# ON-SITE COMPUTERIZATION: A CASE STUDY IN HISTORIC ARCHAEOLOGY

Anita G. Cohen

Since 1979 I have been involved with the analysis of archaeological remains from Mission San Antonio de Padua, in the former Spanish Province of Alta California. We have been focusing our attention at the Mission on two behavioral areas. The first of these is the neophyte quarters. The second is the soldiers' barracks. The data retrieved from these excavations have been used to test a micro-computer system for on-site analysis.

The micro-computer used was a TRS-80 system supported by a printer and an expansion interface. This micro-computer uses a form of modified Basic computer language. The system is small enough to be easily transported. It requires one standard, grounded electrical outlet. The TRS-80 system could conceivably be operated by a generator or batteries at sites that lacked any electrical power. The system is relatively inexpensive, around $2000.

The micro-computer system was chosen due to the considerable degree of trouble associated with University computer systems in general, and particularly in regard to their use on archaeological projects. These systems seem to combine slow speed with a need for high degree of computer skills, which few archaeologists have. The most significant problem was the difficulty of inputing data into the computer system, and receiving analysis in a short period of time. There appears to be little point in doing computer analysis if the turnaround time is longer than the project itself. Furthermore, the overhead cost of computerization in terms of paying keypunchers, programmers, and the use of computer time is usually rather prohibitive for the amount of information gained.

During 1979, I studied the possibility of using a micro-computer that would involve high accessibility and relatively rapid turnaround time. After analyzing ethnohistoric documents and various museum collections, I assembled a simple taxonomic model that would make it possible to determine behavioral areas on the basis of the presence of certain diagnostic features. Under ideal conditions it would be possible to identify domestic areas according to their inhabitants' social position at the mission. For example, the soldiers' barracks would include certain classes of artifacts, such as weaponry, that would not be found with similar frequency among the padres or neophytes. To test this model I examined previous archaeological analyses of Spanish colonial sites in California. James Deetz's data proved useful in appraising the potential value of the program. It worked with a high degree of accuracy as a macro-tool of investigation.

The program itself used information concerning type of artifact. Artifacts were encoded according to their relative position, that is, which room (by number) they appeared in. The data were subjected to a

number of comparison tests in which rooms were assessed as to their possible use. After these tests, the output would give information regarding the likelihood that each area was present. By this process, relatively unlikely interpretations could be eliminated. Although the answers were far from conclusive, they did point to probable uses of areas. On a room by room basis, this program allowed a systematic examination of the data, and made a macro-level interpretation possible.

In 1980 I had the opportunity to develop a program with Jack Williams for on-site analysis at Mission San Antonio. We worked over the problems the earlier program had in terms of direct application to this study area. The original scope of a room by room analysis proved to be inadequate. Our provenience units were smaller than rooms and we felt that particular functions (such as sleeping vs. eating areas), could be determined. Furthermore, we had already established the gross morphology and the social position of the inhabitants of the soldiers' barracks, the area of our investigation. Thus the phase one analysis that the old program could have provided was not necessary.

My earlier work with the computer had convinced me that a more detailed program could be developed. I had determined that the program should focus on the excavator's need for information. We therefore sought to produce a system where relatively untrained individuals could operate the program and gain data essential to maximizing their interpretation of their units. By increasing understanding of what they excavate, I felt that they would become more aware of key attributes they might otherwise miss. Increased information about potential interpretations would allow researchers to make key and informed decisions involving methodology.

With this in mind, two new programs were designed. The first of these was a ceramics identification program. This was especially helpful with majolicas, which are present in abundance on the site. The program allowed one to scan diagnostic features of general ceramic types, and where subtle differences were present, as in the case of the majolicas, to make specific distinctions. An output of possible and probable interpretations was given. This allowed for rapid analysis with vast quantities of sherds. Furthermore, the system was far less subjective than the standard impressionistic techniques often employed.

For a number of reasons, this sort of analysis proved to be somewhat impractical in the mission setting. Nevertheless, small scale tests showed it to be an effective tool. Our second program, designed to make chronological and functional inferences from artifacts was far more successful.

One factor that we insisted was of prime importance to our research was rapid information turnaround. The second computer program was created with this in mind. We felt that it was impractical to do full analysis and curation before preliminary computer analysis, since information as to probable function and dates would often require a change in methodology. For example, we wanted to avoid mixing chronologically distinct strata that represented different occupations. As it turned out,

the computer suggested the multi-component nature of the soldiers' barracks before actual architectual evidence clarified the situation. To accomplish our end the excavators counted materials, and roughly assessed their typological attributes in the field, as each unit's level were finished. All data was analyzed in less than a week, often in less than twenty-four hours.

The program (San Antonio Mission Analysis or SAMAN), inputed data in three simple expressions. The first was type, the second material, and the third count. The data was encoded by the excavators, using a codebook which we had assembled. Both the program and the codes were flexible enough to allow for as many new variables as necessary. This information was then subjected to a number of mathematical appraisals and statements as to function and date. Tables 1-6 give examples of one of the level printouts. Table 1 shows all the artifacts, their respective materials, their number, the percentage of the particular artifacts as compared to the whole assemblage, the time period and the function. Table 2 is an analysis by material. Table 3 is the specific ceramic analysis with type and date of manufacture. Table 4 gives the metal analysis, Table 5 the glass analysis, and Table 6 the lithic analysis. These were printed out as a permanent record, and filed with the various members of the staff. Because of the tremendous count of material, (one level contained over 2400 artifacts and artifact fragments), this proved to be the only systematic way in which individual proveniences could be classified. (For a printout of the actual program, see Appendix A.)

