#6

status

QUARTERLY
OF THE
WESTERN
AUSTRALIAN
REGIONAL
COMPUTING
CENTRE

WINTER 1989

The famous Argyle diamond mine in Western Australia's Kimberley region. One successful pipe from hundreds prospected.

Diamond Search at UWA

Why can diamonds be found in a particular rock and yet not be found in what looks to be an identical outcrop?

This question is at the bottom of original research and development currently being undertaken by Dr Nicholas Rock and his research group of the Department of Geology Key Centre at The University of Western Australia and Dr Michael Wheatley of WARCC's Programming Services group.

The pair are setting up a database using published and new analyses of almost 5,000 samples of *lamprophyres*. This family of rocks, of which *kimberlite* is probably the best known, is famous for its diamond bearing characteristic. While *kimberlite* used to be regarded as the only diamond-producing rock, the finds in Western Australia's Kimberley region now dispel this theory. At the Argyle mine, for instance, the diamonds recovered are from *lamproite*, also from the *lamprophyre* family. And other types of *lamprophyre* have recently been found to carry diamond elsewhere in WA.

Now the database has been built, the researchers are looking for patterns appearing in the chemical composition of all the samples and trying to establish why some rocks are diamond bearing while others of apparently similar composition are not.

"In the long term," said Mike, "what would be nice is.....you take a lump of rock, you analyse it, you feed the results into the computer program and it says, *Yes, there are diamonds in this rock.....Yes, this is a likely one* or *No, this is not a likely one*. The exisiting database will be developed

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A selection of West Australian diamonds

further, adding "intelligence" to it.

"No one knows what the rules are for deciding whether a rock is going to have diamonds or not, so the project starts with basic geological research. Having established the rules, some years down the track it might be possible to build an Expert System which will determine whether a rock is diamond bearing."

With the enormous amounts of data that geologists now have to handle, computing skills are becoming a vital requirement in modern-day geology.

"Traditionally, geology was among the least numerate of sciences," said Mike "but a geologist's life has changed out of all recognition in recent years."

Data coming in from analyses, satellites, aerial surveys and other sophisticated sources mean that geologists today require computers to handle the vast input of information.

While many commercial programs can be used in geology, there is still some need for specialised systems to be developed. Complex database systems such as the *lamprophyre* database also require extensive programming to set up the data input, validation and reporting procedures.

Having a professional programmer on staff who also has a doctorate in Geology has facilitated a close working relationship between WARCC's Programming Services group and the Department of Geology.

Projects such as the *lamprophyre* database can be tackled at a truly professional level given WARCC's pool of in-house skills. The Centre has programmers with qualifications and expertise in a number of disciplines including Chemistry, Zoology, Business Administration, Education, Statistics, Physics, Applied Mathematics and Electrical Engineering.

The Fourth Dimension Database Management System was selected to build the *lamprophyre* database because of its ability to link tables of data together in the relational model, together with its advanced programming capabilities.

The system contains information and cross referencing on data such as major and minor element analyses, trace elements, and isotopic analysis (commonly used for dating rocks), and location details of all the published analyses of the *lamprophyre* family of rocks.

The three-year project, which is about a third completed, is being supported by various university and federal grants while research students in the group include mining industry employees (eg. from CRA). Another database system on gold deposits currently at the pilot stage is being sponsored by 25 mining companies via MERIWA (Minerals and Energy Research Institute of WA).

Director's Desk

WARCC is continuing with the implementation of our corporate plan. We have reviewed our structure and our lines of communication, and most importantly, the ways that we keep in contact with the many people who use our services.

Our aim of excellence in customer support is being approached in several ways. Firstly, our five operating divisions have become more autonomous, to enable more rapid response to customer needs. These divisions, which span a full range of services, include:

Computing Services
Personal Computing
Programming Services
Consulting Services
Facilities Management.

Secondly, an emphasis is being placed on a WARCC-wide commitment to quality, and procedures are being evaluted to ensure that our customers receive a quality outcome every time.

