Footnotes

[1] A vendor of the top-selling expert system shell, the base upon which these tools are built, informed the Commission that a large quantity of its product had been sold but information on what applications it had been applied to was difficult to obtain.

[2] The Rand model described by Waterman, Paul and Peterson in Quinian (ed), Application of Expert Systems, Addison-Wesley, 1987, extends the rules to a number of variants such as "if...let..", "if..conclude.." and "if..assert..". The authors maintain that the complexity of legal reasoning demands an extended rule set.

[3] Tyree, A., Expert Systems in Law An Introduction to Expert Systems with Legal Examples, Prentice Hall, Australia 1989, Chapter 6

[4] Traditionally a language interface has been used, but the expansion of Graphical User Interfaces (GUI) and Computer Aided Manufacturing Systems have led to new types of interfaces such as a mouse-driven link through icons.

[5] Susskind, R.E. The Next Generation of Computers for Lawyers: Artificial Intelligence, Expert Systems and the Law, Masons, Solicitors, London, April 1990.

[6] Susskind, R., *Expert Systems in Law*, Clarendon Paperbacks, Oxford, 1989.

[7] Phillip Argy of Mallesons Stephen Jaques, Sydney, believes that it is in the area of quality control that the commercial application of these types of document modellers will pay their own way many times over.

[8]. Susskind, *op.cit.*

A Brief History of Artificial Intelligence

• *Graham Jefferson*

Attorney-General's Department, Northern Territory. This is an extract of an article accepted for publication in the Tasmanian Law School Journal.

Introduction

The topic of Artificial Intelligence arouses more emotion than any other in the field of computer science. The idea that machines could be made to think upsets people. This has been exacerbated by the grand claims of early AI developers and science fiction portrayals of robots. No-one has produced an undeniably intelligent machine and no-one has proved that such a task is impossible, so the debate remains speculative as well as heated. Talk of applying Artificial Intelligence to the law necessarily raises the temperature of the debate, if only because many see the law as more closely tied to notions of humanity and morality than hard sciences like chemistry and biology. However, the Commonwealth Departments of Tax, Customs, Immigration, Social Security and Veteran's Affairs are developing machines which use Artificial Intelligence to help in their administration. These machines are designed to give the same answers to questions as human experts. The departments propose that these machines will assist departmental staff in a variety of tasks, some of them involving legal decisions. The aim of this short paper is to avoid the emotion surrounding the Artificial Intelligence debate and present a history of this technology in the law.

The Emergence of Expert Systems

The development of Expert Systems (ES)[1] needs to be seen in the context of computer science generally. The emergence of modern computers occurred in the late 1940s so the field is relatively young. However, in the time since the first digital computer[2] we have made a great deal of progress. Computers in the 1990s are smaller and faster than their ancestors. Software has evolved from hard-wiring circuits into sophisticated programming languages. The influence of this new science in society is manifold. Few people in the developed world could claim to be unaffected by advances made in computer science.

At the forefront of academic research within computer science is the pursuit of Artificial Intelligence (AI).[3] In crude terms, AI researchers are "making computers smart".[4] A very large number of experiments fall under the umbrella of AI but, for the purposes of this discussion it is only important to know that AI scientists are trying to develop programs that exhibit intelligent behaviour.

Expert System (ES) technology is a limb of AI research that seeks to implement human reasoning processes within problem solving programs. Unlike other experiments in AI, ES

New South Wales

The NSW Society has been very active over the last four months. The monthly meetings topics included: 1. Open Systems; 2. Electronic Security of Documents; 3. Computerised Conveyancing; and 4. International Copyright in Developing Countries.

Topics being discussed for next year include: understanding computer jargon; government regulations; outsourcing; developments in product liability; expert systems for lawyers; and systems integration and privacy, parallel importing and copyright.

If you have any suggestions for future meeting topics please let Liz Broderick know as soon as possible.

The end of year meeting which is advertised on page 23 is certain to be a "GALA EVENT". The topic is "Europe 1992 - What it means for you". Dr Gragolla of the European Commission will chair the meeting. A warm invitation to attend the meeting is extended to members of any interstate Societies or the New Zealand Society.

After the formal papers, drinks will be served and members will have a chance to renew old acquaintances and to meet new members.

At the last Committee meeting it was agreed that the Society will assist in the advertising of the Pacific Rim Computer Law Conference together with the Computer Law Association Inc. of the US. This conference is currently scheduled for 25 and 26 February 1993.

