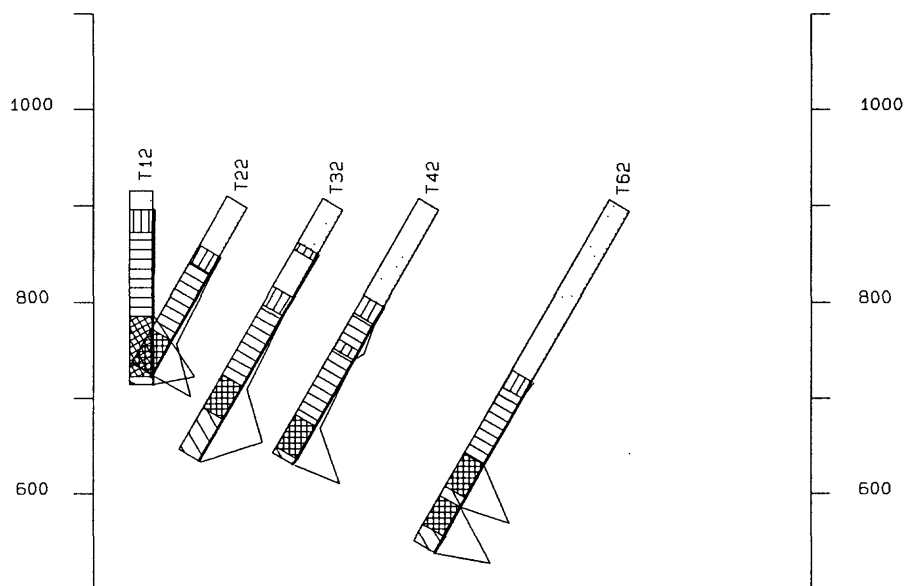UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY

GSLXY Version 1.0: A prototype program to draw cross sections and plot plan views from drill hole data on an X, Y, coordinate system using an IBM PC (or compatible) microcomputer, digitizer, and plotter.

by

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Open File Report
88-387A
Program disk
88-387🌑 *A*

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Although program tests have been made, no guarantee (expressed or implied) is made by the authors regarding program correctness, accuracy, or proper execution on all computer systems.

Denver Colorado

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INTRODUCTION

GSLXY is a microcomputer program for IBM PC or compatible computers, and requires a digitizer and a plotter. The program is designed to process and plot data that define the "vertical" sequence of rock units at locations specified by X,Y coordinates, and up to five numeric variables associated with the lithologic units. The program's name comes from Geological Survey Lithology X Y coordinate system.

The program enables the digitizing of the locations of drill holes, measured sections, or other places where information has been obtained and stores information about the vertical extent of units at each locality, and as many as five numeric variables that apply to each unit. It employs a user-defined "standard set" of unit identifiers. Input of data for units at each locality is checked against this standard set to guarantee consistency. Plotter patterns are specified by the user for each unit, and are used in drawing plan views and cross sections.

HARDWARE REQUIREMENTS

The program requires: 1. an IBM PC (or compatible) with 256K of RAM , an 8087 co-processor chip, a graphics adapter card (either CGA or EGA (not Hercules), a serial communications adapter; 2. a digitizer that interfaces with the computer through an RS232C serial port, transmits X,Y coordinate pairs in an ASCII string, and has a keypad with at least 14 keys that send different ASCII characters, and 3., a plotter that supports HPGL (Hewlett Packard Graphics Language) plot commands.

Information to assist interconnection and installation is given in Appendix 1. Additional information is contained in the manuals supplied with equipment.

SOFTWARE REQUIREMENTS

The minimum software requirements for utilizing the program are PC/DOS (or MS/DOS) Version 2.1 or higher, the release disk, and a word processing program capable of generating ASCII files. The program was developed using the MicroSoft QuickBASIC Compiler Version 2.0, and 87BASIC to support the math co-processor.

GSLXY is one of a series of computer programs for geologists, for use in an office environment. It is designated as "level 5 software because it operates in a manner consistent with Version 5 of GSMAP and GSDRAW (Selner and Taylor, 1988). It uses the same configuration files to interface with digitizers and plotters, and can produce output to files written in HPGL (Hewlett Packard Graphics Language) to drive plotters or printers.

INSTALLATION

The disk contains the program and three configuration files defining parameters for communicating between computer, monitor, digitizer and plotter. One of these (CONFIG.PLT) also contains a standard set of symbols.

The configuration files and the executable program file (GSLXY.EXE) can be stored on a floppy disk or in any sub-directory on a hard disk. The user should employ the standard DOS COPY command to place the program and other files on the appropriate disks, or in appropriate sub-directories on hard disks.

APPLICATIONS OF GSLXY

The GSLXY program was designed to assist analysis of lithologic and/or stratigraphic data from drill holes. It is not a replacement for surface modeling programs. It uses an X,Y coordinate system and can plot data from vertical or slant holes. It does not incorporate the ability to test for dip and strike of beds.

The words "hole or "well" are used generically in this documentation to indicate a place where data on the vertical sequence of units are available.

Cross sections

The program can draw a series of cross sections from drill hole data to show the vertical extent of units plotted at true elevation, thus providing a quick way of determining the consistency of a data set, locating critical holes, and starting the process of data analysis.

The program provides the capability of adjustment so that plots of drill holes on cross sections can be aligned with a specified contact plotted at a specified elevation. Such alignment of data on cross-sections may facilitate stratigraphic analysis. If a contact is specified, only those holes will be plotted where this contact has been identified in the data.

A type of block diagram can be constructed on a single sheet of paper by drawing a series of stacked cross sections.

If stratigraphic thicknesses are needed in final plots, data should be corrected for the dip of units at the time of data entry. The program projects data from slant holes to the plane of cross section in proper geometric projection.

Plan views

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A series of plan views can be drawn to provide information on the stratigraphic and structural framework of an area. A plot of the elevation of the contact of two units provides the basis for construction of a structure contour map. A plot of the thickness of a unit provides a start for construction of an isopach map. ASCII files generated by GSLXY can be used with computer-driven contouring programs. If the elevation data from a series of holes are adjusted to bring a particular contact to a specified vertical position by the program, a plot of the vertical offset required for this adjustment provides insight into the shape of this contact in three dimensions. Horizontal slices through well data sets provide elements of a subsurface geologic map for the chosen elevation.

With the addition of fold axes and faults projected from surface data, insight on three dimensional geology is gained.

EXAMPLES OF GRAPHICAL OUTPUT FROM GSLXY

Figures 1-11

These figures were made from data used to develop GSLXY. The data files and plot control files used to produce these diagrams are included on the release disk, see listing on p. 71.

5
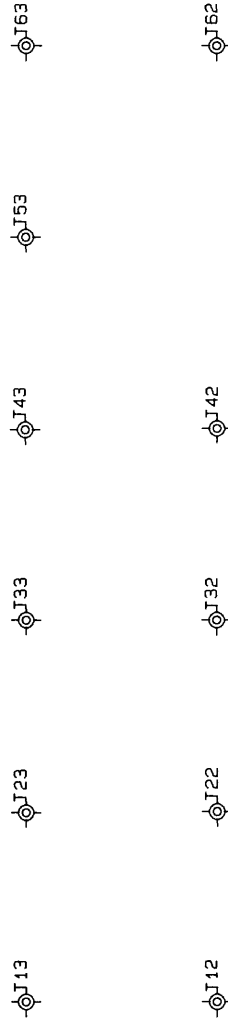
Figure 1. The plan view for the exercise suggested in the tutorial. Drill holes and their identifiers have been plotted. Plot file PLAN.PLT was used to plot this figure.
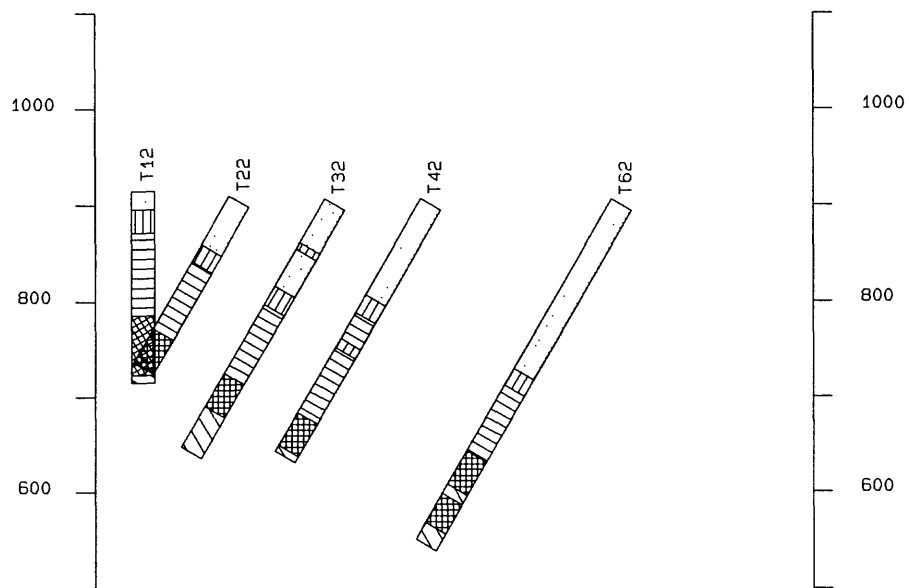
Figure 2._ Example of cross section from tutorial Exercise. Plot file EXAM1.PLT. Numeric variables not plotted.