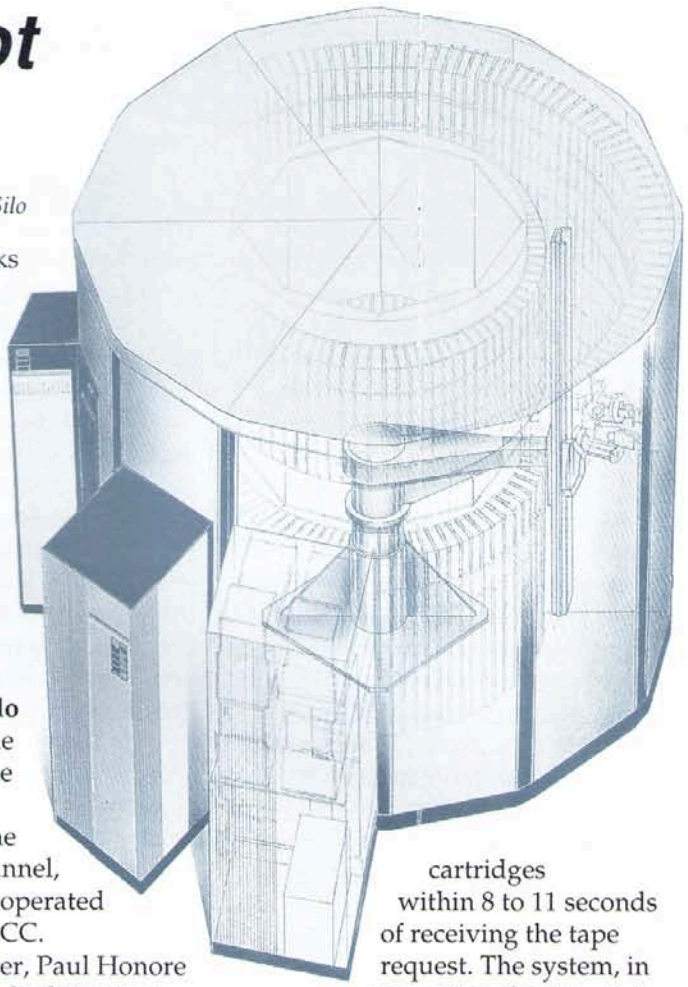
Thirdly, training of management and staff continues, to assist us all to care better for our customers.

WARCC is committed to customer satisfaction, and we welcome any client's comments which will help us to do our job better. WARCC's high technical competence has been gained over many years. It is a significant resource for the entire State of WA.

Therefore, we look forward to discussing with you how WARCC can work with you to achieve your objectives.

Alex Reid
Director

HyperChannel, Robot for Back-Up FM



A "see-through" drawing of the StorageTek Silo

The recent installation of a HyperChannel to link WARCC with a back-up mainframe site across Perth's metropolitan area has further advanced facilities management procedures in Western Australia.

Installed by WARCC's largest client, the Health Department of Western Australia, the HyperChannel link was followed closely by the installation of a StorageTek Automatic Cartridge Silo at the back-up site. Both installations represent the very latest in advanced technology and allow remote operational coverage of the back-up facility.

The HyperChannel is the first to be installed in this State and links the client's primary site at WARCC with the back-up site across the city via a Telecom line. Usually, computer links exist across a building in connecting mainframe computers but the Health Department's requirement to have full back-up resources off-site, tapped the front-end of current technology.

Importantly, WARCC can remotely operate the Department's computing facilities at the second site without any additional manpower. This centralised control also assists in matters of security which, in this case, are of vital concern.

The very high speed Telecom link between the two sites means that separate mainframes have been linked in an on-line capacity via HyperChannel and, in due course, it will be possible for jobs processed at WARCC to be automatically stored at the second site a number of kilometres away.

IBM Operations Co-ordinator, Michael Horton further explains, "We can channel-attach a printer or communications unit at WARCC to the second site and the IBM 3081 (at the second site) thinks it's using devices in its own complex."

It is anticipated that greater use of the link will be made when HyperChannel can run at a transmission speed higher than that currently available.

StorageTek Automatic Cartridge Silo

The installation of the StorageTek Silo at the second site means that, coupled with the use of the HyperChannel, cartridge use can be operated remotely from WARCC.

Operations Manager, Paul Honore described WARCC's facilities management role this way: "Our role is to run the second site as much as we can from here (WARCC) using system consoles across the HyperChannel or network links.

"As soon as there's a manual intervention required at the second site, our client has contracted another organisation for operations support of those machines."

The ability to run a massive tape library system off-site without an operator to intervene has great potential for WARCC's Facilities Management team.