New Zealand

The inaugural meeting of the steering committee of the Christchurch Branch was held in July 1991. The steering group comprises David Rowe, Dean of the Law Faculty - Canterbury University (chairman), Neil MacLean of Bell Taylor & Co also chairman of the NZ Law Society of Technology and Law Committee, Ed Manco from Deloitte Ross Tohmatsu and Tony Robinson. The branch is organising a series of seminars for 1992.

On 30 May, 1991 the President, Anthony Wong addressed the Society on "An Introduction to Document Handling Using Optical Filing". The seminar explored the use of this technology as well as some of the optical filing concepts involved.

In June, 1991 the Society met in Wellington to explore the new options for "User Friendly Access to Computerised Legal Information Services". Representatives from KIWINET demonstrated their new search and help interface called "Kiwinet Prompt" which eliminates the use of the less-friendly ".." commands found in BRS Search. David Hinden from Hinden Communications who developed the front end for the NZ Law Society demonstrated the new services which are available including a gateway to ABAnet, the network of the American Bar Association. An interesting graphical user interface search tool called SearchClerk which allows users of Macintoshes access to the Kiwinet databases was also demonstrated by Graeme Ramsay from CDL Systems. SearchClerk is designed to be used by lawyers themselves and all the commands for each part of the search are available from a pull-down menu.

The Auckland branch of the Society organised an expert systems seminar for 21 June 1991. The speakers were Martin Buis of Ernst & Young who has extensive experience in developing expert systems and Roger Parkinson who has written expert systems for service organisations.

Ian Perry the Society Membership Officer and partner of Deloitte Ross Tohmatsu gave an interesting talk in July 1991 on contingency planning for disasters and events that may preclude a law firm and its employees from access to the office, client files and communication facilities in his address on "Business Continuity Planning for Law Offices". The seminar was of great relevance to New Zealand

businesses particularly because NZ has an earthquake fault line across the length of the country.

On 27 August 1991, John Terry from Baldwin Son & Carey discussed the issues involved in the patentability of computer software in New Zealand and overseas.

On 7 August 1991, the NZ Government introduced the Data Privacy Bill which covers both public and private sector agencies. The Bill sets out a number of information privacy principles and also introduces provisions to allow data-matching between a number of government departments including the Department of Social Welfare, the Inland Revenue and the Accident Compensation Commission. The Minister's media release states that "... it is timely to introduce this Bill now because the Government has decided that in order to prevent welfare fraud and ensure that those eligible to welfare assistance receive their proper entitlement, it is necessary to match some information held by one Government department with that held by another."

Legislation has also been enacted to introduce the Kiwi Card to those in low income groups. The card will be used to obtain payment of any benefit or allowance.

The Society invited the Minister of Justice, the Honourable Mr Douglas Graham to address the Society on a number of issues pertaining to this legislation. The seminar was held in Wellington on 10 September 1991. The seminar will also be repeated in Auckland and will be presented by Tim McBride, senior lecturer at Auckland University.

For information about the Society please contact the secretary, John Terry Baldwin Son & Carey, PO Box 852, Wellington, New Zealand. Tel: 64 -4 721094, Fax: 64-4-736712.

Western Australia

Introduction to Computers for Lawyers

On 12 and 13 March, 1991 WASCAL conducted courses introducing lawyers to computers. The course was designed for computer illiterate lawyers. It involved hands-on experience using the mouse and keyboard. The environment was Windows 3.0 and the packages demonstrated included word processing, spread sheet and database applications.

Privacy Legislation in WA and Related Topics

The speakers were Wayne Martin, Perth Barrister and Convenor of the Privacy Committee of the Law Council of Australia, Bill Hassell past Member of the Legislative Assembly who was involved in introducing privacy legislation into Parliament and John Palmer from the Australian Computer Abuse Research Bureau. This meeting was held on 22 May, 1991.

CD ROM Seminar

On 21 August, 1991 a "legal and not so legal CD ROM Seminar" was held at the Parmelia Hilton Hotel in conjunction with WASCAL's AGM (disposed of in 10 minutes). Approximately 60 people saw demonstrations of the Corporations Law on disk, the LAWPAC Series including New South Wales, Victoria and South Australian State reports, an encyclopedia and Yellow and White Pages Directories on disk. There was also a talk on the use of optical disks for achiving data.