The advantages of using the system were many. It allowed us to come to reasonable conclusions as to what data were being recovered, well in advance of the normal timetables associated with laboratory analysis. It gave us a systematic technique for recording comparative data during the excavation. It provided the students at the mission with a firsthand experience with the computer as an analytic tool. The computer improved their understanding of the site, and greatly enhanced their interpretations of function and chronology. In previous years, a certain distance had been noted between what was excavated and the long range problem of interpretation. In effect, the computer helped focus the entire research team on the problem of determining meaning as to function and relative chronological placement of the site. This led to a broader base of opinions regarding the site and its contents.

The basic program used at Mission San Antonio could easily be adapted to any archaeological site that had artifact assemblages that were previously identified as to functions and dates. It would particularly benefit large scale projects that require significant numeric control of data and rapid turnaround time. It could be used without modification at any Spanish colonial-Mexican Republic era site in California. With minor modifications, it could be used at late historic period sites in the greater trans-Mississippi West.

Table 1. Quantitative Analysis by Artifact Type, Mnt 100, Mission San Antonio, Room 3, 42W/1N C, Level 33

| | | | | | |
|---|---|---|---|---|---|
| fire cracked rock | N | 1 | 0% | proto-historic | hearth? |
| vitrified stone | N | 7 | 0% | proto-historic | hearth? |
| wood fragments | W | 2 | 0% | ? | architecture |
| redwood fragments | W | 1 | 0% | ? | architecture |
| mamal tooth | B | 13 | 0% | ? | food source |
| unid, bone | B | 646 | 25% | ? | food source |
| charcoal | X | 1421 | 56% | ? | fire |
| tegula | L | 4 | 0% | mission | food source |
| mytilus | L | 27 | 1% | mission | food source |
| haliotus | L | 1 | 0% | mission | food source |
| shell bead | L | 3 | 0% | mission | jewelry |
| plaster? | R | 46 | 1% | mission | architecture |
| concrete | Q | 1 | 0% | 20th century | architecture |
| musket ball | M | 1 | 0% | mission | weaponry |
| button | M | 1 | 0% | historic | clothing fastener |
| wood screw | M | 1 | 0% | historic | fastener |
| forged nail | M | 2 | 0% | - 1850 | fastener |
| sewing pin | M | 1 | 0% | 20th century | sewing |
| mtl cndl holder | M | 2 | 0% | 20th century | lighting |
| glass bead | G | 16 | 0% | mission | jewelry |
| green glass | G | 7 | 0% | 20th century | food-liquid storage and serving |
| clear glass | G | 1 | 0% | 20th century | window? |
| mission ware | C | 21 | 0% | mission | food preparation-storage-serving |
| galeraware | C | 14 | 0% | mission | food storage-serving |
| cantonware | C | 2 | 0% | mission | food serving |
| terra cotta | C | 1 | 0% | 20th century | flower pot |
| mocha ware | C | 2 | 0% | 1789-1850 | food storage-serving |
| mono trnsfrwr | C | 2 | 0% | 1746-1848 | food storage-serving |
| pearl-creamware | C | 5 | 0% | 1775-1850 | food storage-serving |
| chinese porcelain | C | 5 | 0% | mission | food serving |
| unid majolica | C | 8 | 0% | mission | food storage-serving |
| puebla b/w | C | 3 | 0% | mission | food storage-serving |
| aranama polychrome | C | 2 | 0% | mission | food storage-serving |
| san elizario poly I, | C | 6 | 0% | 1750-1800 | food storage-serving |
| san elizario poly II, | C | 3 | 0% | 1780-1810 | food storage-serving |
| non-utilized flakes | S | 141 | 5% | proto-historic | stone tool production |
| stone core | S | 70 | 2% | proto-historic | stone tool production |
| utilized core | S | 4 | 0% | proto-historic | processing? |
| utilized flakes | S | 13 | 0% | proto-historic | cutting-scraping |
| drill | S | 2 | 0% | proto-historic | ? |
| gun flint | S | 3 | 0% | mission | weaponry |
| tejas | T | 1 | 0% | mission | architecture |
| ladrillo | T | 1 | 0% | mission | architecture |
| unid tile | T | 1 | 0% | mission | architecture |

TOTAL ARTIFACTS 2515

Table 2. Quantitative Analysis by Material, Mnt 100, Mission San Antonio, Room 3, 42W/1N C, Level 33

| MATERIAL | NUMBER | PERCENT |
|---|---|---|
| non-flaked stone | 8 | 0% |
| wood | 3 | 0% |
| bone | 659 | 26% |
| carbonized non plant | 1421 | 56% |
| shell | 35 | 1% |
| roman cement | 46 | 1% |
| portland cement | 1 | 0% |
| metal | 8 | 0% |
| glass | 24 | 0% |
| ceramics | 74 | 2% |
| flaked stone | 233 | 9% |
| tile | 3 | 0% |
| TOTAL NUMBER 2515 | | |