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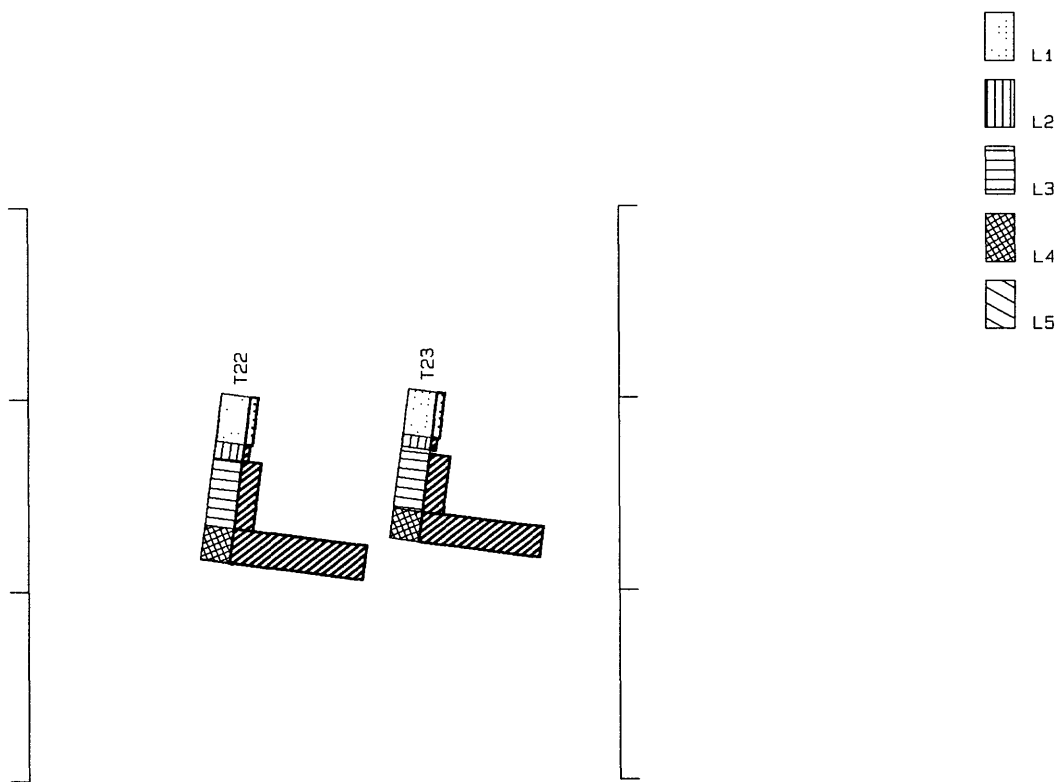
Figure 3._ Example of cross section with numeric variables plotted. Plot file EXAM2.PLT, numeric variable file HIST.VAR, "legend" plotted to show patterns of lithologic units.
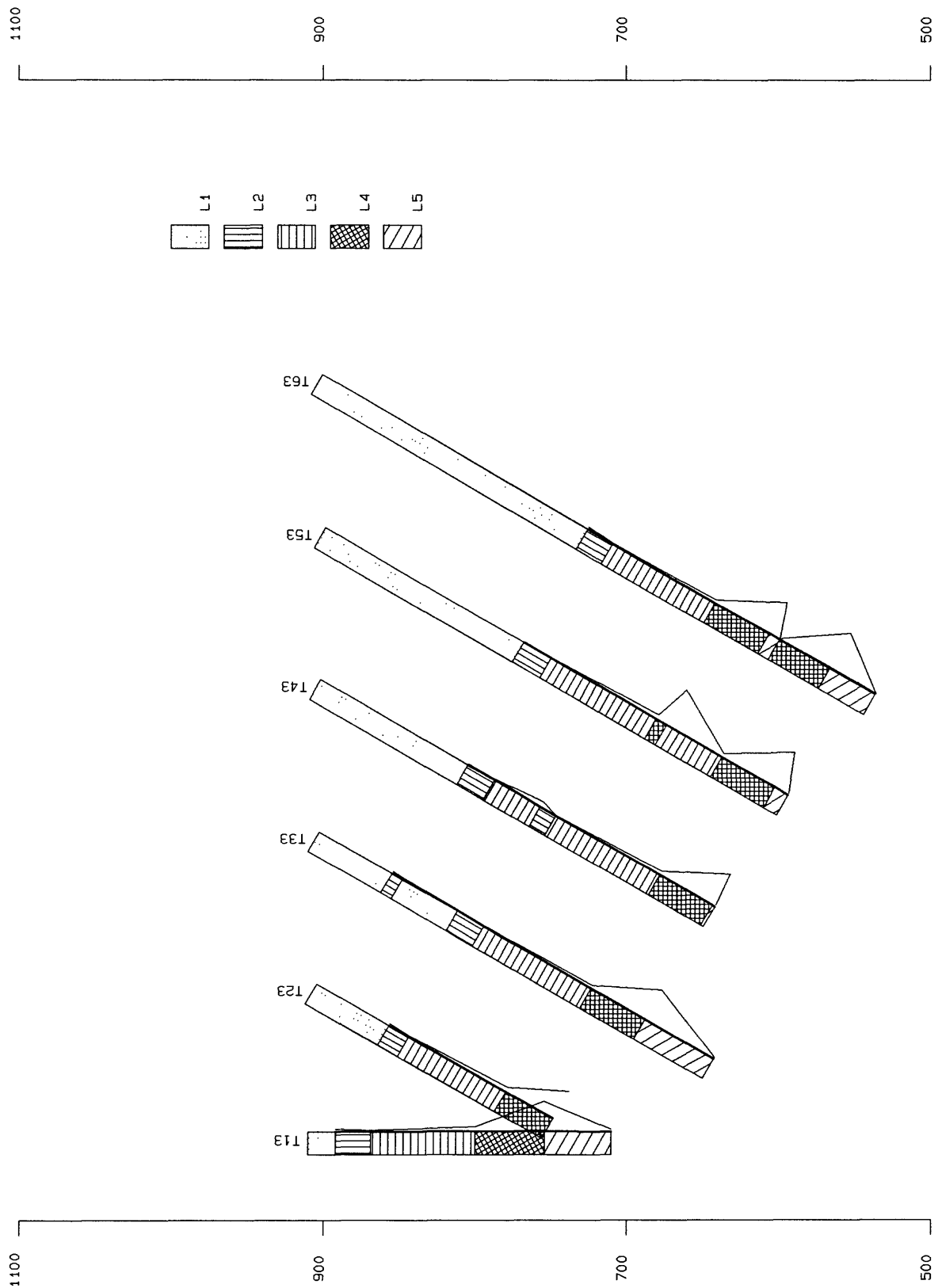
Figure 4._ Cross section with numeric variables plotted. Plot
file EXAM3.Plt, numeric variable file TRACE.VAR.
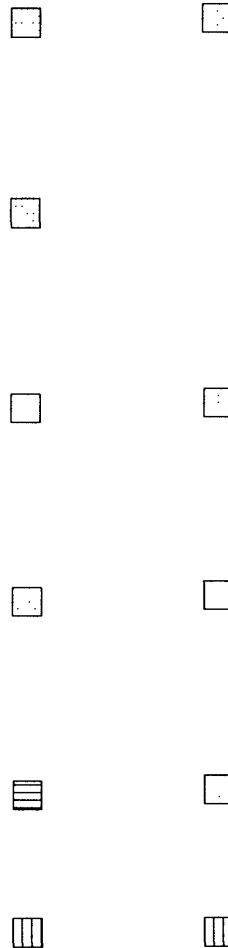
Figure 5._ Plan view, type 11. Units plotted intersected by drill holes at an elevation of 860 feet. Plot file P1.PLT.

Figure 6._ Plan view, type 11. Units plotted intersected by drill holes at an elevation of 750 feet. Plot file P2.PLT. Compare locations with Fig. 5; note shift of some intersections due to change of elevation and plunge of holes.

+   +

35.50 / 32.90   34.64 / 30.31

6.92 / 34.64

34.64   34.64

35.50   34.64

31.17   34.64

46   53

+   +
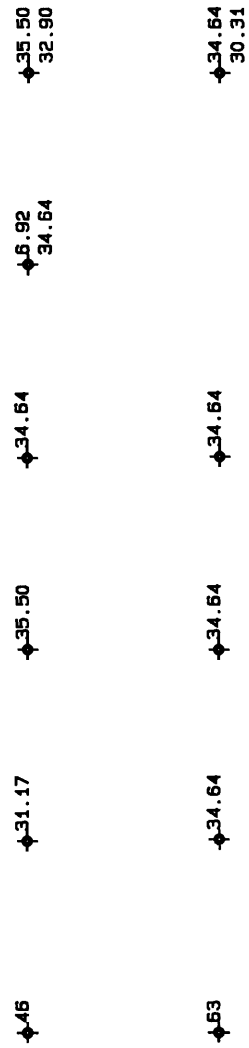
Figure 7._ Plan view type 7. Locations of drill holes, with thickness of unit L4 plotted. Plot File P3.PLT.
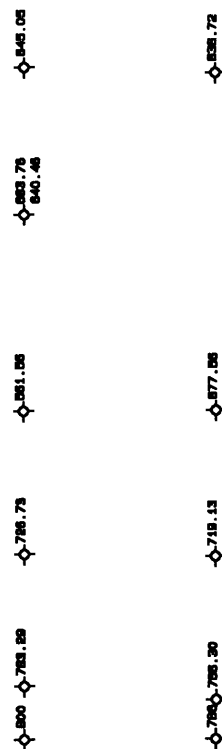
Figure 8._ Locations, and elevations of contact between units L3 and L4. Plotted at location of upper contact, if the contact is present more than once in a drill hole. Plot file P4.PLT

Figure 9._ Locations of drill holes and lines of sections, figures 2-4 Drawn using GSDRAW.
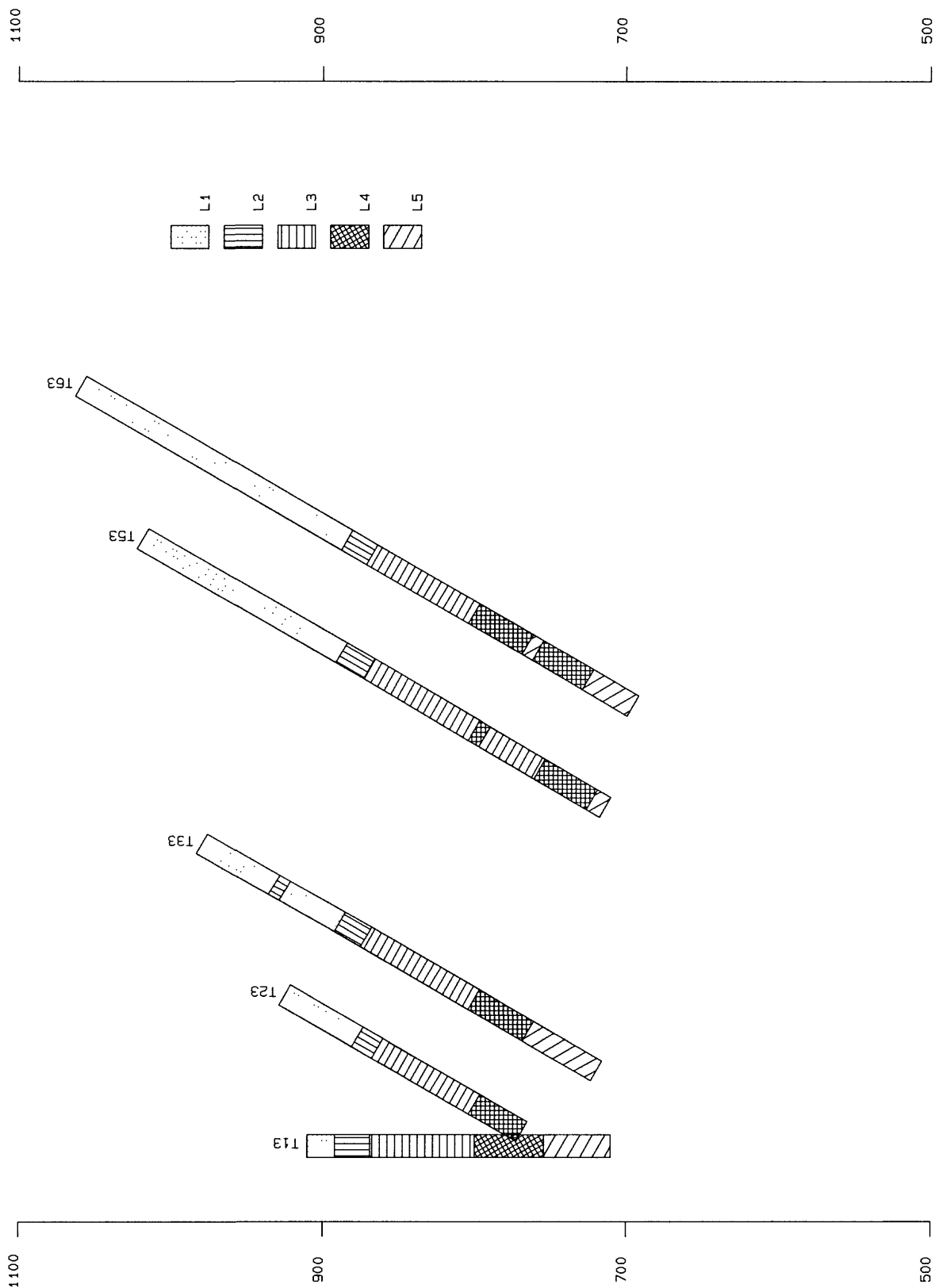
Figure 10. Section like Fig. 2, but contact between units L3 and L4 adjusted to an elevation of 800 feet. Plot file, EXAM4.PLT
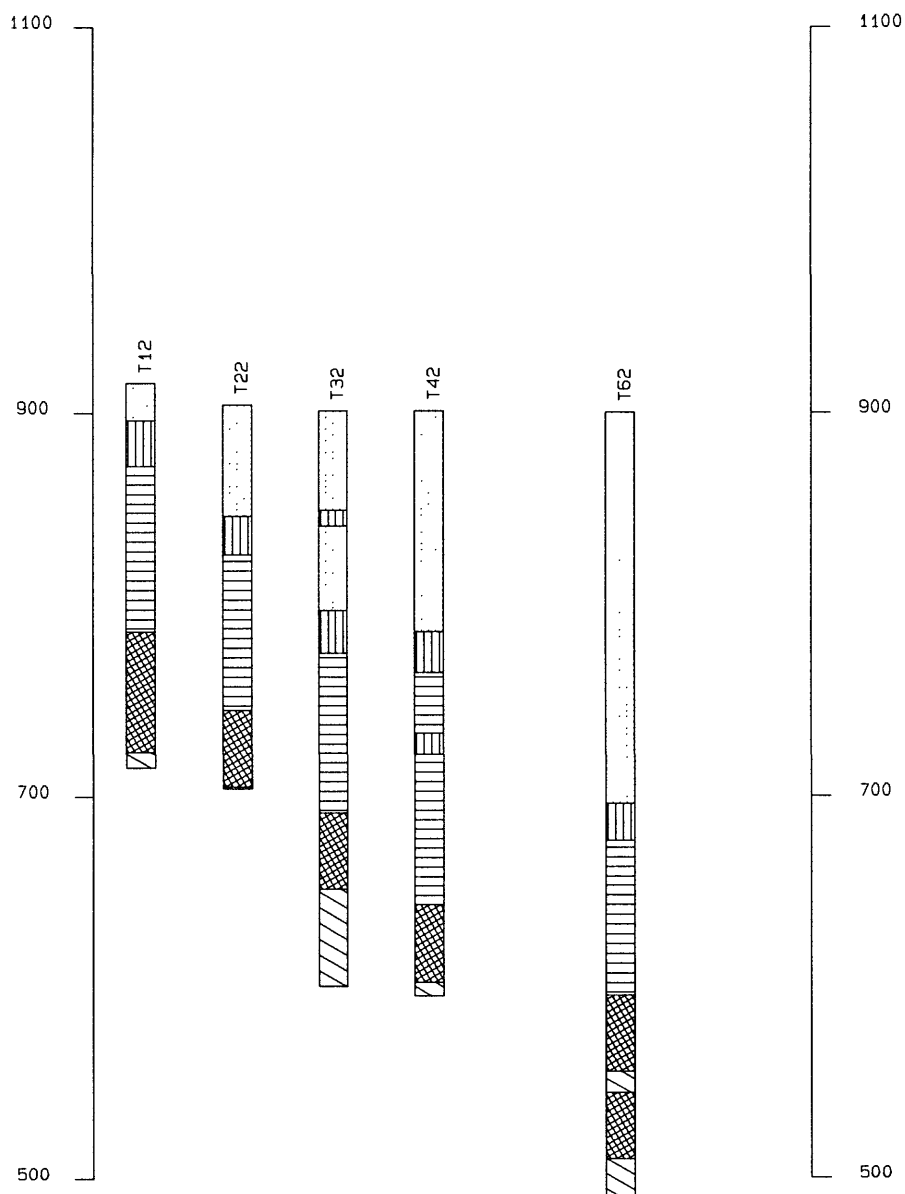
Figure 11. Section of type 3, compare with Fig. 2. Distance and spacing specified in an ASCII file. Plot file EXAM5.PLT, ASCII data file, E1.ASC