Proposed Seminars

• Business Software Association of Australia Seminar

We are attempting to organise a representative of the BSAA, a representative from an organisation caught pirating by the BSAA and an independent legal practitioner to talk about issues relating to software piracy.

• Government Information Technology Contracts

We are organising representatives from State Services, Australian Information Industry Association and an independent legal practitioner to talk about the proposed Federal Government's Information Technology Contracts.

• Imaging

Early next year, we will be conducting a seminar outlining the technology involved with imaging and how it can affect work practices.

• Computers in the Court Room

We will also be conducting a seminar demonstrating how computers can be used in many different ways in the Court room. It will also include a discussion of evidentiary implications of storing data magnetically and optically.

• On-line Information Providers

Various providers of on-line legal information such as the Titles Office, ASC, Info One, the Victorian Law Council's Link Organisation and the Crown Law Department with its proposed data base containing WA Statutes will be the subject of this seminar.

• Litigation Support

We have successfully held seminars and workshops on computerised litigation support in the past. These will be revisited in 1992.

• Introduction to Computers for Lawyers

These courses will be held on a more regular basis, hopefully starting towards the end of 1991. It is envisaged that they will be held at least every two months.

A new committee was elected at the AGM. It includes:

President::   Tony Sutherland
Vice President: David Sigler

Secretary: Michael Paterson
Treasurer: Ken Green

Committee: Alan Cox
            Wendy Campbell
            Jon Kenfield
            John Picton-Warlow
            Kevin O'Toole
            David Prast
            Peter Robinson

Queensland

The Queensland Society has had a very successful first year. The Society has been able to hold a small number of seminars and discussion groups which, on the whole, have been well attended. 1992 will be the year for consolidation. It is anticipated there will be at least 4 seminars and 4 discussion groups.

The Annual General Meeting will be held on **December 11, 1991** at the Hilton Hotel commencing at 5.30 pm. It is hoped that in addition to committee elections, there will be a guest speaker. The meeting will be followed by drinks and savouries so as to offer a chance for everybody to meet and discuss the

Society's future. Notices of the AGM and membership renewal notices will be forwarded to members shortly.

It is hoped that the Society will continue to receive widespread support.

Victoria

News from South of the Border

The newly revamped, reupholstered, and reconstituted Victorian Society for Computers and the Law has been active. Since the last Newsletter entry (way back in the mists of time) we have held aloft the shining flame of truth, ... well, we've had a few seminars.

Ann Caine, an architect of the Government Information Technology Conditions (the"GITC"), spoke on their birth and the likely effects upon the industry of its newborn screams. Most practitioners went away both informed and chastened by, if not a New World Order than,

a differently slanted playing field. In order to show our non-partisan approach, we next heard from David Standen, NCR's legal eagle, and representative of the AIIA. David's all-singing, all-dancing laster light show was perceptive, and struck a chord with the audience, which to a man/woman was biassed in his favour.

We next heard from the non-controversial, but nonetheless interesting and informative, Dr Peter Thorne, Melbourne University Computer Faculty supremo and noted expert witness. His comments on the role of the expert in

difficult and technical litigation were new to most of the members, and a less to all. Then came Bruce Akhurst of Malleson Steven Jaques, who spoke on the new Telecommunications regime. Once again a large group heard an illuminating talk on a little-understood field.

Our final speaker for 1991 represented a lateral step for the Society; previously all speakers had focussed on the law as it relates to computers. In October, Andrzej Kowalski of Melbourne University Law School spoke on expert systems and some of the work he has done at the University of British Columbia

and closer to home. Many of the topics which he discussed are canvassed in the pages of this issue of the Newsletter.

All of the talks have been remarkably well attended. Flush with success, and as a curtain-call for 1991, the Victorian Society is therefore putting on an AGM/Cocktail Party on December 4 at 6.00pm at Mallesons Steven Jaques' aging, but still plush, offices overlooking the Yarra and the bay. Teague J. of the Supreme Court, one of the few computer-literate judges anywhere, is presenting a speech on the differences in computerisation between private practice and the bench. All the usual suspects will be in attendance, and will desperately be seeking re-election. All members of all Societies for Computers and the Law in each state are welcome to attend if in the general vicinity. Director all enquiries to Amanda Bodger, c/- Malleson Steven Jaques, (03) 619 0619.

work interactively with their users. This difference should become clearer following a brief historical discussion of AI.

