



NEW ZEALAND
ARCHAEOLOGICAL
ASSOCIATION

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER



This document is made available by The New Zealand Archaeological Association under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

To view a copy of this license, visit
<http://creativecommons.org/licenses/by-nc-sa/4.0/>.

FIELD RECORDING AND COMPUTERS AT POUERUA,
INLAND BAY OF ISLANDS

Douglas Sutton
Anthropology Department
University of Auckland

Although computers are now in everyday use by archaeologists working on a variety of tasks in New Zealand universities, to date they have been used very little, if at all, on fieldwork. This is true despite the availability of micro-computers which will withstand most fieldwork conditions experienced in New Zealand. This situation should not continue because computers are very advantageous to those of us who collect, organise and then manage large amounts of low-level empirical or observational data such as are collected during excavations.

There are four main advantages involved. First, computers tend to engender orderliness in data collection. This is because omissions show up when data are entered in a standard format. Omissions caused by someone just forgetting to record something fully must be the most common form of error in fieldwork data collection. Second, computers can often be programmed to check for errors in numerical data. Third, records, once entered can be displayed and checked, edited and printed quickly and easily. Finally, both textual and numerical records can be easily distributed and stored for long periods.

This article reviews the use of a field computer at Pouerua and the procedures used in interfacing it with the large capacity IBM 4341, located in the Computer Centre, University of Auckland. A distinction is made here between field computers, which may be taken into the field but must be used there in hardroof, relatively dust-free accommodation, and on-site computers. These are usually physically smaller and are battery-powered. Various models of on-site computers are now available in New Zealand and could be put to very good use, particularly in monitoring the recording and field-checking of numerical data as well as computational work.

It should be emphasised that field computers have a large number potential applications in New Zealand archaeology in addition to those being developed at Pouerua. The sites being excavated there are specialised in the sense that they contain a lot of structural and lithic evidence, but very little non-carbonised organic material. Research on the Pouerua assemblages, therefore, includes lithic source characterisation, spatial analysis, and studies of artefact distributions through

space and time rather than the interpretation of economic debris etc.

Choice of a computer

In November 1983, an IBM Personal Computer (PC) was purchased for use on fieldwork and in the Human Science Building, University of Auckland. It was selected from a fairly wide range of available micro-computers because of its portability, its systems expansion capacity, and its in-house price which made it very competitive. In addition, unlike some other manufacturers, IBM has published the details of their PC hardware so that amateur and other software writers can write their own software for use on the PC. The result is a wide array of software some of which is cheaper than other brand name packages.

At the time of purchase, the PC had 64Kb RAM memory, two disk drives, a monochrome visual display unit and a keyboard. Since then the memory has been increased to 128Kb, and a Hi-Pad digitiser has been bought for use on the PC. A printer was not available for use on fieldwork last summer. Funds are now available for the purchase of an IBM graphics printer.

Fieldwork

The PC was taken to Pouerua and installed in the shearer's quarters there. It was then used for fieldnotes, recording artefact locations and administration. When excavation began, fieldnotes were made in notebooks which contained graph paper and lined pages. Large scale plans of the excavation areas were drawn onto permatrace over graph paper on plane tables. Fieldnotes included descriptions of the work being done, the strata excavated and smaller scale plans of the features being excavated.

They were entered by the project secretary the day after they were written, using the word processing package EASYWRITER and then checked by the author. Readers should perhaps be aware that there are three versions of EASYWRITER and 49 other word processing packages available for PC (IBM software listings, December 1983). The one used at Pouerua is EASYWRITER (1.0). The location of each artefact found was recorded in three dimensions. These are, horizontal distances from each of two pegs set up at selected corners of the excavation area and a vertical distance down from this horizontal plane to the artefact location. The selected corners were, of necessity, the corners of the highest baulk. These were surveyed in on site

plans and their heights recorded in relation to permanent survey data. Each artefact was put in a small grip-lock plastic bag when found, and fixed to the find spot by a wooden meat skewer passed through a small hole in the top of the bag. These bags have a special white square on one side. Ordinary ball-point ink is virtually indelible once applied to this surface.