Table 3. Ceramic Quantitative Analysis, Mnt 100, Mission San Antonio, Room 3, 42 W/1N C, Level 33

| TYPE | DATE | NUMBER | PERCENT |
|---|---|---|---|
| mission ware | mission | 21 | 28% |
| galeraware | mission | 14 | 18% |
| cantonware | mission | 2 | 2% |
| terra cotta | 20th century | 1 | 1% |
| mocha ware | 1789-1850 | 2 | 2% |
| mono trnsfrwr | 1746-1848 | 2 | 2% |
| pearl-creamware | 1775-1850 | 5 | 6% |
| chinese porcelain | mission | 5 | 6% |
| unid majolica | mission | 8 | 10% |
| puebla b/w | mission | 3 | 4% |
| aranama polychrome | mission | 2 | 2% |
| san elizario poly I | 1750-1800 | 6 | 8% |
| san elizario poly II | 1780-1810 | 3 | 4% |
| TOTAL NUMBER 74 | | | |

Table 4. Metal Quantitative Analysis, Mnt 100, Mission San Antonio, Room 3, 42 W/1N C, Level 33

| TYPE | DATE | NUMBER | PERCENT |
|---|---|---|---|
| musket ball | mission | 1 | 12% |
| button | historic | 1 | 12% |
| wood screw | historic | 1 | 12% |
| forged nail | -1850 | 2 | 25% |
| sewing pin | 20th century | 1 | 12% |
| mtl cndl holder | 20th century | 2 | 25% |
| TOTAL NUMBER 8 | | | |

Table 5. Glass Quantitative Analysis, Mnt 100, Mission San Antonio, Room 3, 42 W/1N C, Level 33

| TYPE | DATE | NUMBER | PERCENT |
|---|---|---|---|
| glass bead | mission | 16 | 66% |
| green glass | 20th century | 7 | 29% |
| clear glass | 20th century | 1 | 4% |
| TOTAL NUMBER 24 | | | |

Table 6. Stone Quantitative Analysis, Mnt 100, Mission San Antonio, Room 3, 42 W/1N C, Level 33

| TYPE | DATE | NUMBER | PERCENT |
|---|---|---|---|
| fire cracked rock | proto-historic | 1 | 0% |
| vitrified stone | proto-historic | 7 | 2% |
| non-utilized flakes | proto-historic | 141 | 58% |
| stone core | proto-historic | 70 | 29% |
| utilized core | proto-historic | 4 | 1% |
| utilized flakes | proto-historic | 13 | 5% |
| drill | proto-historic | 2 | 0% |
| gun flint | mission | 3 | 1% |
| TOTAL NUMBER 241 | | | |

Bibliography

Cohen, Anita G.
1980 Crosses and computers: a taxonomic model for the evaluation of Spanish colonial remains in Alta California. Unpublished senior thesis, University of California at Santa Cruz.

Deetz, James J.F.
1963 Archaeological investigations at La Purisima Mission. Archaeological Survey Annual Report 5(5):151-244. University of California, Los Angeles.

Hoover, Robert L.
1977 Ethnohistoric Salinan acculturation. Ethnohistory 24(3):261-268.