Cross-Sections

The GSLXY program provides options to adjust the vertical positions of plots of drill hole data on cross sections. An understanding of some of the algorithms used by the program is important in following these procedures. In this description, the <u>base</u> or <u>top</u> of a unit refers to the bottom or top of a unit as recorded in the log of a well. They are not necessarily the stratigraphic base or top. The <u>contact</u> of two units refers to a position in a log where the elevation of the base of the upper unit is **identical** to the elevation of the top of the lower unit. Once again, this position is not necessarily a stratigraphic contact. The <u>base</u> and <u>top</u> depend on a single record in the log, a <u>contact</u> depends on two.

Cross sections drawn by the GSLXY program show the units encountered in the well using the plotter patterns specified by the user in the file containing the "standard set" of unit identifiers. Drill holes are shown at the angle of plunge "apparent plunge" projected to the plane of cross section.

Plots of well data can be made at true elevation, can be adjusted vertically to bring a contact between two units to a specified elevation or can be adjusted to align the plots at a specified elevation for the base of a designated unit.

Vertical lines are drawn at both ends of the cross-section, tick marks are drawn on these end lines at user specified intervals, to make a vertical scale, and numerical elevations are posted at these tick marks near the end lines.

A "Legend" - a series of rectangles filled with the patterns for each unit in the standard set, followed by the identifier for the unit - can be drawn on the cross section at a specified location.

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Three different methods of creating cross sections are available.

Type 1. The beginning and ending points of a line of cross section are defined by X,Y coordinates of the end points. Wells within a specified distance of this line are selected, by specifying this distance (in the units of the map). Wells within this distance (from both sides of the line) are projected to the line of cross section (perpendicular to this line) and drawn in section. An ASCII file can be created during this procedure and used to generate a section of Type 3.

Type 2. The beginning and ending points of a line of cross-section are defined by X,Y coordinates; wells designated **by identifier,** are projected to this line of section, and drawn in cross section. An ASCII file can be created during this procedure and used to generate a section of Type 3.

Type 3. All parameters of the cross section are specified in an ASCII file: these include the beginning and ending points of the line of section (measured in inches to the top of the well), and listings of well numbers, and their desired position along the line of section. All wells are plotted as if vertical.

The first two types of cross sections facilitate plotting and analysis of well data. The third facilitates the checking of data and data entry.

Plan views

The area drawn on plan views is specified by providing the X,Y coordinates for the corners. For one group of plan views numerical data from the well log is posted immediately to the right of a symbol (of user's choice) that is plotted at the well location. The posted data may be any of the following:
- the characters used as the identifier of the well.
- the elevation of the base or top of a unit in the well (if the unit is present more than once, the elevations will be posted in sequence, that of the upper unit above those of lower units).
- the elevation of a contact between two specified units in the well.
- the thickness of the interval between two contacts in the well.
- the vertical adjustment required to bring the contact between two specified units to a specified elevation.

A second kind of plan view shows the unit present at a designated elevation, as if cut by horizontal slice. The units are shown by patterns specified by the user in the "standard set". If a contact between two units has been adjusted to a specified elevation, the slice is cut and well intersections drawn as adjusted to the specified contact, not at a "true" elevation of intersection.

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TUTORIAL SECTION

We suggest starting with GSLXY by doing a small project - hands on. The exercise includes, digitizing, data entry, and plotting of sections and plan views. We assume the availability of hardware, properly configured. Perhaps a system configured for GSMAP.

First. Turn all of the hardware on - , plotter, digitizer, printer, monitor - if this must be done separately - and computer. Boot up the computer last. Let's assume now that all hardware is operative and properly connected, and that the release disk is available and contains the following files: The first four files are necessary to the operation of GSLXY; the other files (labeled with an asterisk in the list below) are specific to the project described in this section.

CONFIG.SCR ... This file is used to specify the graphics configuration of the computer

CONFIG.DIG ... This file is used to specify the digitizer configuration

CONFIG.PLT ... This file is used to specify the plotter configuration and the symbol. set.

GSLXY.EXE ... This file contains the executable code for GSLXY

*DRILL.BED ... This is the unit identifier file for this project.

*PLAN.PLT.. Example of plan view plot control file type 1.

*P1.PLT ... Example of plan view plot control file, type 11.

*P3.PLT ... Example of plan view plot control file, type 7

*P4.PLT ... Example of plan view plot control file, type 8

*EXAM1.PLT Example of cross section plot control file, type 1.

*TRACE.VAR ... Example of a "trace" file used for plotting numeric variables.

*HIST.VAR ... Example of a "hist" file used for plotting numeric variables

In addition to files on the release disk, A word processing program must be available. A complete listing of the files on the release disk may be found on p. 71.

Getting started.

All projects start by creating a unit identifier file using a word processing program. We assume that you know how to create an ASCII file, so to speed things along we suggest using the file DRILL.BED included on the release disk.

When you create such files on your own, be sure that your word processing program doesn't leave non printing embedded characters like document mode WORDSTAR does. We use non-document mode WORDSTAR and SIDEKICK. User written ASCII files are required for many operations of GSLXY.

The map needed for this project is included here as Fig.9.

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Symbols on this map indicate the locations of 11 drill holes. A location identifier (eg. T21) Immediately to the right of each circle provides the identifier (ID) of the well. The four corners of the map are shown by plus signs, coordinates labeled on Fig. 9.

THE UNIT IDENTIFIER FILE

The file which contains identifying names and graphic patterns for each unit that will be distinguished in the well records is called the UNIT IDENTIFIER FILE, or may be requested as the file containing VALID BED IDENTIFIERS.

The example of the unit identifier file printed below is DRILL.BED. Its six columns contain the data needed by the GSLXY program for data entry and for definition of the patterns used to represent rock units in the drawings produced by the program. Each record ("line") contains information for one unit. This example is used in the exercise suggested in the tutorial section.

```
FILE                   |CONTENTS
                       |
L1, 1, 1, 1, .03, 0    |Unit=L1,Pen#=1, Line type=1, Fill=1, Spacing=0.03", 0°
L2, 1, 0, 1, .04, 90   |Unit=L2,Pen#=1, Line type=1, Fill=1, Spacing=0.04", 90°
L3, 1, 0, 1, .05, 0    |Unit=L3,Pen#=1, Line type=0, Fill=1, Spacing=0.05", 0°
L4, 1, 0, 2, .03, 30   |Unit=L4,Pen#=1, Line type=0, Fill=2, Spacing=0.03", 30°
L5, 1, 0, 1, .07, -30  |Unit=L5,Pen#=1, Line type=0, Fill=1, Spacing=0.07", -30°
```

Summary of the contents of the unit identifier file

Each record (line) contains the following data for one unit.

Identifier,pen number,line type,fill type,spacing between lines,angle from horizontal.

A carriage return is required at the end of each line.

Using the program

Copy the release disk to a backup disk, and with the backup disk in the default drive. Start the GSLXY program by entering GSLXY from the keyboard. Follow instructions provided by screen prompts. From the main Menu, begin by invoking option 1 to start a new data base. The screen prompts will then direct you to make a series of entries:

ENTER DATA BASE NAME: The name EXAMPLE might be used:

ENTER MAP TITLE (16 CHARACTERS): The title Tutorial might be used. Successive screen prompts ask for entry of corner coordinates.

ENTER X,Y OF NW CORNER
ENTER X,Y OF SW CORNER
ENTER X,Y OF SE CORNER
       ENTER X,Y OF NE CORNER

Enter each of the X,Y coordinates in the format requested. NOTE the comma separating the numbers specifying the X and Y coordinates.

The northwest corner is at X=0,Y=600, the southwest corner is at X=0,Y=0, the southeast corner is at X=800,Y=0, the northeast corner is at X=800,Y=600.

Other prompts will ask for the number of numeric variables (specify **2**), and for the file name for valid bed identifiers (specify **DRILL.BED**)

Completion of these entries will cause return of the screen to the main Menu.

Digitizing locations of drill holes

Tape Figure 1 firmly to the digitizer table within the active area of the digitizer. The map must not move during digitizing. Option 3 of the Main Menu is used to digitize locations. When a location is digitized a record is started for that well; data describing the sequence of units in the well are entered later using Option 6.

Select option 3 <u>DIGITIZE</u> <u>NEW</u> <u>WELL</u> <u>LOCATIONS</u> by entering **3** from the Main Menu.

A screen prompt will ask

ENTER 0 (ZERO) KEY ON CURSOR KEYPAD TO SYNCHRONIZE DIGITIZER INPUT

For this first entry from the digitizer the position of the cursor within the active area of the digitizer is not important -- just lightly press the zero key.

The next part of the digitizing procedure indexes the map to the digitizer table using the the map corners.