When the three dimensional recording was done, each artefact was given a number in continuous series from 1 for each excavation area. This number, the site number, and excavation area number were written on the bag with the date and the recorder's initials. The artefacts were collected and stored on skewers in numerical order. On return to Auckland they were hung in numerical order on wire rods in steel shelving units.

As the recording was done, each artefact was entered in the site artefact register with its number, three locational dimensions and tentative identifications of function and material. The dimensions mentioned here are termed co-ordinates in the field notes. For instance, the first ten artefacts found at N15/261, Area I, on the morning of 22 November 1983 were recorded in the site artefact register as follows:

Site N15/261, Area 1, Sq. A

22:11:83

| Area | Number | Material | Function | A Coord | B Coord | C Coord | Test | Pit | Layer |
|------|--------|----------|----------|------------|------------|------------|------|-----|------------|
| I | 1 | Chert | Flake | 3.84 | 4.41 | 0.22 | | | 3 |
| I | 2 | Obsidian | Flake | - | - | - | | | Test Pit 6 |
| I | 3 | Basalt | Flake | 2.99 | 2.06 | 0.24 | | | 1 |
| I | 4 | Chert | Flake | 2.86 | 2.15 | 0.27 | | | 1 |
| I | 5 | Chert | Flake | 2.39 | 2.62 | 0.27 | | | 1 |
| I | 6 | Chert | Flake | 2.68 | 2.47 | 0.22 | | | 1 |
| I | 7 | Basalt | Flake | 2.56 | 2.68 | 0.23 | | | 1 |
| I | 8 | Chert | Flake | 0.52 | 4.53 | 0.21 | | | 1 |
| I | 9 | Chert | Flake | 0.78 | 5.01 | 0.19 | | | 1 |
| I | 10 | Chert | Flake | 1.27 | 4.08 | 0.23 | | | 1 |

In this case the datum pegs were named A and B. The distance to each was measured with a tape measure held alongside a line level. The line level was attached to one of the datum pegs and used in measurement of the vertical depth to each artefact location. The level was kept near the mid-point of the line in an attempt to minimise errors. Notwithstanding this precaution, the D-coordinate is likely to be the least accurate of the three. For a consideration of the accuracy of similar recording systems see Rogers (1982). We recorded all objects

which had been imported to a site and worked there as artefacts. In the field we identified the materials in terms of broad categories such as basalt, chert, obsidian, rather than to specific sources or source areas.

Postholes were recorded in the same way as portable artefacts. Each one was given a number in a continuous series for the site or area involved. Depth from the horizontal plane defined by the line level to the top of the posthole was measured. Depth to the bottom of the excavated posthole was recorded with posthole diameter at the surface. The contents of postholes were described in all cases and sampled where appropriate. For instance, the postholes found at N15/261, Area I, Square B on the 28 November 1983 were recorded as follows:

Site N15/261 Area 1 Sq. B

| | E | F | G | Number | Coord- | Coord- | Coord- | Depth | Diameter | Sample | Comment/ Description |
|----|------|------|------|--------|--------|----------|--------|----------------------|----------|--------|-------------------------|
| 1 | 5.08 | 3.29 | 0.26 | 0.37 | 0.15 | Soil | | Housewall-Brown soil | | | |
| 2 | 1.15 | 4.70 | 0.15 | 0.30 | 0.12 | None | | Housewall-Brown soil | | | |
| 3 | 2.88 | 2.50 | 0.26 | 0.39 | 0.18 | None | | Housewall-Brown soil | | | |
| 4 | 2.84 | 2.22 | 0.22 | 0.38 | 0.15 | None | | Housewall-Brown soil | | | |
| 5 | 2.75 | 5.36 | 0.19 | 0.37 | 0.14 | Charcoal | | Housewall-Brown soil | | | |
| | | | | | | | | | | | and Charcoal |
| 6 | 4.80 | 2.67 | 0.30 | 0.46 | 0.20 | Charcoal | | Housewall-Brown soil | | | |
| 7 | 4.58 | 1.08 | 0.28 | 0.67 | 0.12 | None | | Housewall-Brown soil | | | |
| 8 | 5.07 | 1.00 | 0.38 | 0.59 | 0.08 | None | | Housewall-Brown soil | | | |
| 9 | 1.40 | 4.10 | 0.20 | 0.41 | 0.19 | None | | Housewall-Brown soil | | | |
| 10 | 1.60 | 3.77 | 0.25 | 0.32 | 0.12 | Soil | | Housewall-Brown soil | | | |

Samples were recorded separately but again in a similar format.