# Appendix A

```
105 P=1:CLS:PRINTCHR$(23):PRINT"xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx":PRINT@396,"SAN ANTONIO MISSION ":PRINT"    ARCHAEOLOGICAL ANALYSIS"
:PRINT"ON SITE COMPUTERIZATION PROJECT":PRINT"            1981":PRINT:PRINT:PRINT:PRINT:PRINT"xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx"
112 A=A+1:IFA<250GOTO112
120 CLS:PRINTCHR$(23):PRINT@384," ":INPUT"ENTER <1> FOR NEW DATA FILES";L:IFL=1GOTO140
130 GOTO150
140 CLS:PRINT@128,"PREPARE YOUR DATA FILES IN THE FOLLOWING FORMAT:":PRINT:PRINT"DELETE ALREADY EXISTING FILES WITH THE FOLLOWING CO
MMAND:":PRINT">DELETE 1003-1999":PRINT
144 PRINT"CREATE NEW FILES BEGINNING ON LINE 1003":PRINT">1003 DATA <TYPE>,<MATERIAL>,<QUANTITY>":PRINT:END
150 CLS:PRINTCHR$(23)"CURRENT PROVIENANCE DATA:":PRINT
152 READA$,B$,C:PRINT"NAME  :"B$
154 READA$,B$,C:PRINT"cREW  :"B$
156 READA$,B$,C:PRINT"DATE  :"B$
158 READA$,B$,C:PRINT:PRINT"ROOM  :"B$
160 READA$,B$,C:PRINT"UNIT  :"B$
162 READA$,B$,C:PRINT"LEVEL :"B$
166 PRINT:INPUT"ENTER <1> TO CONFIRM";L:IFL=1GOTO200
170 CLS:PRINT@128,"ENTER PROVIENANCE DATA ON LINES 950,952,954,956,958,960 ":PRINT"IN THE FOLLOWING FORMAT:"
172 PRINT:PRINT"950 DATA #,<NAME IN FULL>,0":PRINT"952 DATA #,<CREW ROMAN NUMERAL>,0":PRINT"954 DATA #,<DATE E.G. 3 JULY 81>,0":PRIN
T"956 DATA #,<rOOM NUMBER-ARABIC NUMERAL>,0":PRINT"958 DATA #,<UNIT-E.G. 45 W/1N A>,0"
182 PRINT"960 DATA #,<LEVEL-ARABIC NUMERAL>,0":END
200 GOSUB900:CLS:PRINT"QUANTITATIVE ANALYSIS BY ARTIFACT TYPE":PRINT"TYPE                    MAT    NUMBER          PERCENT":PRINT
"-------------------------------------------------------------":RESTORE
201 IFW=1:I$="QUANTITATIVE ANALYSIS BY ARTIFACT TYPE":GOSUB5000
202 READA$,B$,C:X=X+C:IFA$="#"GOTO202
203 IFA$="ED"GOTO210
204 GOTO202
210 RESTORE
211 READA$,B$,C:IFA$="#"GOTO211
212 Q=(C*100)/X:DEFINTQ:T$="?":F$="?":GOSUB2000
213 IFC>0:PRINTA$TAB(25)B$,C,Q"%":IFW=1GOSUB300
214 IFA$="ED":GOTO220
216 GOTO211
220 PRINT"-------------------------------------------------------------":PRINT"TOTAL :"X
222 IFW=1:GOSUB400:LPRINTCHR$(27);CHR$(14)"   TOTAL ARTIFACTS"X:LPRINT" ":GOSUB400
228 PRINT"SEE PRINTOUT FOR FUNCTIONAL ANALYSIS":INPUT"ENTER <1> TO CONTINUE ANALYSIS";W3
230 GOSUB700:CLS:PRINT"QUANTITATIVE ANALYSIS BY MATERIAL":PRINT"MATERIAL                          NUMBER          PER CENT"
232 PRINT"-------------------------------------------------------------":RESTORE:IFW=1GOSUB600
234 K$=B$:READA$,B$,C:IFA$="#"GOTO234
236 GOSUB2000
238 IFK$<>B$:L=(K*100)/X:DEFINTL:IFK>0PRINTKK$TAB(34)KTAB(50)L"%":IFW=1LPRINTCHR$(27);CHR$(14)"  "KK$TAB(29)K,L"%":GOSUB400
239 IFK$<>B$:KK$=BB$
240 IFK$=B$K=K+C
242 IFK$<>B$:K=0:K=C
243 IFA$="ED":RESTORE:GOTO245
244 GOTO234
245 IFW=1:GOSUB400:LPRINTCHR$(27);CHR$(14)"   TOTAL  NUMBER"X:LPRINT" ":GOSUB400
246 PRINT"-------------------------------------------------------------":INPUT"ENTER <1> TO CONTINUE";IR
250 GOTO800
299 END
300 IFW=1:LPRINTCHR$(27);CHR$(30)"       "A$TAB(32)B$TAB(40)C,Q"%",T$,F$:GOSUB400:Y=Y+1
302 IFW=1:IFY=27:P=P+1:LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" "
:LPRINT" ":GOSUB906:GOSUB5000
304 IFY=27:READA$,B$,C:S=S+1
306 IFY=27:IFS<33GOTO304
308 IFY=27:IFS=33:Y=0:S=0
310 RETURN
400 LPRINTCHR$(27);CHR$(138):LPRINTCHR$(15)"
                              ":LPRINTCHR$(14):RETURN