These corners must have the coordinates entered to start the database.

Follow the directions provided by the screen prompts

ENTER NORTHWEST CORNER ON DIGITIZER
ENTER SOUTHWEST CORNER ON DIGITIZER
ENTER SOUTHEAST CORNER ON DIGITIZER
ENTER NORTHEAST CORNER ON DIGITIZER

These entries are made by striking the zero key on the keypad of the cursor, with the cross hair of the cursor carefully positioned on the map at the position called for. These entries complete the indexing of the map to the digitizer tablet, and the digitizing of well locations can begin. If there is a problem in indexing the corners, you may get a message: SCALE DIFFERS BY MORE THAN 2%, CONTINUE (Y/N?). This message always indicates a problem: digitizing should not continue.

If all is well, choose a well to start digitizing. Using the keyboard of the computer enter the well identification (digits in sequence from left to right). Next accurately position the cross hair of the cursor at the location of the well being entered, and depress the "1" key to record this location. After this has been done, the system is ready to accept another well identification from the keyboard.

Continue the procedure as described to enter a new well identification, then digitize the location of the new well, as described above. Continue until all wells have been entered.
Then simply press the ENTER key from the keyboard instead of entering a Well ID. This returns operations to the Main Menu screen.

Additional wells can be digitized at any time. The next step in this exercise is to enter data on the units encountered in the drill holes, and on the numeric data that applies to those units.

Entering data

Select option 6, Enter **6** from the Main Menu to begin the process of entering data for the wells in this project.

The following list provides data for the drill holes of this exercise. In this list "Well#" is used for the well identifier, and "Unit" for bed identifier. The depths to the top and bottom of each unit are provided in separate columns.

During data entry follow directions provided by the screen prompts. When all data for a well has been entered, enter ,, (comma comma) instead of a bed identifier, and the next screen prompt will request entry of another Well ID; enter another ID and proceed until all data is entered.

Data for test exercise

Well#	Elev.	Depth	Bearing	Plunge
T12	915	200	0	90

			Numeric Variables	
Unit	Top	Bottom	#1	#2
L1	0	19	4	1
L2	19	43	3	0
L3	43	129	2	1
L4	129	192	65	1
L5	192	200	2	2

Well#	Elev.	Depth	Bearing	Plunge
T13	910	200	0	90

			Numeric Variables	
Unit	Top	Bottom	#1	#2
L1	0	18	5	0
L2	18	41	3	0
L3	41	110	10	2
L4	110	156	62	3
L5	156	200	5	0

Well#	Elev.	Depth	Bearing	Plunge
T23	908	180	270	60

			Numeric Variables	
Unit	Top	Bottom	#1	#2
L1	0	55	4	0
L2	55	75	3	0
L3	75	144	11	2
L4	144	180	64	2

```
------------------------------------------------------
Well#      Elev.   Depth    Bearing  Plunge
T33        906     300      270      60
                                  Numeric Variables
Unit       Top     Bottom     #1     #2
L1         0       55         4      0
L2         55      63         3      0
L1         63      105        3      2
L2         105     125        2      0
L3         125     207        8      1
L4         207     248        68     1
L5         248     300        4      0


------------------------------------------------------
Well#      Elev.   Depth    Bearing  Plunge
T43        905     300      270      60
                                  Numeric Variables
Unit       Top     Bottom     #1     #2
L1         0       112        2      5
L2         112     132        2      0
L3         132     167        12     1
L2         167     179        1      1
L3         179     258        9      2
L4         258     298        72     2
L5         298     300        4      0

------------------------------------------------------
Well#      Elev.   Depth    Bearing  Plunge
T53        902     352      270      60
                                  Numeric Variables
Unit       Top     Bottom     #1     #2
L1         0       151        1      1
L2         151     172        1      0
L3         172     252        10     0
L4         252     260        80     1
L3         260     302        8      0
L4         302     342        80     2
L5         342     352        4      0

------------------------------------------------------
Well#      Elev.   Depth    Bearing  Plunge
T63        904     420      270      60
                                  Numeric Variables
Unit       Top     Bottom     #1     #2
L1         0       202        5      0
L2         202     221        2      0
L3         221     299        7      0
L4         299     340        72     3
L5         340     348        3      2
L4         348     386        82     4
L5         386     420        4      3
```

```
------------------------------------------------
Well#     Elev.  Depth    Bearing  Plunge
T22       904    200      270      60
                          Numeric Variables
Unit      Top    Bottom    #1      #2
L1        0      58        4       0
L2        58     78        3       0
L3        78     159       10      1
L4        159    199       70      3
L5        199    200       2       0

------------------------------------------------
Well#     Elev.  Depth    Bearing  Plunge

T32       901    300      270      60
                          Numeric Variables
Unit      Top    Bottom    #1      #2
L1        0      52        4       0
L2        52     60        3       0
L1        60     104       2       2
L2        104    126       1       0
L3        126    210       9       1
L4        210    250       72      1
L5        250    300       4       0

------------------------------------------------
Well#     Elev.  Depth    Bearing  Plunge
T42       901    305      270      60
                          Numeric Variables
Unit      Top    Bottom    #1      #2
L1        0      115       2       1
L2        115    136       2       0
L3        136    168       10      1
L2        168    179       1       1
L3        179    258       9       2
L4        258    298       78      2
L5        298    305       4       0

------------------------------------------------
Well#     Elev.  Depth    Bearing  Plunge
T62       900    410      270      60
                          Numeric Variables
Unit      Top    Bottom    #1      #2
L1        0      204       4       0
L2        204    224       1       0
L3        224    304       8       0
L4        304    344       80      3
L5        344    355       2       2
L4        355    390       85      4
L5        390    410       4       3
```

PLOTTING using PLOT CONTROL FILES

GSLXY requires user-created files to control the drawing of cross sections and plan views. Cross sections are drawn using Option 9 from the Main Menu; plan views are drawn using Option 10.

Plan view with drill hole ID's posted

File |Comments (not a part of the file)

```
1            |Plan view type 1
0,700        |X,Y coordinates NW (upper left) corner
0,0          |X,Y coordinates SW corner
800,0        |X,Y coordinates SE corner
800,700      |X,Y coordinates NE (upper right) corner
0.01,0.01    |Xscale,Yscale
1.5,0.5      |Xoffset, Yoffset
N            |"N" don't rotate on plotter
12,2         |Speed=12, Force=2
0.1,0.15     |Width=0.1,Height=0.15 for label characters
NOSTRAT,,0   |This record calls for plot of symbols with identifiers
1,76,80      |Pen#=1,Symbol#=76,Size=80/1000 inch
```

Let's plot figure 1 using this plot control file. Load the plotter with paper and check the pens. From the Main Menu choose option 10 by entering **10**. The program will supply a prompt:

DO YOU WANT TO USE THE ONLINE PLOTTER(Y/N): Enter **Y**

After this entry a reminder that the plotter must be ready will be displayed; and with it the next prompt:

ENTER PLOT CONTROL FILENAME:

> Enter **PLAN.PLT**

> The screen will display the Map Size (X,Y) 9.5,7.5

> The screen will prompt:

DO YOU WISH TO CREATE AN ASCII FILE X,Y,Z?(Y,N)
> Enter **N**

The plotter will then draw figure 1. The system will return to the Main Menu when the plot is complete.

Cross-section view
EXAM1.plt is the plot control file used to draw Figure 2.

Section cutting through the drill holes from T12, T62.

File	Comments (not a part of the file)
1	|Section type=1
500,1100,200,100,0.12	|base elev., top elev., vert scale 100units/inch, tick interval 100', width 0.12"
0.005	|horizontal scale units/inch
2.0,3.0	|Xoffset=2",Yoffset=3"
Y	|"Y" rotate
12,2	|Speed=12,Force=2
0.1,.15	|Width=0.1, height=0.15 of posted characters
"NOSTRAT",,0	|Do not adjust from true elevations
N,0,0	|"N" no don't plot a legend
50,200	|X=50,Y=200 (coordinates of left end of section)
800,200	|X=800,Y=200 (coordinates of right end of section)
20	|20=distance (select holes within this width-both sides of section)

Before
we actually plot the cross-section, let's examine the contents of
this file, line by line.

1   This record specifies that a section of Type 1 is to be
drawn. As you obviously remember from page 18, this kind of
section is defined by specifying the X,Y coordinates of
the starting and ending points and wells within a
specified distance of this line projected perpendicularly to this
line (both sides of the line are drawn)

500,1100,200,100,0.12 This record (the second in the plot file)
specifies parameters for the lines that are drawn at the two ends
of the cross section. From the left, the elevation of the base
of the section, the elevation of the top, the scale, the tick
mark interval, and finally the width in inches for the plots of
the well columns

0.005 Record #3 specifies the horizontal scale. It is specified
as a factor related to the coordinate system of the map. It is
independent of the vertical scale and is specified in a different
way.

2,3 Record #4 specifies XOFF and YOFF, the offsets in inches for
the diagram relative to the plotter paper.

Y   Record #5 may be an N" or a "Y"; "Y"specifies that the plot
should be rotated on the paper.

12,2   Speed and force see previous example

0.1,.15 Width and height of numbers and letters, see previous
example

NOSTRAT,,0   As in the previous example, this entry specifies
that all plots are to be drawn at their proper elevation

N,0,0   This record is used to specify that a legend should or
should not be be plotted The entry here tells the computer
not to plot a legend.

50,200 This record specifies the X,Y coordinates of of the starting
point of the cross section (left end).

800,200 This record specifies the ,Y coordinates of the end point
of the cross section (right end).

20.   This record specifies distance in the units of the diagram
so that holes within this distance will be projected to the line
of section and plotted. This plot file tells the computer to plot
wells closer than 20 units to the line of section.

Now let's actually plot figure 4. From the Main Menu choose
option 9. Prompts will request entries

DO YOU WANT TO PLOT THE NUMERIC VARIABLES (Y N)

Enter **N**

ENTER PLOT CONTROL FILENAME:

    Enter **EXAM1.PLT**
CREATE AN ASCII FILE CONTAINING WELL#, DISTANCE DOWN SECTION(Y/N):
    Enter **N**
DO YOU WANT TO USE THE ONLINE PLOTTER (Y/N):
    Enter **Y** The message
PLOTTER SHOULD BE TURNED ON AND PAPER LOADED will be displayed;
the plotter will draw Fig. 2; when finished, the system will
return to the Main Menu.

Review

    The file that identifies standard units and specifies
graphical plot patterns for these units must be prepared before
starting GSLXY. This unit identifier file (or bed file) is
utilized by the program to check the well data as they are
entered, to verify consistency of the unit identifiers as
entered. This insures that a standard terminology is used and
that all identifiers have been specified, and that graphical
patterns are defined for all of them.

    Before digitizing, the user invokes Option 1 from the Main
Menu to to create a database for the project at hand. The X,Y
coordinates of the corners specified for the database must match
the corners of the map that will be used for digitizing well
locations.

    Next, one uses Option 3 from the main GSLXY Menu to enter the
well identifications and to digitize the locations for wells from
the map.

Then, using option 6 from the Main Menu, data for the units in each well log is entered into the data base.

At this point the fun starts. Data can be edited, wells deleted and recovered, and drawing of maps and cross sections can begin. You have drawn an example of a plan view and a cross-section. The plot files used to create Figures 1-8 are included on the release disk. Using your word processing program you can create plot control files for other views of this data.

Plan views drawn at the same scale as the base, with well numbers posted enable easy checking of the data entered from the digitizer keypad. Data dumps made using Option 8 can be compared with the input data to check keyboard entry. Changes can be done from the keyboard of the computer using Option 7.

Values for coordinates of a well can be changed either from the keyboard, or by redigitizing the location. The program allows the user to change unit lithology, depth to top and depth to bottom for individual units, and provides for the deletion or addition of unit records.

We have found that the drawing of cross sections at an early stage is useful to check the accuracy of data entry and the consistency of the well data.

