature of your school, we would greatly appreciate substantive details on your particular successes so that other schools may emulate them.
- **Hardware Reviews**—what systems have you used? What are their specifications and prices? What advantages and disadvantages have they offered to your school? What modifications have helped you get more out of the installations, etc.
- **Software Reviews**—"courseware", business applications, programming languages, administrative systems, etc. What are their hardware requirements? What advantages and disadvantages do the packages offer for schools? user reports, etc. (For courseware please see the software review form in the centrefold of this magazine.)
- **Administrator's Corner**—evaluations of computers/software for school administration, discussion of problems encountered in administering school computer installations.
- **Funding**—details on available sources of government funding, corporate assistance, local fundraising ideas, plans, and results. Ideas on how to develop the necessary grass-roots support required for the rapid computerisation of schools.
- **Policy Matters**—policy papers and documents (e.g., see 'C.A.P. South Coast Region—Draft Computer Policy', pp. 29; and 'Computer Education in N.S.W.—Where It's Been, Where It's Going', pp 22). How will computerisation affect school curricula? How can they best be integrated into the overall educational needs? What benefits/disadvantages to students derive from the computerised curricula?
- **Public access and adult education**—reports on involvement of parents and the community in general with school computer installations—both for public education and as potential sources of revenue for the support of the school installations.
- **Contributed Papers**: e.g., *Tasting the Future*—jobs, economics and the structure of society will be changing radically and all-pervasively over the next ten years as the microelectronics revolution accelerates. What do you foresee from this future about the kinds of education students will need today to prepare them for the world they will enter when leaving school. *The human/computer interface*—we welcome discussions of the humanistic and philosophical implications of the computerisation of society.
- **Suppliers Reports and Contributions**—we also seek information from suppliers concerning their offerings in the educational area. Short 'Reports' should describe the nature of the product(s) you wish our readers to know about, what advantages do they offer schools, what are their potential social implications. Longer 'Contributions', should discuss the supplier's views of the growth of technology, the corporate policy with respect educational products/services, and so on.

Disclaimer: Given that we receive more material than we can publish, we reserve the right to make minor editorial alterations in style, cut, reject, and/or return manuscripts to their authors for suggested revision. To minimize the time between receipt of a manuscript and its publication, authors' proofs will be provided only for papers received early in our publication cycle, and we reserve the right to publish even though corrected proofs have not been returned.

Payment for contributions: As yet our budget for the Quarterly does not allow for payments to authors unless by prior agreement. To a considerable degree the Quarterly must operate like an academic journal, depending for copy largely on your voluntary desire to communicate your experiences and knowledge to your colleagues. However, if everyone who needs to know about computerisation actually subscribes to the journal, at some later date we should be able to pay all contributors a decent rate for their experiences.

Electronic text editing: We welcome text submitted on computer diskettes, as it facilitates editing. We are able to read a wide range of 5-1/4" CP/M-80 or MS/PC-DOS formats including: Apple II, KAYPRO II, IBM-PC, Osborne single and double density, Xerox single and double density, Tandy single and double density, and standard 8" IBM single density. After editing, the text will then be sent to the typesetter on disk—avoiding all re-keyboarding. At present we prefer text files to be written with WordStar or submitted as pure ASCII characters, but we have access to a variety of other word processing programs and will be happy to discuss the problem of program compatibility with any author. Please indicate on your disk what disk formats and word processing packages have been used. Also, to serve as a backup and to indicate stylistic preferences, please include hard copy along with the disk. Disks and/or manuscripts will be returned if accompanied by a stamped, self-addressed envelope of suitable size.

Style: Typewritten text should be double spaced on good A4 bond paper. Photographs, figures and tables are welcomed as a change from straight text. We think our readers would like to see what you look like; and if the visual material contributes to the text—so much the better! All graphical material (photographs, figures, diagrams, etc.) should be clear and of high contrast—suitable for printing. Ideally, the graphical material should be prepared with double the dimensions of the printed version. Artwork should be planned for 1, 2 or 3 columns width as provided by our page format. Where figures are to be inserted into the text at a particular point this should be clearly indicated both on the back of the figure and in the manuscript. These or any other notes associated with the figure should be written on a separate piece of paper and stuck to the back with sticky tape. DO NOT WRITE DIRECTLY ONTO THE FIGURE—either front or back.

One of the great difficulties the uninitiated have with computers is the new language that has grown up around them. Since this journal is directed partially towards those who as yet know little about computers we hope that contributors writing for this audience will minimize their use of jargon and define that which they must use. Since we anticipate that many non-teachers will also read the journal, the comments on computer vocabulary apply equally to educational vocabulary. The Quarterly package will include a language lesson and a glossary of computer jargon (presently included in Computer Commentaries), but there will always be readers who first encounter the jargon in your article.