600 REMARKS<PRINT MAT INSTRUCTIONS>
602 GOSUB906:I$="QUATITATIVE ANALYSIS BY MATERIAL":GOSUB5000
603 LPRINTCHR$(27);CHR$(14)"  MATERIAL                  NUMBER            PERCENT":GOSUB400
699 RETURN
```

```
700 IFW=1:CLS:PRINTCHR$(23):PRINT@128,"IF USING PRINTER ADVANCE":PRINT"THE PAPER TO THE TOP OF THE NEXTPAGE":PRINT:PRINT"ENTER <1> T
O CONTINUE":INPUTW3:P=P+1:RETURN
702 RETURN
800 GOSUB700:CLS:PRINT"CERAMIC QUANTITAVTIVE ANALYSIS":PRINT"TYPE                              NUMBER        PER CENT":PRINT"----------
----------":RESTORE
802 IFW=1GOSUB904:I$="CERAMIC QUANTITATIVE ANALYSIS":GOSUB5000:GOSUB9000:GOSUB400
804 READA$,B$,C:IFA$="ED"GOTO810
806 IFB$<>"C"GOTO804
808 TC=TC+C
809 GOTO804
810 RESTORE
812 READA$,B$,C:IFA$="ED"GOTO819
814 IFB$<>"C"GOTO812
816 DEFINTV:V=(C*100)/TC:GOSUB2000:PRINTA$TAB(30)CTAB(45)V"%"
817 IFW=1:LPRINTCHR$(27);CHR$(14)A$TAB(27)T$TAB(43)CTAB(55)V"%"
818 GOTO812
819 IFW=1GOSUB400:LPRINTCHR$(27);CHR$(14)"TOTAL NUMBER"TC:LPRINT" ":GOSUB400
820 PRINT"----------":INPUT"ENTER <1> TO CONTINUE";W3
899 GOTO6000
900 REM>INSTRUCTION FOR LPiv
902 CLS:PRINTCHR$(23):PRINT@128,"TURN ON LP IV":PRINT"TURN <ON LINE>":PRINT:PRINT"ENTER <2> IF NOT ACTIVATED":PRINT"ENTER <1> IF ACT
IVATED":INPUTW
904 IFW=1:LPRINTCHR$(27);CHR$(20):GOTO906
905 RETURN
906 INPUT"ENTER <1> TO PRINT TOP OF PAGE";TR:IFTR<>1RETURN
908 RESTORE
910 READA$,B$,C
912 LPRINTCHR$(27);CHR$(14)"   "B$,,"Mnt  100"
913 READA$,B$,C
914 LPRINTCHR$(27);CHR$(14)"   Crew "B$,,,"Mission San Antonio"
915 READA$,B$,C
916 LPRINTCHR$(27);CHR$(14)"   "B$
917 READA$,B$,C:LPRINTCHR$(27);CHR$(138)
918 LPRINTCHR$(27);CHR$(14),,,"Room "B$
919 READA$,B$,C
920 LPRINTCHR$(27);CHR$(14),,,B$
921 READA$,B$,C
922 LPRINTCHR$(27);CHR$(14)"   PAGE"P,,,"LEVEL "B$
949 RESTORE:RETURN
950 DATA #,ANITA COHEN,0
952 DATA #,II,0
954 DATA #,4 JULY 80,0
956 DATA #,-,0
958 DATA #,41 W/1N B,0
960 DATA #,32,0
1001 DATABG,0,0
1003 DATA UT,T,577,FL,S,250,PT,R,30,MN,M,1,NC,M,1,CL,M,1,CF,G,6,BK,G,22,AQ,G,1,YF,G,1,BD,G,1,MG,C,5,MN,C,4,PQ,C,5,S3,C,1,AA,C,1,TR,C
,7,CP,C,7,GW,C,11,IW,C,14,MW,C,2,SE,C,1,TE,C,1,PW,C,4,CR,C,1,MW,C,16,TM,B,1,BF,B,932,CH,X,447,FR,W,52,HT,L,5,MT,L,11,BD,L,1
1004 DATA SD,P,50
1999 DATA ED,0,0
2000 REM-DECODING ROUTINE
2002 IFB$<>"A"GOTO2008
2004 IFB$="A"BB$="WAX":T$="HISTORIC":IFA$="WX":A$="WAX":F$="LIGHTING ?"
2006 IFT$="CY"F$="WRITTING"
2008 IFB$<>"B"GOTO2020
2010 IFB$="B":BB$="BONE":F$="FOOD SOURCE":IFA$="TM":A$="MAMAL TOOTH"
2012 IFA$="BB"A$="BIRD bONE"
2014 IFA$="BF":A$="UNID. BONE"
2015 IFA$="BX":A$="UNID. BURNT BONE"
2016 IFA$="TD":A$="RODENT TOOTH":F$="NOT CULTURAL ?"
2017 IFA$="BT":A$="WORKED BONE":F$="NOT-FOOD"
2020 IFB$<>"C"GOTO2100
2021 F$="FOOD STORAGE AND SERVING"
2022 BB$="CERAMICS":T$="MISSION":IFA$="SE":A$="SHELL EDGED WARE":T$="1780-1850?"
2023 IFA$="MG"A$="MJ"
2024 IFA$="CW":A$="CANTONWARE":F$="FOOD SERVING"
```

```
2025 IFA$="CB":A$="CLAY BALL":F$="GAMES"
2026 IFA$="TE":A$="TERRA COTTA":T$="20TH CENTURY":F$="FLOWER POT"
2027 IFA$="TQ":A$="TLAQUEPAQUE WARE"
2028 IFA$="IM":A$="IMPROVED MAJOLICA":T$="20TH CENTURY"
2030 IFA$="MP":A$="MONTERY POLYCHROME":T$="1800-1810"
2032 IFA$="TR":A$="IRONSTNE TRNSFWR":T$="1810-PRESENT"
2033 IFA$="TO":A$="TONALA POLYCHROME"
2034 IFA$="SW":A$="STONEWARE":T$="HISTORIC"
2036 IFA$="GW":A$="GALERAWARE"