At the data entry stage, data bases and digitizing are tied to one specific map. Later, if larger areas are needed in a single data base, another data base can be created and the databases created for parts of this area merged to cover the entire area.

REFERENCE SECTION

The GSLXY program is menu driven. The user operates the program by making choices from the menus and responding to prompts (instructions and requests for entries) that are displayed on the screen.

Start operation of the program by entering GSLXY at the DOS prompt. A disclaimer screen will be displayed on the screen. Strike any key, and the Main Menu screen will be displayed.

THE MAIN MENU

G   S   L   X   Y

CURRENT DATA BASE:

```
 1  -  START A NEW DATA BASE
 2  -  OPEN AN EXISTING DATA BASE
 3  -  DIGITIZE NEW WELL LOCATIONS
 4  -  DELETE A WELL
 5  -  RECOVER A WELL
 6  -  ENTER UNIT RECORDS FOR A WELL
 7  -  EDIT UNIT RECORDS FOR A WELL
 8  -  LIST CONTENTS OF DATA BASE
 9  -  PLOT SECTION VIEW ON THE PLOTTER
10  -  PLOT PLAN VIEW ON THE PLOTTER(POSTING)
11  -  MERGE ANOTHER DATA BASE INTO THE CURRENT DATA BASE
12  -  EXIT
```

ENTER CHOICE BY NUMBER:

Main Menu

The Main Menu is displayed above. The user chooses one of the options by entering the appropriate number.

After starting the program, a new data base must be started using Option 1, or an existing data base must be opened using Option 2. A unit identifier file is required.

A data base is started once using Option 1. After the data base has been established, the data base is opened using Option 2 for subsequent sessions.

Option 1. START A NEW DATA BASE

   The program will clear the screen and prompts will request
entry of the **NAME** for the new data base. This name will be used
to form the filenames for the two parts of the data base: the
index file and the data file. The data base name can consist of
up to six alphanumeric characters containing no blanks, periods
or commas. The extension .NDX will be added to the index file;

   A prompt will then request entry of a **Title** (a name with up
to 36 characters).

   The next four prompts will request entry of the X,Y
coordinates of the four corners of the map area. These
coordinates correspond to the map corners, which will be used for
digitizing, and must be entered in the format specified on the
screen, **X,Y**.

   Another prompt will ask for the number of numeric variables.
Enter the number desired.

   After these entries, prompts will call for entry of the name
of the file (including extension) containing the valid bed
identifiers. After this is supplied, the program will return to
the main menu.

   The user will not need to "open" the data base if it has
just been started.

Option 2. OPEN AN EXISTING DATA BASE

   Generally, the user will be working with a data base started
in a previous session, and for which the database files already
exist. Selection of a "Option 2" will clear the screen and bring
a prompt requesting the name of the data base. The name of the
data base should be entered. The program will add the extension
of .NDX and .LSF to the data base name and will check to see if
the required files exist, and open the data base if they do.

   Next, prompts will request entry of for the name of the
file (including extension) containing the valid bed identifiers.
After this entry, the program will return the screen to the main
menu.

Option 3. DIGITIZE NEW WELL LOCATIONS

     Selection of Option 3 from the Main Menu screen will clear
the screen and bring prompts requesting entries from the
digitizer keypad to synchronize communication between the
digitizer and the computer.

     Prompts will then request entry of the northwest corner of
the map by centering the cursor over the location and depressing
the "0" key. Each of the four corners are entered in sequence
(NW, SW, SE, and NE) as requested.

     Well identifications are entered from the keyboard of the
computer. Well locations are digitized using the keypad of the
digitizer keypad by placing the cursor exactly at the well
location and depressing the "1" key. If the well number has
already been entered, the program will ask if you wish to
redigitize the location for this well before allowing the
position to be re-digitized. A "Y" from the keyboard of the
computer will allow you to re-digitize this position. A "N" from
the keyboard will return the digitizing procedure to permit entry
of a new well identifier. Each well identification and location
is entered in turn. After all locations have been entered, enter
an ENTER on the keyboard instead of a well identifier. This
tells the program to return to the main menu.

Note:
- For well identifiers, either upper case letters or lower case
letters may be used; they are NOT equivalent.
Eg. T21 and and t21 are not the same.

Option 4. DELETE A WELL

     The program will clear the screen and request entry of the
WELL IDENT (the identifier) for the well to be deleted. After
entering the identification of all wells to be deleted, each in
response to the prompt, use the ENTER key (carriage return) in
response to this prompt to return to the Main Menu.

Option 5. RECOVER A WELL

     This option allows you to recover a deleted well. After
entry of 5 from the Main Menu, the screen will clear, and a
prompt will request entry of the identifier (WELL IDENT) for the
well that was has been deleted. Use the carriage return at this
prompt to return to the main menu.

Option 6. ENTER UNIT RECORDS FOR A WELL

    After the location of a well has been digitized, the user
should supply the detailed information about the units in the
well. The program will request the well identification, then
request the elevation of the top of the well and the total
depth of the well, and its bearing and plunge . Next the program
will ask the user to supply information about the units cut by
the well. Each unit identifier, depth to top, and depth to
bottom, should be entered, separated by commas. The program
will check each unit identifier to verify that it is a legitimate
unit identifier. Prompts will call for entry of the numeric
    variables for each unit. After all unit records are entered,
type two commas and a carriage return to indicate end of unit
information.

Option 7 - EDIT UNIT RECORDS FOR A WELL

    Once a well location has been digitized and the unit record
detail entered, any changes to the values must be made using this
option. The screen will clear and the user will be requested to
enter the identifier of the well to be edited. The well
identifier, X and Y coordinates, top elevation and depth,
bearing, and plunge, will appear across the top of the screen and
will be followed by the first ten unit records. Across the last
line of the screen will appear a series of options; the program
will pause waiting for the user to enter his choice. The choices
are as follows:

1 - CHANGE
    Change the well number, top elevation, total depth, or any
unit record.

2 - DELETE
    Delete any unit record

3 - PRINT NEXT SECTION
    Print the next ten unit records

4 - INSERT AFTER
    Insert a new unit record after an existing unit record

5 - QUIT
    Returns to the well identification to edit question

    Each of the choices will be followed by specific questions
as to the unit record to edit, and the new values to be entered.
When all editing has been done, respond with an ENTER to the well
identification question and the program will return to the main menu.

Option 8 - LIST CONTENTS OF DATA BASE

   The program will clear the screen and request the user to
indicate whether the data should be printed to the screen or to
the printer. The user is then prompted to indicate whether he
wants records for a specific well or all wells. A response of
ALL will create a listing of the data for all wells; entry of a
specific well identifier (WELL IDENT) will cause the program to
list the data for that well. After the data are listed, the
program will return to the well identification question.
Striking the carriage return key instead of entering a well
identifier will cause the program to return to the main menu.

Note:
- For all identifiers, lower case and upper case letters are NOT
equivalent.

Option 9. PLOT SECTION VIEW ON THE PLOTTER

After entering **9** from the Main Menu the screen will clear. The first prompt will ask:

DO YOU WANT TO PLOT THE NUMERIC VARIABLES?(Y/N).
If you enter **Y**, the next prompt will request:

ENTER PLOT CONTROL FILE FOR NUMERIC TRACE: Enter the filename with extension. After entry, if a section is being drawn of type 1 or 2, after entry, the next prompt will ask

CREATE AN ASCII FILE CONTAINING WELL #, DISTANCE DOWN SECTION? (Y/N):

If you wish to create an ASCII file containing the WELL ID's and the distance along the section, enter **Y**. If you do, a prompt will request entry of the name for the file, with extension:

ENTER FILENAME:

The next prompt will ask:

DO YOU WANT TO USE THE ONLINE PLOTTER(Y/N):

Enter **Y** to plot on the plotter. A message will remind you that the plotter must be on and paper loaded. The plotter will begin to work after entry of **Y**

Enter **N** to generate an HPGL file to be used to drive an external program. If you enter **N**, a prompt will ask for the name of the file to be used to store the data.

After entry of this file name with extension, an arcane prompt will request entry of the scaling points:
 P1X,P1Y,P2X,P2Y:

These are the scaling points (see appendix) used by the plotter. They are entered in the form, **80,320,10080,7520**

After entry of these numeric values for the scaling points, the program will operate and generate the required file.

Option 10. PLOT PLAN VIEW ON THE PLOTTER (POSTING) and horizontal slices.

After entry of **10** from the Main Menu, the screen will clear and the user will be requested to enter the filename of a plot control file, see p. 41. The user is then asked if the well number, X,Y coordinates and the selected value for posting should be saved in an output file. If he responds **Y**, he is then asked to supply a filename. This option is designed to allow the user to export the well data to gridding and contouring programs for the creation of isopach maps, etc.

The user will then be asked whether the online plotter should be used. If his response is **Y** then the program will proceed with plotting. If his response is N, then prompts will request the name of a disk file where the HPGL commands will be written, and then the values of the scaling points on the plotter. The program will then search through the data base and post the indicated symbol at the well location and the chosen data value on the right side of the symbol.

Option 11. MERGE ANOTHER DATA BASE INTO THE CURRENT DATA BASE

After entry of **11** from the Main Menu, the screen will clear and the user will be requested to enter the data base name of a data base which is to be merged into the current data base. The information contained on the specified data base will be added to the end of the current data base. The coordinate systems of the two data bases must match.

When merging is complete, the screen will return to the Main Menu.

Option 12. EXIT

Entry of **12** from the Main Menu will return operation of the system will will return to the DOS prompt.

UNIT IDENTIFIER FILES

The unit identifier file is created with the aid of an ASCII word processing program (like SIDEKICK or non-document mode WORDSTAR). Each record in the Unit Identifier File contains an identifier assigned to a lithologic or stratigraphic unit, followed by parameters that define the pen and pattern to be plotted as graphic output. A maximum of 99 different units can be specified. Each record contains the following entries:

Unit Identifier   up to eight alphanumeric characters no blanks or commas

Pen number*   1-8 (1-6 on some plotters)

Line type*   0-12   See p. 67 and fig. 14

Fill type (pattern) 0-2   See p. 67 and fig. 15

Spacing between lines of fill pattern in thousandths of an inch.

Angle of lines*   measured in degrees (+ angles) counterclockwise

Example of a unit identifier file

FILE	CONTENTS
L1, 1, 1, 1, .03, 0	Unit=L1,Pen#=1, Line type=1, Fill=1, Spacing=0.03", 0°
L2, 1, 0, 1, .04, 90	Unit=L2,Pen#=1, Line type=1, Fill=1, Spacing=0.04", 90°
L3, 1, 0, 1, .05, 0	Unit=L3,Pen#=1, Line type=0, Fill=1, Spacing=0.05", 0°
L4, 1, 0, 2, .03, 30	Unit=L4,Pen#=1, Line type=0, Fill=2, Spacing=0.03", 30°
L5, 1, 0, 1, .07, -30	Unit=L5,Pen#=1, Line type=0, Fill=1, Spacing=0.07", -30°

The units should be listed from top to bottom in this file in order of increasing age, The youngest in the first record, the oldest in the last. This gives the vertical sequence (arranged from top to bottom by increasing age that we expect in the legend, see figs 3 and 4.

The first (left hand) column of the bed file contains the identifier to be used for each unit present in the well data set, in this example: L1, L2, L3,L4, and L5.

The second column of the table contains the number of the pen that will be used to draw the unit, The carousel of the plotter has numbered positions. The pen you get as called by the GSLXY program will be the pen you load into the specified position in the carousel.

The third column designates the line type to be used in the graphical representation of the unit. The line type is specified by providing a number from 0 to 12. These line types are shown in the diagram below.

The fourth column contains the entry that specifies the fill type to be used in representation of the unit. The fill type is designated by a number, 0, 1, or 2.