AI and Expert Systems: a brief history

The seeds of modern software were planted in the nineteenth century with George Boole's attempt to formalise reasoning using a logic system. Boolean logic, at its simplest, is an algebra capable of mapping reasoning processes by the use of basic operators such as AND, OR and NOT. Modern computers represent and manipulate information by combining Boolean algebra and binary numbers.

Charles Babbage is generally credited with building the first item of computer hardware. Although he never finished his Analytical Engine,[5] the notion of mechanising problem solving started a trend. It was not until advances in electronics, most notably the invention of the vacuum tube, that large and reasonably efficient problem solving 'engines' could be built.

In the late 1940s a number of universities produced electronic machines capable of performing simple arithmetic using Boolean operations. At first, these devices were of academic interest only. Later, the potential processing power of computers was seen as useful in business, science and inevitably, defence. Interest in computers increased and the machines became smaller as programming techniques developed.

Computers were solving problems but, were they 'thinking'? Early philosophers contemplated whether thought could be a mechanical process. Computers provided a way to test the theory. Could it be possible that a machine might 'think' in the way that a human being does? This question necessarily involves a discussion of what it is that defines intelligence.

One of the earliest and most influential papers in this area was published by the English mathematician Alan Turing.[6] Turing felt that the question of whether machines could be said to think was 'too meaningless to deserve discussion.'[7] His test of intelligence was what he called the 'imitation game', but which is nowadays often called the 'Turing test'.. The rules of the game call for

Computers were solving problems but, were they 'thinking'?

three participants, a male, a female, and an interrogator, to be isolated in separate rooms. The interrogator attempts to discover the sex of the other two by written questions and answers. The male must persuade the interrogator he is the female while the female indicates her true sex. Turing felt that a machine's capacity to play the male or the female role in the imitation game would be a meaningful test of intelligence. Whether this is correct is still hotly disputed.

Implicit in the Turing test is the notion that intelligence need not involve consciousness. The results are important, not the underlying processes. This concept of intelligence without consciousness has become an article of faith among AI engineers.[8] Most computer scientists shy away from claiming that the production of a conscious machine is imminent, but many believe the development of intelligent machines is well under way.

Early attempts at AI took the form of game playing programs. Researchers felt that mastering game skills would necessarily incorporate some of the fundamentals of intelligent behaviour. The game subject to the most investigation was chess.[9] Success with chess programs did not come as easily as anticipated but, by 1973 there were programs providing internationally rated masters with challenging games.[10] Results with backgammon have been even more impressive.[11]

BRAIN SURGERY HAS COME A LONG WAY.

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The practical uses for game playing machines are limited and research within AI now extends well beyond games. AI has grown to encompass three broad categories of investigation: robotics,[12] natural language systems[13] and expert systems. Smaller areas of research including artificial vision and speech recognition[14] may accurately be labelled AI but fall outside these more commercially successful groups.[15]

The third category, ES, is the most expansive and the focus of our attention. The ideal ES is a computer program that can 'handle real world, complex problems requiring an expert's interpretation.'[16] To answer difficult questions an ES must have some representation of the relevant body of knowledge.[17] It must be able to apply that knowledge to the particular problem and reason out a solution.[18] These are the salient features of all ES but specific implementations vary greatly.[19]

The results from ES are encouraging to AI proponents. The DENDRAL project, designed in 1965, helps chemists infer the molecular structure of molecules from mass spectrometry data. That program is now more proficient in the field than its creator and most human experts. Similarly, MYCIN diagnoses blood based infectious diseases with greater accuracy than human pathologists.[20] Other ES have provided good results in oil well log analysis and VLSI (Very Large Scale Integration) computer architecture design.

Unfortunately, the application of ES technology to the social sciences, particularly the law, has not been successful. A fundamental problem in applying ES to non-science fields is that the reasoning processes used often rely less upon rules of logic than intuitive human responses.[21] Description of these responses is difficult and the determination of hard

and fast principles is virtually impossible.