"In this day and age disaster recovery options are becoming increasingly important," said Paul, "and the silo offers a solution to one aspect of that picture."

The StorageTek Silo holds 6,000 cartridges, with each cartridge holding the equivalent of up to two 6250 tape reels. A robot mounts the cartridges within 8 to 11 seconds of receiving the tape request. The system, in requesting the mount, is unaware that the robot exists and believes that an operator is mounting the cartridges.

The silo has its own processor which keeps track of the location of each cartridge and, like an operator, it is unaware of the data content of the cartridges. The cartridges used in the silo are the same as those used on the primary site.

"Visually and operationally, the Silo is the most exciting thing that's happened in the computer room since flashing lights on CPU's," said Paul. "At last managers can take away the drudgery for operators and free them up to do better things."

The state-of-the-art facilities installed by our client give WARCC's operations personnel valuable first-hand experience and help the Centre to maintain its front-line position in facilities management in Western Australia.

HyperCard Demystified

More than 400 members of the University community took advantage of WARCC's HyperCard promotion in June.

Many on campus had a copy of HyperCard, which comes free with the purchase of a Macintosh computer, but did not know how to operate the powerful system. In a comprehensive series of lectures and courses, WARCC helped remove much of the mystery associated with the package.

John Langsford, WARCC's Manager of Consulting Services, co-ordinated the promotion designating June as *HyperCard Awareness Month* on campus, and devised the teaching programme of free introductory lectures and special courses.

Guest Speaker, Guy Hickey of Apple Australia, conducted a number of free seminars at UWA and Murdoch University to introduce HyperCard.

Commenting on the need for action, John said, "We realised that even though HyperCard had been issued with the Mac for some time there was limited evidence of its use on campus.

"We felt that the time was right for a major launch on HyperCard, " he said. "We wanted to demonstrate the power and versatility of this package and saw UWA and Murdoch University as being an appropriate target group for the launch. HyperCard is a really powerful tool, particularly in the areas of courseware, presentations and cataloguing and therefore is very relevant to academics."

A number of WARCC personnel had attended the Apple Pacific University Consortium Conference held at Wollongong earlier in the year and had returned full of enthusiasm for HyperCard and multimedia courseware.

"That was the initial stimulus'" said John. "The Wollongong experience was really vibrant and much of it had to do with the potential of HyperCard."

The software is an exciting and radical development in personal computing. Information is accessed via association, with HyperCard approaching the memory function of the brain in finding and retrieving interrelated facts. Information can be hidden or revealed in an interaction between the user and the application, providing the appropriate level of detail at all times. Pictures, text and sound can all be easily integrated and manipulated without advanced programming skills.

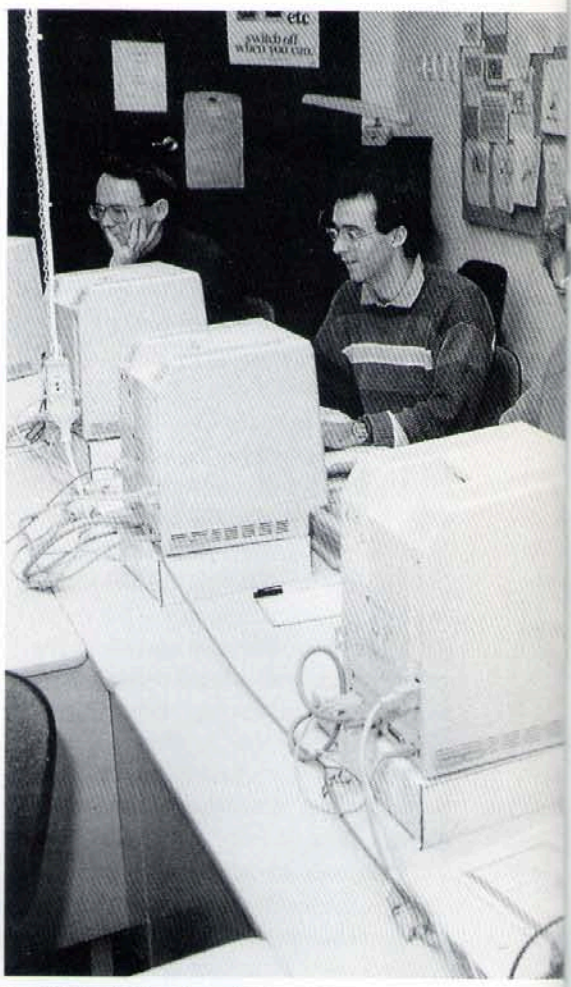
HyperCard's simplicity means that with just a little know-how, Macintosh users can confidently create and manage their own stacks of information.