Fill type   0 draws only the outline of the area.
Fill type   1 is a fill drawn by parallel lines.
Fill type   2 consists of two sets of mutually perpendicular
parallel lines that form a rectangular grid.

The fifth column of the table contains a number that specifies the separation in thousandths of an inch between parallel lines drawn as polygon fills types 1, 2. Use 0 as the entry for fill type 0.

The sixth column of the table specifies the angle of the first set of parallel lines from the horizontal measured in degrees (+ angles are counterclockwise), - angles clockwise may also be used. Fill types are discussed in the plotter manual. Note that the angle zero (0) specifies horizontal lines, 90 specifies vertical lines. In the bed file, the entry in each column is ended by a comma, as shown shown in the example, DRILL.BED on the preceding page. Comparison of the entries in this table with the plots on figure 6 may help you visualize the graphical results of these plotter instructions.

control file for NUMERIC TRACE

If the trace of a numeric variable is to be plotted, a control file is needed. The first record in the file is used to select the method for plotting the numeric data.
Record 1. The first record should either be **HIST** or **TRACE**

HIST produces a graphical record of the numeric variables in the form of a bar graph. TRACE graphs the numeric variables using a line connecting points at the base of each lithologic unit with values as recorded in the data base at scales defined in the plot control file for numeric variables. The outlines of the bars alone can be plotted, or the polygons can be patterned.

After Record 1, one record is needed for each variable in the data base. The first line sets parameters for Variable 1, the second for Variable 2. Up to 5 numeric variables are allowed.

Examples of plot control files for numeric variables
TRACE

FILE	CONTENTS
TRACE	TRACE selects the numeric trace option
1,0,0,100	1 (Pen=1), Line type=0,Base value=0,Units/inch=100 "Variable 1"
2,1,0,100	2 (Pen=2), Line type=1,Base value=0,Units/inch=100 "Variable 2"
1,0,0,80	3 (Pen=1), Line type=0,Base value=0,Units/inch=80 "Variable 3"
2,3,0,100	4 (Pen=2), Line type=3,Base value=0,Units/inch=100 "Variable 4"

HIST

HIST

0,100,2,1,1,.03,45	Base value=0,Units/inch=100,Pen=2,Line type=1,Fill=#1,Specing=.03",angle=45 Var#1
0, 0,1,1,1,.01,0	Base value=0,Units/inch=*0,Pen=1,Line type=1,Fill=#1,Spacing=0.01",angle=0 Var#2
0, 50,1,1,1,.01,0	Base value=0,Units/inch=50,Pen=1,Line type=1,Fill=#1,Spacing=0.1", angle=0 Var#3
0, 80,1,1,2,.01,0	Base value=0,Units/inch=80,Pen=1,Line type=1,Fill=#2,Spacing=0.01",angle=0 Var#4

Notes:

-If you do NOT want to plot a particular numeric variable, set the scale for that variable to 0 (Zero), see variable #2 in file HIST above.

Plot control files for sections allow the user to specify the plot parameters and select the data to be plotted. The plot control file consists of a series of ASCII records in a file with a name specified by the user.

Types of cross sections

1 = Beginning and ending points to be specified by X,Y coordinates and well data to be projected (perpendicularly) to this cross-section line if the wells are located within a specified distance (in the units of the map) of this line of cross-section.

2 = Beginning and ending points to be specified by X,Y coordinates and wells specified by well identifier (ID) projected (perpendicularly) to this line of cross section.

3 = An ASCII text file specifies the beginning and ending points of the cross-section (inches along the cross section), the wells to be plotted by well identification, and the positions of their plots along the cross section.
Wells are plotted as if <u>vertical</u>.

Record 1
> This record is used to specify the type of the cross section to be drawn. Three types of cross sections can be specified by a number, 1, 2, or 3. Example of entry in the file, **1**

Record 2 specifies the base elevation, final elevation,
> vertical scale, tick mark interval and the width of the well column in inches. The program will construct a vertical scale on the left and right sides of the cross-section. The scale will be labeled on even multiples of the vertical scale. Example **3600,4600,200,100,0.25**

Record 3 specifies the horizontal scale. The scale is expressed as
> a multiplying factor. If the base map is plotted at 100 units per inch, a same-scale section would be drawn by specifying a scale of 0.01. Example **2.01**

Record 4 specifies the offset, in inches, for the lower left
> corner of the cross section from the default position of the plotter on the paper. Example **1,1**

Record 5 contains an entry of Y or N specifying whether or not
> the plot is to be rotated by the plotter. Example **Y**

Record 6 specifies the speed and force at which the plotter is to
    draw the map or cross-section. Normally the speed is 15
    centimeters per second (cps) for final drawings and 55 cps
    for drafts. Minimal force is generally used to minimize the
    wear on the pen points (value of 1 or 2). Example **25,1**

Record 7 specifies the width and height, in inches, for letters
    and numbers that are posted. Example **0.1,0.15**

Record 8 specifies parameters that determine (1) whether the
    plots of well data are drawn to their correct elevation
    (based on the elevation entered for the top of the hole);
    (2) are to be aligned at a specified elevation for the
    bottom of a chosen unit if it was encountered in the hole;
    or (3) are to be aligned at a specified elevation on the
    contact of two specified units.

    - To draw plots that show wells at their actual elevation,
enter **"NOSTRAT",,0** for Record 8.

    - To draw plots of wells in which the bottom of the
uppermost occurrence of a unit is drawn at a specified elevation,
enter the unit identifier and the elevation desired, e.g.
    Or,,1000 for Record 8.

    - To draw plots that show wells in which a contact is
fixed at a specified elevation, enter the two unit identifiers
and the elevation desired eg. **Or,Oc,1000**. A plot of the well will
be drawn only if both units are present in the well and the
depth of the base of the first unit (here Or) matches the
depth of the top of the second unit (here Oc).

Record 9 specifies whether a legend is to be plotted or not.
    To plot a legend, enter Y and the position of the top left
    corner location (in inches) where the legend is to be
    plotted; to not plot a legend, enter N,0,0
    Examples
    - To plot a legend with top at position X=6,Y=9 on the
    paper, enter **Y,6,9**
    - To make a plot without a legend enter **N,0,0**

    Beyond this record, the contents of the Plot Control File
differ according to the type of section specified in record 1.

    Legends are always drawn the same size. Changing the scale
of a plot does not change the size of the boxes.

For a section of Type 1

Record 10 specifies the <u>starting</u> point of the cross section (left end) specified by X,Y coordinates (the coordinates of the map). Example **100, 150**

Record 11 specifies the <u>ending</u> point of the cross section (right end) specified by X,Y coordinates (the coordinates of the map). Example **700, 150**

Record 12
>   This record specifies the distance (coordinates of the map) on both sides of the cross-section line to be used to select wells to be drawn on the cross-section. Example **0.5**

For a section of Type 2

Record 10
>   This record determines the starting point of the cross-section as specified by X,Y coordinates   Example **6,9**

Record 11
>   This record determines the ending point of the cross-section as specified by X,Y coordinates Example **6,9**

Record 12 through N+1
>   These record specify the well identifiers (ID) for wells to be projected to the section line.

>   - A single well identifier makes up each line of the file.
- There must be a carriage return at the end of the final line of the file. An example of records 12-17 is printed below.

T12
T22
T32
T43
T53
T63

For a section of Type 3

Record 10

>   This record specifies the name of a file that contains a
>   list of well identification and distance in inches along
>   section with the last line containing a blank well number
(" "0) and the total length of the section in inches.

>   Example of ASCII "list" file

T12	,	0.250
T22	,	0.751
T32	,	1.249
T42	,	1.751
T62	,	2.749
"	",	3.750

>   This file can be generated while making sections of Type
1 or 2; alternatively it can be written using a word processing
program. The file above is in the format written by GSLXY. The
file below has a format more convenient for a word processing
program. Both work.

```
T12,0.25
T22,0.751
T32,1.249
T42,1.751
T62,2.749
" ",3.750
```

PLOT CONTROL FILES
Plan Views

Plot control files for plan views (maps) consist of a series of ASCII records that specify the kind of plot desired.

Record 1
    This record specifies the type of plan view, and the kind of value to be posted. Example **2**

Types of plan views

1 = Well Identification (symbol and posting plotted at
    position of top of well).
2 = Elevation at the top of the well (symbol and posting plotted at
    position of top of well).
3 = Elevation at the bottom of the well (symbol and posting plotted at
    position of top of well).
4 = Depth of the well (symbol and posting plotted at
    position of top of well).
5 = Elevation at the top of a unit (symbol and posting plotted at
    true X,Y position).
6 = Elevation at the bottom of a unit (symbol and posting plotted at
    true X,Y position).
7 = Thickness of a unit (symbol and posting plotted at
    true X,Y position).
8 = Elevation of a contact between two units (symbol and
    posting plotted at true X,Y position).
9 = Thickness of a unit between two contacts (symbol and
    posting plotted at true X,Y position).
10 = The computed vertical offset necessary for stratigraphic
        alignment (symbol and posting plotted at true X,Y position).
            (See Note Below)
11 = Plot horizontal slice at a specified elevation (no
    posting), square filled with pattern designated for unit
    plotted at true X,Y position for specified elevation.
    Note: when the stratigraphic sequence of a well (or series of wells) is adjusted to the base of a rock unit, contact, or other geologic horizon, the values plotted are relative to the fixed elevation.

Record 2
    This record specifies the X,Y coordinates of the NW
    corner of the area. Example **6,9**

Record 3
    This record specifies the X,Y coordinates of the SW
    corner of the area. Example **6,9**

Record 4
    This record specifies the X,Y coordinates of the SE
    corner of the area. Example **6,9**

Record 5
    This record specifies the X,Y coordinates of the NE
    corner of the area. Example **6,9**

Record 6
    This record specifies the map scale for the X and Y directions.
    Example **1,1**. Scale is relative to the units of the
    coordinate system used for the data base.

Record 7
    This record specifies the offset (in inches) from the corner
    of the paper where the SW corner of the map is to be drawn.
    Example **1,1**

Record 8
    This record indicates whether the plot is to be rotated on
    the plotter paper, Y=Rotate, N=Don't rotate. Example **Y**
    Rotate plot.

Record 9
    This record specifies the speed and force at which the
    plotter is to draw the map or section. Normally the speed
    is 15 centimeters per second (cps) or less for drawings
    using technical pens and ink, and up to 55 cps for drafts
    using fibertip pens. Minimal force is generally used to
    minimize wear on the pen points, value of 1 or 2. Example
    25,1

Record 10
    This record specifies the size (width and height) in
    centimeters of the characters that are to be posted. Example
    0.1,0.15

Record 11
This record contains the specifications that control the
vertical parameters of data. Vertical positioning can be
based on the elevation of the top of the well (true
elevation), on a selected (and fixed) elevation for the
bottom of a unit, or on a fixed elevation for the contact
between two units.

- If plots are to be based on the elevations of the well
tops (true elevations without adjustment), the entry is:
"NOSTRAT",,0
- If plots are to be based on the elevation of the bottom of
the uppermost occurrence ofa unit (adjustments based on that
position), the entry is the unit identifier, a second comma, and
the elevation specified for alignment: Example **Or,,10000**
- If plots are to be aligned at a stratigraphic contact, the
entry consists of the identifier of the upper unit, followed by
the identifier of the lower unit, followed by the elevation
chosen for that contact on the diagram. Example **"Ocs","Or",1000**

Record 12

For plan view types 1-10, as defined in record 1 of this
plot file: This record (# 12) specifies the pen number to be
used, the symbol number and the size of the symbol in units
of 1/1000 inch. Example **1,5,35** (specifies pen number 1,
symbol type 5 at a size of 35/1000 inch. Symbols and
procedures for coding of additional symbols are described in
the appendix.