2038 IFA$="PW":A$="PEARL-CREAMWARE":T$="1775-1850"
2040 IFA$="BW":A$="BLACK GLZD WARE"
2042 IFA$="MW":A$="MISSION WARE":F$="FOOD PREPERATION-STORAGE-SERVING"
2044 IFA$="WW":A$="WAVY RIM MAJ":T$="1750-1810"
2046 IFA$="MJ":A$="UNID MAJOLICA"
2048 IFA$="IW":A$="IRONSTONE WARE":T$="1810-PRESENT"
2050 IFA$="EP":A$="EUROPEAN PORCELAIN":T$="HISTORIC":F$="FOOD SERVING"
2052 IFA$="HZ":A$="HUEJOTZINGO WARE":T$="1700-1800"
2054 IFA$="S1":A$="SAN ELIZARIO POLY I":T$="1750-1800"
2056 IFA$="S2":A$="SAN ELIZARIO POLY II":T$="1780-1810"
2058 IFA$="S3":A$="SAN ELIZARIO POLY III":T$="1780-1810"
2060 IFA$="TC":A$="PRL CRM TRNSFRWR":T$="1756-1810"
2062 IFA$="CR":A$="CERAMICS ?":T$="HISTORIC"
2064 IFA$="SD":A$="SAN DIEGO POLY":T$="1770-1810"
2066 IFA$="GD":A$="GAUDY DUTCH":T$="1850-1875"
2068 IFA$="NW":A$="ANNULAR WARE":T$="1795-1830"
2070 IFA$="AW":A$="SWATOW WARE":F$="FOOD SERVING"
2072 IFA$="MV":A$="MONO TRNSFRWR":T$="1746-1848"
2074 IFA$="OJ":A$="OLIVE JAR WARE":F$="FOOD STORAGE"
2076 IFA$="AA":A$="ARANAMA POLYCHROME"
2078 IFA$="PQ":A$="PUEBLA B/W"
2080 IFA$="CP":A$="CHINESE PORCELAIN":F$="FOOD SERVING"
2082 IFA$="YA":A$="AMERICAN YELLOW WARE":T$="1880-PRESENT"
2084 IFA$="S4":A$="SAN ELIZARIO POLY IV":T$="1780-1810"
2086 IFA$="MM":A$="MOCHA WARE":T$="1789-1850"
2088 IFA$="GP":A$="GREEN MAJOLICA"
2090 IFA$="TU":A$="TUMACACORI POLY I":T$="1820-1860"
2091 IFA$="T2":A$="TUMACACORI POLY II":T$="1820-1860"
2092 IFA$="VT":A$="VITRIFIED POTTERY":T$="HISTORIC":F$="EVIDENCE OF INTENSE HEAT"
2093 IFA$="EN":A$="ENAMELWARE":T$="HISTORIC"
2094 IFA$="PG":A$="PUEBLA G/W":T$="1780-1810"
2096 IFA$="OM":A$="ORANGE LINE MAJ":T$="1800-1910"
2097 IFA$="TI":A$="TIMOTIO WARE"
2098 IFA$="SA":A$="SAN AGSTN B/W":T$="1700-1750"
2100 IFB$<>"G"GOTO2120
2101 IFA$="CO":A$="GG"
2102 T$="HISTORIC":F$="FOOD-LIQUID STORAGE AND SERVING":BB$="GLASS":IFA$="GB":A$="GLASS BEAD":F$="JEWELRY":T$="MISSION"
2103 IFA$="BD":A$="GB":GOTO2102
2104 IFA$="GG":A$="GLASS FRAG"
2105 IFA$="GH":A$="GLASS HANDLE"
2106 IFA$="BN":A$="GLASS BUTTON":F$="APPAREL":T$="20TH CENTURY"
2108 IFA$="VG":A$="VITRIFIED GLASS":F$="INTENSE HEAT-HEARTH?"
2110 IFA$="AQ":A$="AQUA GLASS":T$="1850-1900"
2111 IFA$="BR":A$="BROWN GLASS":T$="1920-PRESENT"
2112 IFA$="UF":A$="UTILIZED FLAKE":T$="MISSION":F$="CUTTING"
2113 IFA$="YF":A$="YELLOW GLASS":T$="1914-1930"
2114 IFA$="BK":A$="BLACK GLASS":T$="    -1860"
2115 IFA$="AF":A$="AMBER GLASS"
2116 IFA$="CF":A$="CLEAR GLASS":T$="20TH CENTURY":F$="WINDOW?"
2117 IFA$="PF":A$="PURPLE GLASS":T$="1880-1914"
2118 IFA$="GF":A$="GREEN GLASS":T$="20TH CENTURY"
2120 IFB$<>"L"GOTO2140
2122 BB$="SHELL":F$="FOOD SOURCE":T$="MISSION"
2124 IFA$="MT":A$="MYTILUS"
2125 IFA$="TA":A$="TEGULA"
2126 IFA$="HT":A$="HALIOTUS"
2127 IFA$="FS":A$="FOSSILIZED SHELL"
```

```
2128 IFA$="SH":A$="SHELL"
2130 IFA$="OL":A$="OLIVELA FRAG":F$="JEWELRY"
2132 IFA$="SB":A$="BD"
2134 IFA$="BD":A$="SHELL BEAD":F$="JEWELRY"
2136 IFA$="GA":A$="LAND SNAIL":F$="NOT CULTURAL?"
2140 IFB$<>"M"GOTO2200
2144 T$="HISTORIC":BB$="METAL":F$="FASTNER":IFA$="NL":A$="UNID NAIL"
2145 IFA$="BL":A$="RB"
2146 IFA$="DO":A$="DOOR ORNAMENT":F$="ARCHITECTURE"
2147 IFA$="WR":A$="WIRE"
2148 IFA$="CN":A$="TIN CAN":T$="20TH CENTURY":F$="FOOD STORAGE"
2150 IFA$="RV":A$="RIVET"
2152 IFA$="BS":A$="BRAD"
2154 IFA$="FM":A$="UNID METAL FRAG"