WARCC personnel with expertise in HyperCard are interested to see what ideas evolve from the June promotion.

"We're keen to see how HyperCard applications will develop and particularly those on a larger scale which may require WARCC's Programming Services group's collaboration," said John. A *Request for Proposals* has been circulated among University departments and no doubt we'll become involved in some interesting ventures."

"I don't expect that we'll see developments emerge for a few months while people explore their own areas of interest using HyperCard. But after that we expect to be involved in helping to devise some sophisticated applications."

Groups outside the University can



Dr Michael Wheatley of WARCC's Programming Service with some enthusiastic beginners during one of a number in June. Pictured here in University Extension's Macinto

s group shares his knowledge of the HyperCard system of introductory courses which he devised and conducted sh Laboratory.

also obtain copies of the *Request for Proposals* by contacting WARCC's Programming Services Manager, Terry Woodings on 380 2618.

"There was no lack of interest, " said John. "It was a great success in terms of raising the awareness of HyperCard and having many users register for the special courses. Many owners and users now realise the power of the Macintosh in the multimedia area, know what HyperCard is and what it can do and also that they can effectively teach courses using a microcomputer."

A number of HyperCard courses will be presented throughout the remainder of the year. If you are interested in attending please contact the WARCC office on 380 2611 or John Langsford on 380 2616.

SACS for SEAPOLE Systems

A dynamic young West Australian company with its sights on marginal Australian and South-East Asian oil reserves is utilising WARCC's bureau service software.

Seapole Systems Pty. Ltd. is intent on finding a less expensive way of developing marginal oil fields. The company produces an "off-the-shelf" series of drilling production platforms which can operate in up to 35 metres of water. The small platforms, which are fabricated in Western Australia, are then slightly modified to suit particular drilling locations.

Seapole Systems has recently engaged in a second three-month contract with WARCC's WA CYBERNET Services to access the SACS system of software so that the various modifications to the Seapole platforms can be determined.

Each platform must be tailored to the requirements of a specific drilling site and a computer analysis provided for each locale.

The company is using SACS (Structural Analysis Computer System) and computing systems at WARCC to carry-out finite element and structural stress analysis for projects such as the *Chervil Alpha* platform for Western Mining Corporation Petroleum Division (Australasia).

The platform is currently being installed by Seapole Systems at the Chervil Field in the Barrow Sub Basin off the coast of WA (about 40 miles North West of Onslow) where it will stay until the reservoir is depleted.

The *Chervil Alpha* platform is the first installation of its kind in the world and is being viewed excitedly by those connected with Seapole Systems and others in the industry.

While the SACS system offered by WARCC is being used effectively by Seapole in the analysis and design of small platforms, it is also being heavily utilised by engineers Davy McKee-McDermott on their Goodwyn "A" Topsides Design contract, a venture at the other end of the spectrum in oil field exploration.

The contract with Seapole Systems Pty Ltd was tailored to suit the requirements of the fledgling company.

WA CYBERNET Services' Richard Clark said, "Seapole only required about four of the modules, so we arranged for them to pay only for the modules they needed."

"We were also able to arrange a reduction in the amount of royalties to be paid although this meant that their results would take slightly longer.

"The tailored package to provide a combination of acceptable computer response time and price is working well for Seapole, and shows that companies do not have to be as large as Davy McKee-McDermott or as rich as Croesus to use our services," said Richard.

Seapole Systems have a simple dial-up access to SACS using a modem. The company intends to continue using WARCC's bureau services in the short to medium term.

MacSale a Sellout

Assistant Director, Carole Herriman (left) and Rob Van Zanten, Manager of MicroComputer Support, with the winner of the promotional Macintosh SE computer, Dr Judy Straton of the Division of Public Health, Department of Medicine..

WARCC's entrpreneurial MicroComputer Support was at the centre of the action during May and June in a series of promotions designed to raise the awareness of Macintosh computers on campus.