For plan view type 11: this record (#12) specifies the
elevation of the horizontal slice and the size of the square
to be plotted in inches. Example **9600,0.2**

Record 13

For plan view types 5-9, as defined in record 1 of this
plot file: This record (#13) specifies the unit or contact
(upper contact for type 9) contact. For a single unit plan
types 5, 6, 7, the unit ID followed by a comma; example
"Or",; for a contact (plan types 8, 9, the two unit ID's
separated by a comma, example **"Ocs","Or"**.

Record 14
For plan view type 9, this record specifies the 2nd (lower)
contact: Example **"Or","Oj"**

REFERENCES

Selner, G., I., and Taylor, R. B., 1988, GSdraw and GSMAP Version 5.0: prototype programs, Level 5, for the IBM PC and compatible microcomputers to assist compilation and publication of geologic maps and illustrations: U.S. Geological Survey Open-File Report 88-295 A, documentation and tutorial, 130 p., 88-295 B executable program disks (2).

APPENDIX

Data Base Structure

Each data base contains records for wells within a study area.
The data base consists of two data files: an index file and a
data file. Both files use direct access methodology with the
data stored in binary format. The index file contains one record
for each well; the data file contains one record for each unit
within a well.

INDEX FILE

First Record

Number of Wells	4 bytes	Number of Wells in this data base
First Record	4 bytes	First Record in Data file
Last Record	4 bytes	Last Record in Data File
NNV	4 bytes	Number of numeric variables
Unused	28 bytes	Unused

All subsequent records

WellIdent	12 bytes	Well Identification
TopElev	4 bytes	Well collar elevation
TotalDepth	4 bytes	Total depth of well
StartingRecord	4 bytes	Starting record in Data File for this well
EndingRecord	4 bytes	Ending record in Data File this well
WellX	4 bytes	X coordinate for this well
WellY	4 bytes	Y coordinate for this well
Bearing	4 bytes	Bearing from North
Plunge	4 bytes	Plunge from horizontal

DATA FILE

First Record

TITLE	36 bytes	Title of this data base

Second Record

X (NW corner)	4 bytes	X coordinate of NW corner of data base
Y (NW corner)	4 bytes	Y coordinate of NW corner of data base
Unused	28 bytes	

Third Record

X (SW corner)	4 bytes	X coordinate of SW corner of data base
Y (SW corner)	4 bytes	Y coordinate of SW corner of data base
Unused	28 bytes	

Fourth Record

X (SE corner)	4 bytes	X coordinate of SE corner of data base
Y (SE corner)	4 bytes	Y coordinate of SE corner of data base
Unused	28 bytes	

Fifth Record

X (NE corner)	4 bytes	X coordinate of NE corner of data base
Y (NE corner)	4 bytes	Y coordinate of NE corner of data base
Unused	28 bytes	

All Subsequent Records

BedIdent	8 bytes	Bed Identification
TopOfBed	4 bytes	Elevation of top of bed
BottomOfBed	4 bytes	Elevation of bottom of bed
Numb(1)	4 bytes	Value of first numeric variable
Numb(2)	4 bytes	Value of second numeric variable
Numb(3)	4 bytes	Value of third numeric variable
Numb(4)	4 bytes	Value of fourth numeric variable
Numb(5)	4 bytes	Value of fifth numeric variable

SOFTWARE

Version 1.0 of GSLXY was written and tested using the MicroSoft QuickBASIC Compiler to improve execution speed. The program cannot be tested or executed under BASICA, but must be compiled using Microsoft QUICKBASIC. Because the program supports the 8087 co-processor, a product such as 87BASIC from Microway is needed: this product modifies the standard libraries from Microsoft to call the 8087 chip. The program can be compiled and executed using the standard Microsoft compiler and libraries after removing one line (CALL MICROSOFT), but the execution time is slower. The compilation should include the compiler switches /O, /E and /V. The program is linked with an object module called GWCOM.OBJ that is supplied with the QuickBasic Compiler to support the transmission of data through the RS-232 Communications Adapters. The program has been tested using 128K of RAM memory and should run on versions of 2.1 DOS and greater. The release disk contains the source code in ASCII format, the executable code generated by the QuickBASIC compiler and the LINK program (supplied with the QuickBasic compiler), the symbol file (GSCAD.SYM), and a file named CONFIG.CAD used to set communication parameters among computer, digitizer, and plotter.

The minimum software requirements for utilizing the programs are PC/DOS 2.1 or higher, the release diskettes and a word processing program capable of producing ASCII files. The authors utilize Wordstar in non-document mode as the word processing program.

HARDWARE INSTALLATION AND CONFIGURATION FILES

This section deals with the physical installation of the digitizer and plotter, the connection of these devices to the computer, and verification of correct installation. A work sheet is supplied, p.56, to assist recording of settings. The makeup of configuration files and modifications required to tune the files to specific hardware configurations is also described.

The plotter and the digitizer must be connected to serial ports; there must be a match between the port connections, the communications parameters of these devices, and the settings of the programs. The printer must be connected to parallel port #1 (LPT1:).

DIGITIZER

The digitizer must have the following characteristics:
- Transmit data to the computer using RS232C communications protocol
- Send information in the form of ASCII characters followed by a carriage return. When a key is depressed on the keypad of the digitizer, the digitizer must send three pieces of information as a part of the string; a character representing the key depressed, the X coordinate, and the Y coordinate. This string must not contain commas or quotation marks.
- It must have a multi-button cursor keypad with the 10 numeric keys and a minimum of four other non-numeric keys that can be assigned to program functions.
63- It should have a resolution of 0.001 inches.

Digitizer installation

1. Connect the cable from the digitizer to one of the asynchronous communication adapters (ports); note whether the port is COM1 or COM2 on the work sheet.

2. Set the digitizer switches for the communications speed you want to operate; we have found 1200 baud to be satisfactory; record the baud rate on the work sheet.

3. Set digitizer switches for parity; generally you will have a choice of the following:

S   - SPACE: Parity bit always transmitted and received as a
       space (0 bit)
N   -NONE; No transmit parity, No receive parity checking
O   - ODD: Odd transmit parity, odd receive parity checking
E   -EVEN: Even transmit parity, even receive parity checking
M   -Mark: Parity bit always transmitted and received as a mark
       (1 bit)

We normally use N: record the setting on the work sheet

4. Set the number of databits per character on the digitizer
switches. The choice is generally 7 or 8. We generally use 8.
Record the value on the work sheet

5. Set the number of stopbits on the digitizer switches. The
choice is 1 or 2; we use 1; record the setting on the work sheet.

6. Set the digitizer switches to transmit a carriage return only;
set switches to NOT transmit a line feed.

The following BASIC (BASICA) program can be used to check
transmission between the digitizer and computer. It may require
modification to reflect the values set in previous steps. It is
set up using the values we normally use. Modifications normally
are on line 10; refer to the BASIC manual supplied with your
computer for a description of the OPEN COMn: command.

```
10 OPEN "COM2:1200,N,8,1" FOR INPUT AS #1
20 PRINT "HIT KEYS ON DIGITIZER KEYPAD ONE AT A TIME"
30 LINE INPUT #1, DSTRING$
40 PRINT DSTRING$
50 GOTO 30
60 END
```

    If the above program does not run, check switch settings
and/or cable connections, and retry the program. If it still
does not work, check the digitizer manual, and seek assistance.

    For the GTCO Digi-Pad series of digitizers used for
development connect a null-modem cable from the computer serial
port (COM2:) to port J5 on the digitizer. The cable diagram is
shown in the User's Manual, Appendix on RS232 interfacing, Fig.
1, DTE-to-DTE cabling. The following switch settings are used.

        1 2 3 4 5 6 7 8

S1   1 1 1 0 0 0 0 1   1 = ON
S2   1 1 1 0 1 0 0 0   0 = OFF
S3   0 1 1 0 1 0 0 0

Hewlett-Packard plotters were used to develop these programs. They may work with other plotters that use the Hewlett-Packard Graphics Language.

Plotter Installation
1. Connect the cable from the plotter to the remaining asynchronous communications adapter (port); note on the work sheet whether it is connected to COM1 or COM2

2. Set the plotter switches (hardware or software) for the communication speed at which you want to operate; we have found 2400 baud to work well. Record the baud rate on the work sheet.

3. Set the plotter switches for parity. Generally you will have a choice of the following:

S   - SPACE: Parity bit always transmitted and received as a
         space (0 bit)
N   -NONE; No transmit parity, No receive parity checking
O   -ODD: Odd transmit parity, odd receive parity checking
E   -EVEN: Even transmit parity, even receive parity checking
M   -Mark: Parity bit always transmitted and received as a mark
         (1 bit)

We normally use N; record the setting on the work sheet

4.   Set the number of stop bits on the plotter switches. You will have a choice of 1 or 2; we use 1. Record the setting on the work sheet.

5. Check other settings on the plotter; we use the following.
Remote
Standalone
Handshake: hardwire Direct
Duplex: Full

The following BASIC program (BASICA) can be used to check
transmission between the plotter and computer. It may require
modification to reflect values set in previous steps. It is set
up for the values we normally use. Modifications normally are
one line 10.   This program came from the Hewlett-Packard operation
and Interconnection Manual for the HP 7550A Graphics Plotter;
refer to the BASIC manual supplied with your computer for a
description of the OPEN COMn: command.

```
10  OPEN "COM1:2400,N,8,1,RS,CS65535,DS,CD" AS #1
20  PRINT #1 "IN;OI;"
30  INPUT #1,ID$
40  PRINT #1,"LB";ID$;" COMMUNICATION OK";CHR$(3)
60  PRINT #1, "PA 0,0;SP0;"
70  END
```

The program will read the model of the plotter and plot the
following message on the plotter using the pen in carousel
position one.

7550A COMMUNICATIONS OK
(YOUR MODEL #, if not a 7550A)

If the above program does not run, check switch settings and/or
cable connections, and then retry the program. If it still does
not work, check the plotter manual, and seek assistance.

For the HP 7585B plotter the following switch settings apply: the
cable must be connected to the COMPUTER/MODEM port.

RS232C	NORMAL
	NORMAL
STANDALONE	
	NORMAL
Parity	OFF
	ODD
Duplex	ODD
HARDWIRE	
	NORMAL

For the HP 7475 plotter, the following switch settings apply:

```
    0    S2
    0    S1
    0    Y
      1  US
    0    B/A3-.A/A4
      1  B4
    0    B3
      1  B2
    0    B1
```

SCREEN and GRAPHICS ADAPTER

On the worksheet, make a record of the kind of Graphics adapter (CGA or EGA, and the kind of Monitor (Color or Monochrome).

GSMAP/GSDRAW do **NOT** support Hercules or Hercules compatible graphics adapters.

Version 4.0 provides support for the IBM Enhanced Graphics adapter (EGA), either with monochrome or color monitor. To implement this support, lines in the CONFIG.SCR file are used to specify colors for individual codes. Using CGA with color monitors, only the text screens will appear in color. With EGA, and a color monitor, lines, points, and polygons will also be shown in color.

The colors for individual codes are selected from 16 available colors for each code desired by specifying choices during the software installation procedure, or by adding lines to the CONFIG.SCR file at some later time. Each line has the following format; code, color number. A carriage return is required at the end of each line.

Colors are specified by number (see BASIC Manual)

0	Black	8	Gray
1	Blue	9	Light Blue
2	Green	10	Light Green
3	Cyan	11	Light Cyan
4	Red	12	Light Red
5	Magenta	13	Light Magenta
6	Brown	14	Yellow
7	White	15	High Intensity White

INSTALLATION WORKSHEET

DIGITIZER
    Port   _____   Key Char position   _____
    Speed   _____   X Coordinate Starting   _____
    Parity   _____   Width of X Coordinate   _____
    Bits/Char _____   Y Coordinate Starting   _____
    Stop bits _____   Width of Y Coordinate   _____
    Non Numeric Keys:
      A Labeled _____ Transmits as _____ ASCII code _____
      B Labeled _____ Transmits as _____ ASCII code _____
      D Labeled _____ Transmits as _____ ASCII code _____
      E Labeled _____ Transmits as _____ ASCII code _____
      ASCII codes are listed in the back of the BASIC Manual
PLOTTER   SCREEN
    Port   _____   Graphics adapter _____
    Speed   _____   Monitor   _____
    Parity   _____
    Bits/Char _____
    Stop bits _____

     If the digitizer is connected to COM2 and set to 1200 baud
and is a GTCO Digi-Pad 5, or emulates the GTCO, and, the plotter
is connected to COM1, and set to 2400 baud, both set as
recommended in the hardware installation The configuration files
can be used without modification.