If you are reporting your own thoughts or something you did personally, we much prefer for you to write in such a way that a reader can easily determine who did what to whom (i.e., please use the first person active voice where appropriate, rather than the royal 'we' or the weak and wordy passive voice). Short simple declarative sentences are generally preferable to long, complex and compound sentences. On the other hand, if you think you have something to contribute and are put off by your schooling to avoid the first person at all costs —we will be happy to receive your thoughts, no matter how

disguised you are in person and voice. We do, however, reserve the right to edit.

Anonymity: Many successful efforts to install computer installations have involved telling different things to different people (and other sneaky or even questionable practices) to raise the necessary funds or promote needed equipment or services. We hope you will help to pass successful tricks along to others behind you on the computerisation pathway by telling us how you did it. We also hope to be able to advise others against trying tricks that have caused trouble. If it will help convince you to tell you story, we are quite happy to publish anonymous articles that also disguise the particular school—as long as we know who you are so we can check the source. Confidentiality of sources will be maintained.

In any event, we seek to provide a wide band communication channel to facilitate your computerisation efforts. The value of the information you get out of this channel will depend largely on the value of what you put into it. We hope to avoid the perils of GIGO. Please contribute!

SOFTWARE REVIEW

The success of computer applications in schools depends almost entirely on the software. Useful evaluations of educational software packages are also much harder to come by than are evaluations of hardware. In later issues of the Quarterly, we hope to include detailed reviews of new and popular software. You can help us pass your experiences with various packages on to other schools by filling out and sending to us a copy of the review form included in the Quarterly for each software package used in your school. For new packages we will publish reviews in full. For popular packages we will summarise everyone's results. If you wish to take the time to write a review paper on software that you have found to be particularly useful, we will also be very happy to consider this for publication.

We will also appreciate review articles on administrative software packages.

Please send your reviews to Dr William P. Hall, Australian Foundation for Computer Literacy, 430 William Street, Melbourne, Vic. 3000.

The included form combines ideas drawn from the form published by A.D. Salvas and G. J. Thomas in their article, "The Evaluation of Educational Software Material" from the Proceedings of the Sixth Annual Conference of the Computer Education Group of Victoria, 1984: "Computing and Education—1984 and Beyond", and a form provided by Murray Luke of Bemboka (NSW) Primary School. We recommend the Salvas and Thomas article for more detail on the information we request and how it can be used by those charged with selecting educational software for their school.

If you wish your review to remain anonymous (e.g., because you pirated the software), please indicate this. We still need your evaluation. A good review will still help the manufacturer do more good work—someone else will then be more likely to buy the package.

Multiple Copies for Every School

We believe that every school will benefit from Computerisation Quarterly, and that your subscription will be cost effective. In fact, most schools will probably find they need additional copies of the Quarterly.

Thanks to the microelectronics revolution, society and the nature of work are changing faster than ever before in human history. We try to anticipate the nature and direction of these changes. Each Quarterly issue will contain important material from around the world which should be read by every educator and parent concerned to help our children face this future.

Most readers will probably keep the Quarterly for at least a week, so many schools will want to have more than one copy available for staff, Council and parents. Because of the scope and value of the contents, we also anticipate that many teachers will want full sets of the Quarterly for courses in Computer Awareness and Computer Literacy.

If your school needs more than one copy of the Quarterly package, these can be obtained at substantially reduced costs. Note that bulk prices are available only to schools which have paid for one subscription at the full price. Please make any enquiries or orders for additional subscriptions by turning to page 16.

Since the Foundation and Trust both seek to maintain their independence from the Government and major computer industry suppliers, publication and growth of the journals can continue only on a sound commercial basis—through the support of our subscribers.

Australian Foundation for Computer Literacy

Aside from the help your subscriptions to Computerisation Quarterly will provide, the Australian Foundation for Computer Literacy also welcomes support for our operating expenses and the educational and training efforts we provide in the area of Computer Literacy. This support can be provided through joining the Foundation in one of three classes of associate membership: Associate ($25.00/yr), Corporate ($100.00/yr), and Sponsoring (500.00+/yr). For further information, please write to The Australian Foundation for Computer Literacy, 1/180 Flinders Street, Melbourne, Vic. 3000.

Your subscriptions and support from memberships will help to ensure that the Foundation remains independent from government and industry support—to provide a forum for the free and open discussion of computerisation issues that represents the USERS of the new technology.