Before examining the potential applications of ES technology to the law it is essential to realise the extent that Information Technology (IT) has penetrated the law already. At several levels the efficiency and reliability of computers has been integrated into our usually conservative legal profession. Word processors are found in all modern offices, and law firms, courts and universities are no exception. Large commercial firms have extended the utility of word processors by storing

"Unfortunately, the application of ES technology to the social sciences, particularly the law, has not been successful."

templates of their more frequently used documents within word processing databases.[22] Automated text retrieval systems like INFO-ONE and LEXIS are now essential research tools for organisations that can afford them. In 1986 the Federal Attorney General's Department introduced automated case management systems for the Federal Court and the Administrative Appeals Tribunal.[23] The Deputy Secretary of the Department, suggested that further developments might include jury management systems and automated administration of budgeting and accounts.[24]

The technology in use at present is conventional. While performing

vast administrative chores, it fails to assist in the execution of any process demanding intelligence. ES technology attempts to supplement the processing power of conventional IT with a capacity to perform 'intelligent' tasks. Whereas a text retrieval device could be used to gather all the relevant cases dealing with nervous shock, an ES might help a lawyer determine that nervous shock is an issue in the case. The distinction here is critical. A retrieval system returns raw legal data in the form of text. An ES attempts to embody knowledge about that data and to 'understand' the text. ●

Footnotes

1 Hereafter ES. Singular or plural depending upon context.

2 ENIAC, the first digital computer, was built in 1945 at the University of Pennsylvania, It weighed 30 tons, took up 1500 square feet of floor space and contained 19000 vacuum tubes.

3 The term 'Artificial Intelligence' was coined by John McCarthy in 1956 for a conference called 'The Dartmouth Summer Research Project on Artificial Intelligence'. Then, as today, the phrase was subject to a variety of interpretations but, in the absence of better descriptions, it has persisted.

4 R Trappl, *Impacts of Artificial Intelligence* (1986) 5

5 Babbage worked on the Engine from 1828 to 1839 while Professor of Mathematics at Cambridge.

6 A.M.Turing, "Computing Machinery and Intelligence " (1950) LIX *Mind* 4 3 3

7 *Ibid* 442

8 "While Artificial Intelligence is concerned with the general behaviour [has goes along with intelligence, it is not committed to any particular way of producing the results (and in particular the methods may not be those that people use)." E Charniak, *Introduction to Artificial Intelligence* (1985) 7

9 In 1950 Claude Shannon said chess provided a challenge where "the problem is sharply defined, both in the allowed operations (the moves of chess) and in the ultimate goal (checkmate). It is neither so simple as to be trivial nor too difficult for satisfactory solution.": C E Shannon, "A Chess Playing Machine"(1950) *Scientific American*, February 48

10 A L Zobrist & F R Carlson, "An Advice-Taking Chess Computer " (1973) *Scientific American*, June 93

11 In July 1979 BKG 9.8 defeated Luigi Villa, the Backgammon World Champion, by seven games to one. Although backgammon is a game that relies to some extent upon the roll of a dice, mastery of the game requires skill and the capacity to assess situations several moves in advance. The program's author believes 'BKG 9.8 does well more by positional judgment than by brute calculation. This means that it plays backgammon much as human experts do.': H Berliner, "Computer Backgammon" (1980) *Scientific American*, June 54

12 Robotics has wide application in manufacturing industries where the capacity of machines to work long hours with extreme accuracy in hostile environments

justifies the huge investment required to establish an automated plant line.

[13]. Natural language systems attempt to understand, produce or process languages like English. Because of the complexities and relative lack of strict rules in natural language successes have been modest. Basic machine translation systems exist but these tend to be limited to word by word methods. More sophisticated programs have been used to make summaries of texts, in some cases drawing quite subtle inferences from events. CYRUS, a system designed by Roger Schank, searched UPI wire services for information about then US Secretary for State, Cyrus Vance. It correctly inferred from the fact that Vance had dined with Menachem Begin on several occasions that their wives had met.

[14] S E Levinson & M Y Liberman, "Speech Recognition by Computer" (1981) *Scientific American*, April 56

[15] R Trappl, *op. cit.*

[16] S Weiss & C Kulikowski, *A Practical Guide to Designing Expert Systems* (1984) 1

[17] This is stored in a database of concepts called a Knowledge Base.

[18] A large piece of software known as an Inference Engine performs this task.

[19] Lack of space prevents a more complete operational definition of ES. See generally: G Greenleaf, "The Computer as a Robot Lawyer" Paper delivered to the 26th Australian Legal Convention Sydney 13 - 18 August 1989

[20] R Trappl, *loc. cit.* 6

[21] Also known as 'heuristics'.