WARCC is among the sales leaders in the Apple University Consortium which consists of nine universities around Australia. With greatly improved buying power the Consortium is able to purchase Macintosh computers at very attractive prices and pass these savings on to staff, students and departments of the universities participating.

In a promotion of Macintosh SE computers in May, WARCC was offered a number of units to sell at greatly reduced prices until stocks ran out. Together with the Australian dollar being stronger at the time than in the weeks following, buyers were thrilled with the drastically slashed price of the coveted SE units. With savings in the vicinity of $800 per unit, the run-out sale literally ran.

In less than seven days MicroComputer Support had sold-out of the 200 or so units which had been allocated for the promotion. About half of these were procured by University departments with a total saving to The University of Western Australia of about $100,000.

Manager of MicroComputer Support, Rob van Zanten, said, "It was a really big deal if you start thinking of it like that. It probably meant a 20% saving to UWA.

"More than 60% of the computers on campus are Macs," said Rob "and by being a member of the Consortium, UWA is well positioned to make extremely good buys."

While many happy customers had been quick enough to take advantage of the SE promotion, many were left disappointed. Dozens of names were on the waiting list but with the rush on Mac SE units Australia-wide, stocks of the model were soon exhausted.

"I don't think Apple (Australia) realised how big it would get," said Rob. "The promotion was a brilliant success. Even too effective."

With additional SE units unavailable, WARCC negotiated with Apple for a second promotion, this time with MacPlus microcomputers. Although it lacked the zing of the SE promotion, this "consolation" sale was also popular with all 150 units being sold at sale prices.

"With the Aussie dollar having slipped, we just couldn't get as good a deal," said Rob, whose group adjusts computer prices accordingly.

While MicroComputer Support was stretched during these busy months of MacSale transactions, June was also nominated as *HyperCard Awareness Month* by WARCC management (see story page 4).

The organised campaign to promote Apple Macintosh computers and software on campus was highly successful.

More than 1,500 contestants responded to the lucky draw of a Macintosh SE computer which was run in conjunction with the promotion. The entrants had either responded directly from the specially

circulated brochure or had qualified by registering for any one of the HyperCard courses and lectures conducted in June.

The winner, pictured opposite, was Dr Judy Straton of the Division of Public Health, Department of Medicine.

With the likelihood of a new SE model being released in the near future, the tail-end of current stock is being cleared at reduced prices. MicroComputer Support therefore has a third 'promotion' on its hands in the space of a few months and is enjoying the continuing exposure that the sales have generated.

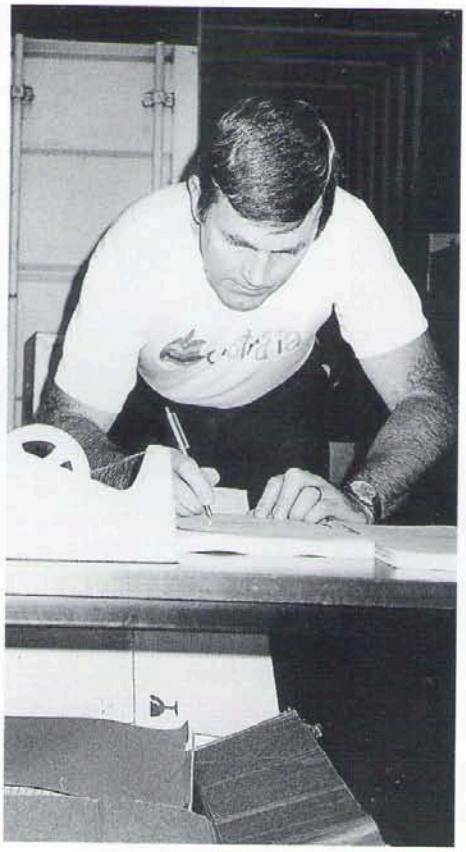
Awareness of WARCC as a major seller of Apple computers in Western Australia is increasing steadily despite sales being limited to UWA and Murdoch University departments, staff and students.

A major spin-off effect from WARCC's commercial activity with Apple is that the Centre's buying power is increasing in other areas.