Site N15/261, Area 1 Sq. B

28:11:83

| | | | E | F | G | |
|--------|---------------------|-------------|--------|--------|--------|-------|
| Number | Type | Component | Coord- | Coord- | Coord- | Layer |
| 1 | Ash (dating) | Fire Hearth | 2.63 | 3.00 | 0.37 | 1 |
| 2 | Soil | Posthole | 5.08 | 3.29 | 0.37 | 1 |
| 3 | Ash (flootation) | Fire Hearth | 2.63 | 3.00 | 0.37 | 1 |
| 4 | Charcoal | Fire Hearth | 2.63 | 3.00 | 0.37 | 1 |
| 5 | Charcoal | Posthole | 4.80 | 2.67 | 0.46 | 1 |

The column for component in this register shows the function of features from which each sample was taken. This information is given for postholes, where it is known, in the content/description column of that register.

All excavation records were entered onto the PC using the statistical and computational package MULTIPLAN (1.1). Approximately 300 pages of handwritten text, artefact records, posthole and sample locations from two excavations were entered between 24 November 1983 and 1 February 1984.

The PC was also used on administrative matters. MULTIPLAN was used to store records of accounts. These were totalled each week to ensure that the project ran within budget. The accounts records will help with the planning of the Phase III excavation season. Inventory files were kept, also on MULTIPLAN, of food bought, used and in dry storage or in the freezer. Departmental and other equipment in use, broken or lost was also listed. All project manuscripts have been put on the PC by Margaret Pitman who is our computer operator for 1984. These manuscripts are available to be edited for publication by their authors, using EASYWRITER. Similarly project and other research bibliographies are now stored on diskettes using PFS software packages FILE and REPORT.

The 5½ inch floppy (320Kb) diskettes from the PC were sent periodically from Pouerua to the Computer Centre, University of Auckland where the files on each were print-prepared and printed. Printed copies of the field-notes have since been interleaved with diagrams and surface plans, xeroxed and put in the project's working files. All originals have been put in the project's paper archive.

Interfacing the field computer and the large capacity IBM 4341

On return to Auckland, the three dimensional triangulation data for each location were converted, using a simple SAS programme, into a distance at right angles to a known point on one edge of the excavation area and a depth to artefact.

These normal or cartesian data were then run through a graphics programme called PLOTT-IT which was written for the Pouerua data in 1983 by Russel Fulton, Computer Centre, University of Auckland. The programme runs on the IBM 4341. It shows on an A4 paper the edges of an excavation, some components of excavated structures such as hearths and walls and the location of each artefact found. PLOTT-IT runs through each data set twice. In the first one a separate colour and/or symbol is used to show the material of which each artefact was made. In the second run the function of each artefact is shown.

Figures 1a and b show the materials and functions run off PLOTT-IT for N15/255, Area 2. This 10 x 6 m area was excavated by Roger Green and others in January 1983 (Green R.C., D. Nevin and D.G. Sutton, n.d.). It was laid out on shallow rectangular depression and excavation revealed the remains of

a prehistoric semi-subterranean house. Lines of postholes defined the sides and ends of the structure. These are shown as continuous straight lines in Figure 1. The sides are shown to diverge slightly towards the front of the house. It is to the east of the firescoop, which is shown as a polygon in the figures. The firescoop is located in the centre line and towards the back of the house.

The materials run, shows that chert was the most common material found, that the range of stone materials identified in the field was very limited and that it included neither obsidian nor nephrite. The metal present was intrusive. The functions run shows flakes to be a most common artefact type present.