[22] Blake Dawson Waldron of Sydney spent one and a half million dollars upgrading their word processing and document facilities in 1987.

[23] Other significant court based computer systems include the Registry system for the Family Court, the PROMIS system in the NT Supreme Court and the COURTNET system operating in NSW.

[24] For a more complete discussion of IT within the law see: L Glare, "Computers in the Courts" in Papers to the 24th Annual Legal Convention (1986) 326

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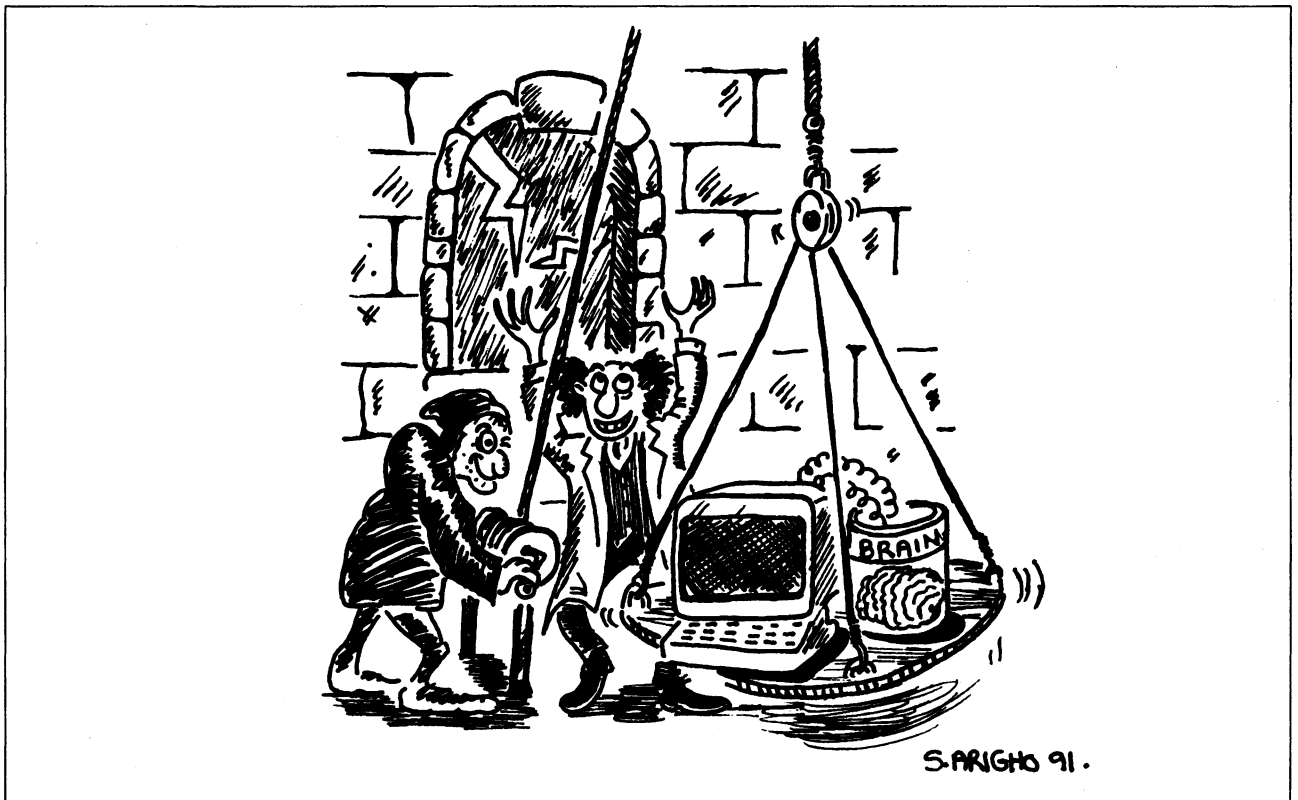
We hope you enjoy our "theme" newsletter. It has been jointly produced by editors both south and north of the border. This joint editorship has made it easier to obtain articles relevant to different jurisdictions. Any comments, suggestions, criticisms or infact any feedback (is there anyone out there!) would be welcome. Please send together with any articles to Virginia Gore c/- Blake Dawson Waldron, DX 355 Sydney by 31 January 1992.

Although somewhat premature, the Editors extend to members of all Societies best wishes for Christmas and the New Year.