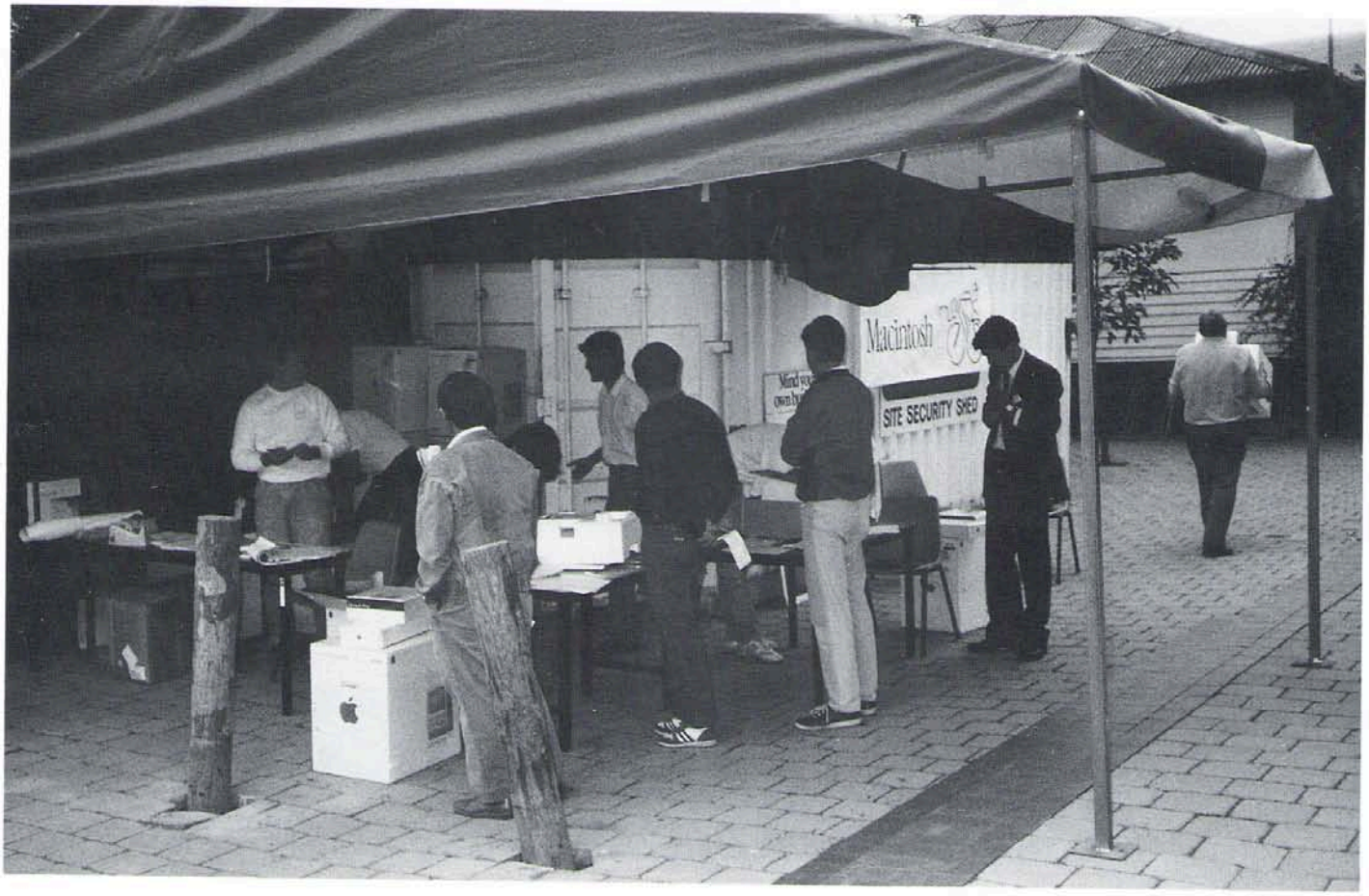
"WARCC's MicroComputer Support is growing into a large group with a lot of say and can therefore arrange dealerships with many suppliers", said Rob.

"Not only are we able to deal with Apple but we can also negotiate very good deals for UWA and Murdoch University with IBM, Toshiba, Microsoft, Imagineering and others."

The Consortium (UWA site) grosses around $2,500,000 per annum and because of its size is able to provide significant support for the University's thrust into personal computing.



Left: Peter McNabb of MicroComputer Support processes one of the many Mac SE sales. Below: A view of the special storage container required to house the Macs during the sale. A marquee was erected to shelter WARCC staff and new owners on the rainy May day.