2156 IFA$="TF":A$="TIN FOIL":T$="POST MISSION":F$="?"
2158 IFA$="EW":A$="ELECTRICAL WIRING":T$="20TH CENTURY":F$="POWER"
2160 IFA$="JG":A$="JANGLE":T$="MISSION":F$="HORSE DECORATION"
2162 IFA$="NC":A$="CUT NAIL":T$="1797-1900?"
2164 IFA$="MN":A$="MACHINED NAILS":T$="1879-PRESENT"
2166 IFA$="CT":A$="CARPET TACK"
2168 IFA$="CD":A$="MTL CNDL HOLDER":F$="LIGHTING":T$="20TH CENTURY"
2170 IFA$="BC":A$="BOTTLE CAP":T$="1895-PRESENT":F$="LIQUID CONTAINER"
2172 IFA$="CL":A$="COIL":F$="?"
2174 IFA$="FN":A$="FORGED NAIL":T$="    -1850"
2175 IFA$="ST":A$="STAPLE":T$="20TH CENTURY"
2176 IFA$="TB":A$="THREADED BOLT"
2177 IFA$="SU":A$="STAPLE"
2178 IFA$="RB":A$="RIM FIRE BULLET":T$="POST 1865":F$="WEAPONRY"
2179 IFA$="BE":A$="BEER CAN":T$="20TH CENTURY":F$="LIQUID CONTAINER"
2180 IFA$="PB"A$="PULL TAB":T$="20TH CENTURY":F$="LIQUID CONTIANER"
2181 IFA$="HK":A$="HOOK"
2182 IFA$="LW":A$="LEAD WASTE":F$="BULLET PRODUCTION?":T$="MISSION"
2183 IFA$="ML":A$="MIGUELET LOCK":F$="WEAPONRY":T$="MISSION"
2184 IFA$="MB":A$="MUSKET BALL":F$="WEAPONRY":T$="MISSION"
2185 IFA$="KT":A$="KNIFE TIP":F$="WEAPONRY-UTENSIL"
2186 IFA$="FK":A$="FORK":F$="EATING UTENSIL"
2187 IFA$="NH":A$="NAIL HINGE":T$="MISSION":F$="ARCHITECTURE"
2188 IFA$="22":A$="22 SHELL":F$="WEAPONRY":T$="20TH CENTURY"
2189 IFA$="PN":A$="SEWING PIN":T$="20TH CENTURY":F$="SEWING"
2190 IFA$="WS":A$="WOOD SCREW"
2191 IFA$="CN":A$="COUNTER PLATE":F$="WEAPONRY"
2192 IFA$="HN":A$="HORSE SHOE NAIL":F$="HORSE GEAR"
2193 IFA$="GB":A$="SEQUIN":F$="JEWELRY"
2194 IFA$="MN":A$="WASHER"
2195 IFA$="WN":A$="WING NUTT":T$="20TH CENTURY?"
2196 IFA$="CI":A$="COIN":F$="BARTER"
2197 IFA$="BN":A$="BUTTON":F$="CLOTHING FASTENER"
2200 IFB$<>"N"GOTO2220
2202 BB$="NON-FLAKED STONE":T$="PROTO-HISTORIC"
2204 IFA$="FC":A$="FIRE CRACKED ROCK":F$="HEARTH?"
2205 IFA$="HS":A$="HAMMER STONE":F$="TOOL PRODUCTION"
2206 IFA$="YO":A$="YELLOW OCHRE":F$="NOT CULTURAL"
2208 IFA$="VS":A$="VITRIFIED STONE":F$="HEARTH?"
2210 IFA$="GS":A$="GROUND STONE":F$="FOOD PRODUCTION"
2212 IFA$="BO":A$="BOILING STONE?":F$="FOOD PREPERATION"
2214 IFA$="MR":A$="MUD MORTAR":F="ARCHITECTURE"
2220 IFB$<>"P"GOTO2230
2222 BB$="PLANT REMAINS":F$="FOOD SOURCE"
2224 IFA$="OP":A$="OLIVE PIT"
2226 IFA$="SD":A$="SEEDS"
2228 IFA$="NT":A$="NUT SHELLS"
2230 IFB$<>"Q":GOTO2240
2232 BB$="PORTLAND CEMENT":T$="20TH CENTURY":F$="ARCHITECTURE":A$="CONCRETE"
2240 IFB$<>"R"GOTO2250
2242 BB$="ROMAN CEMENT":A$="PLASTER?":T$="MISSION":F$="ARCHITECTURE"
2250 IFB$<>"S" GOTO2270
```

```
2252 BB$="FLAKED STONE":T$="PROTO-HISTORIC"
2253 IFA$="CH":A$="FL"
2254 IFA$="FL":A$="NON-UTILIZED FLAKES":F$="STONE TOOL PRODUCTION"
2255 IFA$="TK":B$="N":A$="FC"GOTO2000
2256 IFA$="UF":A$="UTILIZED FLAKES":F$="CUTTING-SCRAPING"
2257 IFA$="SS":A$="SCRAPER":F$="HIDE PROCCESSING"
2258 IFA$="PP":A$="PROJECTILE POINT":F$="WEAPONRY"
2260 IFA$="CE":A$="STONE CORE":F$="STONE TOOL PRODUCTION"
2261 IFA$="GN":A$="GUN FLINT":F$="WEAPONRY":T$="MISSION"
2262 IFA$="CA":A$="UTILIZED CORE":F$="PROCESSING?"
2263 IFA$="UB":A$="STONE BIFACE":F$="CUTTING?"
2264 IFA$="BC":A$="BURNT CHERT"
2270 IFB$<>"T"GOTO2290
2272 BB$="TILE":T$="MISSION":F$="ARCHITECTURE"
2274 IFA$="TJ":A$="TEJAS"
2276 IFA$="LD":A$="LADRILLO"
2278 IFA$="UT":A$="UNID TILE"
2280 IFA$="WT":A$="WASTER"
2290 IFB$<>"U"GOTO2300
2292 BB$="RUBBER":A$="RUBBER FRAGMENT":T$="20TH CENTURY"