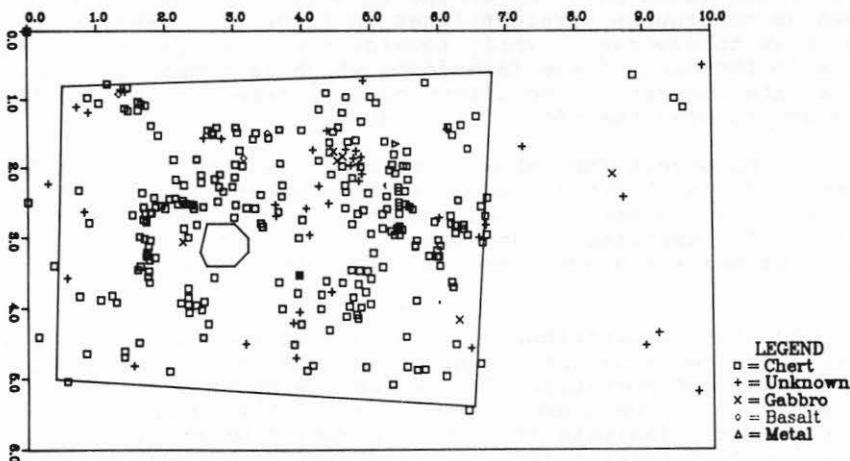
The spatial distribution of artefacts show a concentration north-west of the fireplace, another north-east of it and a lower concentration of flakes on the south side of the longest axis of the house. There is a lot to be learnt from the systematic analysis of this information which is now available from Phase I and II excavations at Pouerua.

Yvonne Marshall, who was the project's research assistant for 1983, and Russel Fulton worked together on the development of PLOTT-IT. They are preparing a paper for publication on the programme. Function and material runs of PLOTT-IT were prepared for all the Phase I excavations by 12 November 1983. They were developed from handwritten and typed field-notes and artefact location data. The use of a field computer has meant that the excavation records and numerical data are partially edited and ready to print at the end of each excavation season. So at the time of writing (5 April) function and material plots are available for all the Phase II excavations and the fieldnotes are printed.

Computer files generated during fieldwork and the development of PLOTT-IT have been archived on the IBM 4341. At the time of writing there are approximately 120 files there on 2Mb of disk space. These files are a major part of the project's data base. Therefore, as the number of people involved with the project has grown, so has the number of requests received for access to the files.

Halfway through 1983 we set up a system of user access. First, each of the project files has been archived under the author's user code. After the file is archived users can read but not modify it. This is termed "reader only access". Copies of the files can be transferred to other user codes when requested and modified, leaving the original intact.

Artefact material for site 255 in area 2 all layers



Artefact function for site 255 in area 2 all layers

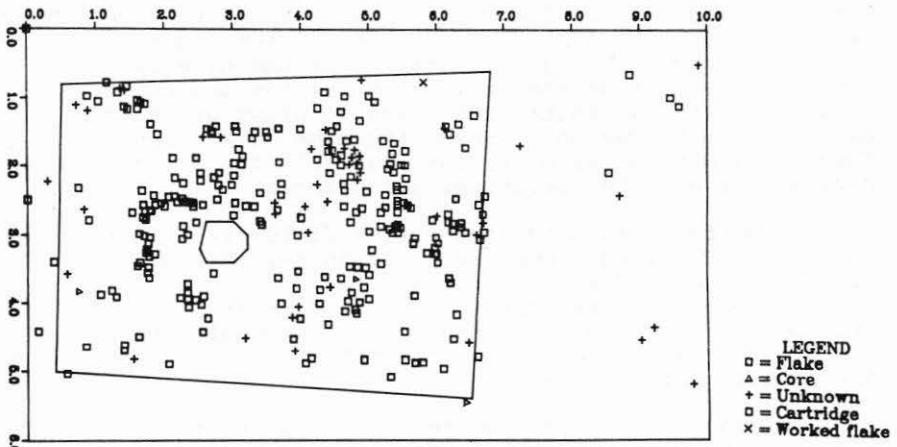


FIGURE 1. Computer printouts of artefact distributions.

Data can be added or deleted and the files reorganised as necessary. Most of the archived files are formatted in ways which will allow the addition of the anticipated results of on-going research. As users add their results, the updated files are archived, again under the central user code. In this way all original files and subsequent modifications are retained. Each modification to any of the files will include a record of the date of modification and the user code employed.

As an example of this feedback procedure we have on file now field identifications of over 5300 stone artefacts from the Phase I excavations. Rob Brassey and Neville Ritchie are improving many of these through their lithic source studies (Brassey and Seelenfreund, 1984; Ritchie, 1984). The results of their work have been used to update the original artefact computer files. The name of the identified source of each artefact has been typed into a forty character interval left alongside the artefact's number, location data and field identification in the artefact files. Weight per artefact and per material have also been included.