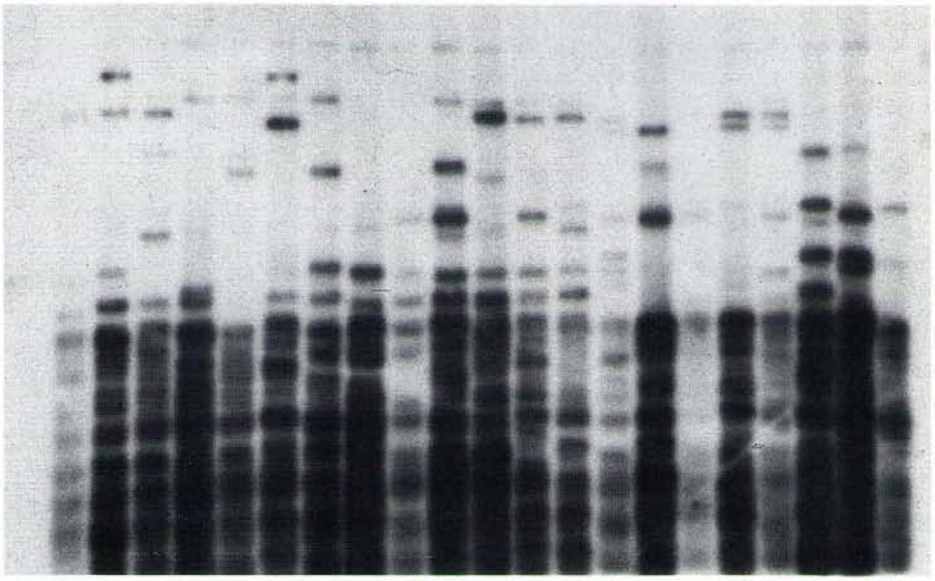
Genetic Fingerprinting Solutions

As animal breeding programmes become more elaborate, techniques for determining the parentage of individual offspring are also being revolutionised.

WARCC has been collaborating in exciting work being undertaken jointly by the Western Australian Department of Agriculture and Curtin University's School of Medical Technology.

These two institutions have been developing "genetic fingerprinting" techniques to resolve disputes concerning the parentage of individual animals. The work is at the leading edge of bio-technology and among the most advanced of its kind in the world.

The identification techniques are essential for the Department of Agriculture's artificial insemination and frozen embryo breeding programmes but the current system of creating a unique genetic fingerprint of an individual animal is laborious and time-consuming.



An autoradiograph showing genetic fingerprints of calves. The bands correspond to individual DNA fragments.

The Current System

Once the tissue sample of an animal has been cultured with a biochemical probe and positioned on a gel plate, an electrical charge is applied to the plate and different sized genetic particles then move to corresponding positions on the plate depending on their density. This polarisation results in the distribution of bands on the plate which are then able to be read onto an autoradiograph.

The images on the autoradiographs are measured by hand. This procedure is followed by exhaustive attempts at matching genetic fingerprints to identify the parents of an individual animal.

WARCC's Software Solutions

WARCC's involvement concerned specifying and developing a suitable software system to extract the information from the autoradiographs using computer vision technology and developing a pattern matching facility that will be able to identify the parents of an individual from a database of genetic fingerprints.

Brook Waters of WARCC's Programming Services group has recently completed an assignment at the Department of Agriculture where he carried out a feasibility analysis.

Back on campus, he has devised a simple procedure for reproducing an image of the plate onto the computer screen and, by using a mouse and clicking on the appropriate bands, assigning the bands to their relative positions.

Although several possible hardware configurations are under consideration it is envisaged that the system will eventually run on an Apple Macintosh SE computer using a video frame grabber to read the autoradiographs.

The Department of Agriculture hopes to have a prototype system in operation by the end of this year.

While there has been a great deal of world interest in similar work being done with human identification procedures in England, the work in animal identification being carried out by Associate Professor John Wetherall (Curtin University) and Dr Michael Carrick (Deptartment of Agriculture) *et al* in Western Australia promises to return to its authors considerable renown.

WARCC

Western Australian Regional Computing Centre
The University of Western Australia
Nedlands 6009
Phone (09) 380 2611 Fax (09) 382 1688
Edited by Jasmine Michelides

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