2300 IFB$<>"W"GOTO2320
2302 BB$="WOOD":F$="ARCHITECTURE"
2304 IFA$="FR":A$="WOOD FRAGMENTS"
2306 IFA$="PC":A$="PINE CONE BRACKS":F$=" "
2308 IFA$="PG":A$="WOOD PEGS":T$="MISSION"
2310 IFA$="RW":A$="REDWOOD FRAGMENTS"
2320 IFB$<>"X"GOTO2330
2321 BB$="CARBONIZED NON PLANT"
2322 IFA$="CH":A$="CHARCOAL":F$="FIRE"
2324 IFA$="VA":A$="VITRIFIED ADOBE":F$="INTENSE HEAT"
2326 IFA$="VS":B$="N":GOTO2000
2330 IFB$<>"Y"GOTO2350
2332 BB$="PLASTIC":T$="20TH CENTURY"
2334 IFA$="ET":A$="ELECTRICIANS TAPE":F$="POWER"
2336 IFA$="RE":A$="PLASTIC RECORD":F$="AMUSEMENT"
2338 IFA$="TG":A$="PLASTIC TAG":F$="MARKER"
2340 IFA$="PX":A$="PLASTIC FRAGMENTS"
2342 IFA$="SF":A$="STYROFOAM":F$="LIQUID CONTAINER"
2350 IFB$<>"Z":GOTO2360
2352 BB$="PAPER":T$="20TH CENTURY"
2354 IFA$="CG":A$="CIGARETTE BUTT":F$="AMUSEMENT"
2356 IFA$="PR":A$="PAPER":F$="WRITING"
2358 IFA$="TP":A$="TAPE":F$="FASTENER"
2360 REM
2999 RETURN
5000 LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":GOSUB400:LPRINTCHR$(27);CHR$(14)"   "I$:LPRINT" ":GOSUB400:RETURN
6000 GOSUB700:CLS:PRINT"METAL QUANTATATIVE ANALYSIS":PRINT"TYPE                    MATERIAL       PERCENT":PRINT"----------
----------":RESTORE
6002 IFW=1GOSUB904:I$="METAL QUANTATATIVE ANALYSIS":GOSUB5000:GOSUB9000:GOSUB400
6004 READA$,B$,C:IFA$="ED"GOTO6010
6006 IFB$<>"M"GOTO6004
6008 TM=TM+C
6009 GOTO6004
6010 RESTORE
6012 READ A$,B$,C:IFA$="ED"GOTO6020
6014 IFB$<>"M"GOTO6012
6016 DEFINTV:V=(C*100)/TM:GOSUB2000:PRINTA$TAB(30)CTAB(45)V"%"
6017 IFW=1:LPRINTCHR$(27);CHR$(14)A$TAB(27)T$TAB(43)CTAB(55)V"%"
6018 GOTO6012
6020 IFW=1GOSUB400:LPRINTCHR$(27);CHR$(14)"TOTAL NUMBER"TM:LPRINT" ":GOSUB400
6022 PRINT"----------":INPUT"ENTER <1> TO CONTINUE";W3
6100 GOSUB700:CLS:PRINT"GLASS QUANTATATIVE ANALYSIS":PRINT"TYPE                    MATERIAL       PERCENT":PRINT"----------
----------":RESTORE
6102 IFW=1GOSUB904:I$="GLASS QUANTATATIVE ANALYSIS":GOSUB5000:GOSUB9000:GOSUB400
6104 READA$,B$,C:IFA$="ED"GOTO6110
6106 IFB$<>"G"GOTO6104
```

```
6108 TG=TG+C
6109 GOTO6104
6110 RESTORE
6112 READA$,B$,C:IFA$="ED"GOTO6119
6114 IFB$<>"G"GOTO6112
6116 DEFINTV:V=(C*100)/TG:GOSUB2000:PRINTA$TAB(30)CTAB(45)V"%"
6117 IFW=1:LPRINTCHR$(27);CHR$(14)A$TAB(27)T$TAB(43)CTAB(55)V"%"
6118 GOTO6112
6119 IFW=1GOSUB400:LPRINTCHR$(27);CHR$(14)"TOTAL NUMBER"TG:LPRINT" ":GOSUB400
6120 PRINT"-------------------------------------------------------------------":INPUT"ENTER <1> TO CONTINUE";W3
6200 GOSUB700:CLS:PRINT"STONE TOOL QUANTATATIVE ANALYSIS":PRINT"TYPE                    MATERIAL       PERCENT":PRINT"-------
-------------------------------------------------":RESTORE
6202 IFW=1GOSUB904:I$="STONE QUANTATATIVE ANALYSIS":GOSUB5000:GOSUB9000:GOSUB400
6204 READA$,B$,C:IFA$="ED"GOTO6210
6205 IFB$="N"GOTO6208
6206 IFB$<>"S"GOTO6204
6208 TZ=TZ+C
6209 GOTO6204
6210 RESTORE
6212 READA$,B$,C:IFA$="ED"GOTO6220
6213 IFB$="N"GOTO6216
6214 IFB$<>"S"GOTO6212
6216 DEFINTV:V=(C*100)/TZ:GOSUB2000:PRINTA$TAB(30)CTAB(45)V"%"
6217 IFW=1:LPRINTCHR$(27);CHR$(14)A$TAB(27)T$TAB(43)CTAB(55)V"%"
6218 GOTO6212
6220 IFW=1GOSUB400:LPRINTCHR$(27);CHR$(14)"TOTAL NUMBER"TZ:LPRINT" ":GOSUB400
6222 PRINT"-------------------------------------------------------------------"
7000 END
9000 LPRINTCHR$(27);CHR$(14)"   TYPE                  DATE          NUMBER      PERCENT":RETURN
```