To return to PLOTT-IT, at the time of writing the programme is using a limited vocabulary of material names and function terms. They are the field identifications.

| <u>MATERIALS</u> | <u>FUNCTIONS</u> |
|--------------------|------------------|
| CHE Chert | FLA Flake |
| OBS Obsidian | COR Core |
| GRE Greenstone | GRI Grinding |
| SAN Sandstone | NEE Needle |
| MET Metal | SPSH Spokeshave |
| ARG Argillite | CHI Chisel |
| P.W Petrified wood | ADZ Adze |
| QUA Quartz | P.ADZ Part adze |
| GUM Kauri gum | MFL Microflake |
| BAS Basalt | CRO Cropstone |
| BON Bone | WIR Wire |
| OCH Ochre | CART Cartridge |
| GAB Gabro | JEW Jewellery |
| | BIR Birdspear |
| | WFL Worked flake |
| | DRI Drill |
| | KNI Knife |

This is now being extended to include all of the terms listed below, plus Ritchie's (1984) nephrite sources and some more terms which are not yet finalised.

PLOTT-IT's revised vocabulary (These lists were compiled by Robert Brassey. Several of the original terms and abbreviations were deleted).

| <u>MATERIALS</u> | <u>FUNCTIONS</u> | <u>SOURCES</u> |
|---------------------|------------------------|-------------------|
| CHE Chert | FLA Flake | KAE Kaeo area |
| OBS Obsidian | COR Core | MAY Mayor Island |
| GRE Greenstone | ABR Abrader | GBA Great Barrier |
| SAN Sandstone | NEE Needle | FAN Fanal Island |
| MET Metal | PEB Pebble | HUR Huruiki |
| ARG Argillite | CHI Chisel | OTHER Not Kae/May |
| F.W Fossil wood | ADZ Adze | Source not known |
| QUA Quartz | P.ADZ Part adze | |
| BAS Basalt | CRO Cropstone | LOC Local |
| BON Bone | WIR Wire | NLOC Not local |
| HAE Haematitic mat. | CART Cartridge | |
| RCY Rock crystal | BIR Birdspear | |
| GAB Gabbro | UFL Flake, use wear | |
| GUM Kauri gum | OCH Ochre | |
| FEL Feldspar | HAM Hammerstone | |
| HOR Hornblende | P.HAM Part hammerstone | |

At present Russel Fulton is now working with Andrew Crosby, who is project research assistant for 1984, on modifications to PLOTT-IT so that it will run with the extended vocabulary, show postholes and plot artefacts of specific functions or identified material on separate transparency sheets. It is hoped that PLOTT-IT will eventually be able to show stratigraphy and excavated structures in three dimensions, for teaching as well as research purposes. Its greatest value in the medium term may be that it has resulted in the production of edited data sets on spatial relationships within and between prehistoric and protohistoric Maori habitations in open settlements and fortifications. Statistical and analytical software can now be applied to these data.

Conclusions

This article outlines some of the advantages of field computers to archaeologists in New Zealand. It describes the beginnings of field computer applications on the Pouerua project. The primary advantage is additional rigour in data collection.

Easy access to data, which is very important to projects involving any number of people, is an additional advantage. Data storage is permanent, very cheap and nothing gets dog-eared or yellowed with age.

Finally powerful analytical software can be applied to edited and clean data sets. There is nothing new about archaeologists producing these. The point here is that the use of field computers can expedite the process for us considerably.

References

- Brassey, R. and A. Seelenfreund 1984 Sources of obsidian artefacts from Pouerua, Bay of Islands district. N.Z.A.A. Newsletter, 27:39-42.
- Green, R.C., D.Niven and D.G. Sutton n.d. N15/255 - excavation of a lake-shore open settlement site at Lake Owhareiti. Ms., Anthropology Department, University of Auckland.
- Ritchie, N. 1984 An analysis of nephrite artefacts from Pouerua, Bay of Islands. N.Z.A.A. Newsletter, this issue.
- Rogers, A.R. 1982 Data collection and information loss in the study of spatial pattern. World Archaeology, 14:249-258.