CONFIG.DIG   Digitizer configuration
CONFIG.PLT   Plotter configuration and symbols
CONFIG.SCR   Screen configuration

Programs will operate with the monitor in CGA mode using these
files.

     The contents of the configuration files, and changes that may be
made to accommodate different systems are described on subsequent
pages, with printouts of sample files annotated to explain their
contents.

CONFIG.DIG

Parameters apply to GTCO digitizer. Annotations are not a part of
the file

```
"COM2: 1200,N, 8, 1"  |            Port, baud rate, see OPEN COM, instruction
 1,1                   | Position, # characters sent when a key is depressed
2, 5, .001             |            Start position, field length X coordinate
8, 5, .001             |Start position, field length Y coordinate,resolution
15                     |                          Length character string
0,0                    | The final 15 lines contain the character sent by the
1,1                    | digitizer, a comma, and the label on the key of the
2,2                    | digitizer keypad
3,3                    |
4,4                    |
5,5                    |
6,6                    |
7,7                    |
8,8                    |
9,9                    |
:,A                    |
;,B                    |
<,C                    |
=,D                    |
>,E                    |
```

No blank lines are allowed at the beginning or end of the file

Without comments the file is as below.

```
"COM2: 1200,N, 8, 1"
 1,1
2, 5, .001
8, 5, .001
15
0,0
1,1
2,2
3,3
4,4
5,5
6,6
7,7
8,8
9,9
:,A
;,B
<,C
=,D
>,E
```

- No blank lines are allowed at the beginning or end of
the file

CONFIG.SCR

For CGA adapter with color or CGA monochrome monitor,
CONFIG.SCR file contains one line

"CGAC"

For EGA adapter with EGA monochrome monitor, CONFIG.SCR contains
one line.

"EGAM"

For EGA adapter with color monitor, CONFIG.SCR is as follows:

"EGAC"

1,8	Each succeeding line contains a code number, a
2,6	comma, and a color number (see p. 66) 15 colors
4,1	different from background (#0) are available
5,14	so that entries of different codes will be drawn
8,10	in different colors on the screen
9,2	
11,12	
300,14	
400,12	
401,11	

No blank lines are allowed at the beginning or end of the
file

Notes:
- VGA and PGA graphics adapters are not supported.

The first line of the CONFIG.PLT file sets communication parameters between the computer and the plotter. The rest of the file contains the code for symbols (see p. 55-59. These parameters are described in the BASIC manual, see OPEN COM statement.
the

Part of CONFIG.PLT [code after symbol 2 not printed]

```
"COM1: 2400,N, 8, 1,RS,CS65535,DS,CD"
50,4
"PU",1.0,0.0
"PD",-1.0,0.0
"PD",0.0,-1.0
"PU",0.0,1.0
1,2
"PU",0.0,0.0
"CI",1.0,0.0
2,4
"PM",0,0
"PU",0.0,0.0
"CI",1.0,0.0
"PM",2,0
```

The kind and size of the symbols can be specified during plotting. The instructions to the plotter that define symbols are contained in the file named CONFIG.PLT; additions to this file are easily made, see p. 62. The following numbered symbols are in the standard file supplied with GSLXY. Version 1.0:

○ 1	● 2	□ 3	■ 4	△ 5	▲ 6
◊ 7	♦ 8	+ 9	× 10	∧ 11	Χ 12
⚹ 13	◪ 14	☆ 15	★ 16	U 17	D 18
ı 19	⬡ 20	⬢ 21	⬓ 22	⬠ 23	⬟ 24
▲ 25	▲ 26	◫ 27	◧ 28	✕ 29	30
◳ 31	◰ 32	◲ 33	◱ 34	⊠ 35	⊠ 36
⊠ 37	⊠ 38	✳ 39	40	◉ 41	◉ 42
◓ 43	◒ 44	◍ 45	◌ 46		
	⌐ 50	-◊- 75	-◉- 76	-◉- 77	

Figure 12._ Standard symbols plotted at a size of 100 (100/1000 inch).

CODING OF NEW SYMBOLS

New symbols can be encoded by the user and included in the CONFIG.PLT file. Coding is easier than might be anticipated. Symbols are drawn with straight lines and/or with circles. Areas and or circles may be filled.

Starting

To be consistent with other symbols, sketch a square with sides of unit length, with a point at the center. Assume that the pen is at the center point of the square. Each line of the code describing the symbol provides one instruction to the computer: the center of the square is the point that is digitized. A symbol is drawn using straight line segments (moves) and circles; moves can be either with pen up (no line drawn) or with pen down (line drawn); moves can be combined to define polygons which will be filled (solid fill); circles may either be filled or not filled.

The first line of the code for a symbol specifies the number assigned to the symbol and the number of lines (records) required to define that symbol. Subsequent lines consist of a series of instructions for the plotter. No more than 25 lines may be used.

Moves

A line starting with a "PU" tells the the pen in the plotter to move to a new position with the PEN UP (no line drawn), a line starting with "PD" specifies that the move is made with PEN DOWN (drawing a line). All moves are relative to the last point. After a "PU" or "PD" at the start of a line a comma must be used; the number after this comma specifies the X distance to the next point, then a comma must be used; the number after the second comma specifies the Y distance to the next point. Each line that begins with a "PU" or "PD" instruction, also specifies coordinates in X and Y for the next point, relative to the current pen position.

Polygons

A line starting with a "PM" is an instruction to the plotter about a polygon.

"PM",0,0 defines the start of a polygon.

"PM" 2,0 ends a polygon and ends polygon mode in the plotter.

The polygon defined between "PM",0,0 and "PM",2,0 instructions will be filled with a solid pattern.

Moves between "PM"0,0 and "PM,2,0 instructions should define a closed polygon); if the polygon is not closed, the "PM"2 instruction forces a closing of the polygon to the point occupied by the pen when the "PM",0 instruction was issued.

Exterior and interior polygons

"PM",1,0 ends a polygon but leaves the computer in polygon mode. This instruction is used, for example, between moves that define an external polygon and moves that define an internal polygon to be left unfilled.

The "PM",1,0 instruction forces a closing of the polygon back to the position of the pen at the time the "PM",0,0 instruction was issued.

Circles

A line of code starting with a "CI" instruction calls for the drawing of a circle; the "CI" must be followed by a comma; the number following the comma specifies the diameter of the circle to be drawn; this number is followed by a comma, then by a 0 (zero). The diameter is specified in units relative to the unit square, see Fig. 8.

The center of the circle is the point occupied by the pen at the time the "CI" instruction is given. A "CI" instruction defines a complete polygon; it is equivalent to a set of moves between "PM"1,0 instructions, but counts as a single line.

Additional information on coding is given in the Interfacing and Programming Manual supplied with HP plotters. Please note that all of the HPGL commands **ARE NOT SUPPORTED** by GSLXY or other level 5 programs. Use only the commands provided above.

Examples of the effect of coding are diagrammed on Fig. 9.

Symbol 209; Uses PU and PD moves

```
209,6                  - symbol number, number of lines of code
"PU",0.2,-0.5
"PD",0.0,1.0
"PD",0.1,-0.2
"PU",-0.5,0.2
"PD",0.0,-1.0
"PD",-0.1,0.2
```

Symbol 14; Uses PU and PD moves, and one filled polygon

```
14,8                   -symbol number, number of lines of code
"PU",0.5,0.5           - move to the upper right corner of symbol; PU
"PD",-1.0,0.0          - move to upper left corner; PD
"PD",0.0,-1.0          - move to lower left corner; PD
"PM",0,0               - starts polygon to be filled
"PD",1.0,0.0           - move draws lower line of filled triangle
"PD",0.0,1.0           - move draws right edge of filled triangle
 "PD",-1.0,-1.0         - move draws hypotenuse of filled triangle
"PM",2,0               Ends definition of filled polygon
```

- Filling of triangular polygon
    Note: the "PM 0,0" instruction starts definition of a polygon to
be filled; the PM,2,0" ends the polygon's definition

```
77,14; Uses PU and PD moves, two circles, one defined as polygon
"PU",0,1.0
"PD",0,-0.5
"PU",0,-0.5
"PM",0,0               -starts filled polygon=circle
"CI",.5,0              -specifies circle, diameter 0.5
"PM",2,0               -ends filled polygon=circle
"PU",0,-0.5
"PD",0,-0.5
"PU",-1.0,1.0
"PD",0.5,0.0
"PU",1.0,0.0
"PD",0.5,0
"PU",-1.0,0.0
"CI",1,0               open circle; polygon not specified; circle
                       will not be filled
```

- The "units" for the diameter of the circles are specified in
the same "units" as the "moves" for the pen, based on the unit
square
- Lines for symbol 77 go outside the unit square; this is
permissible. The only reason for the unit square is to assist in
keeping symbols similar in size.
- Symbol 209 with coding as drawn here was found to be too small;
current CONFIG.PLT files contain a symbol which is twice the size
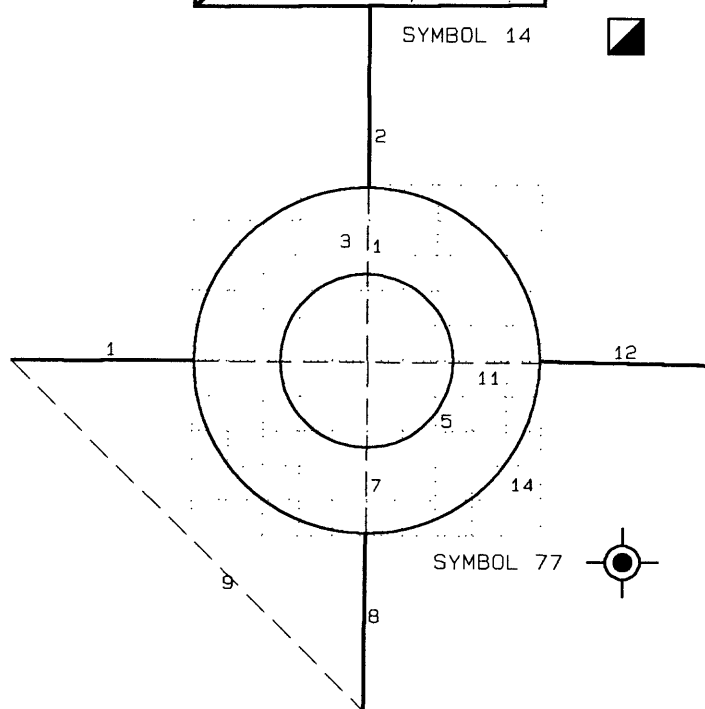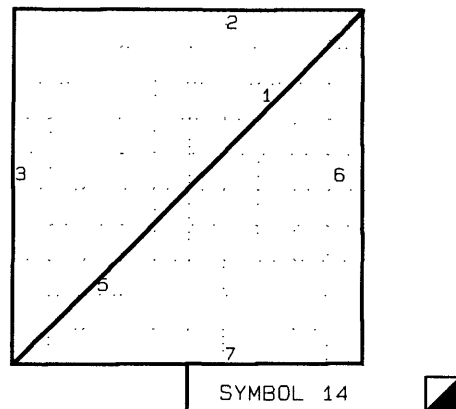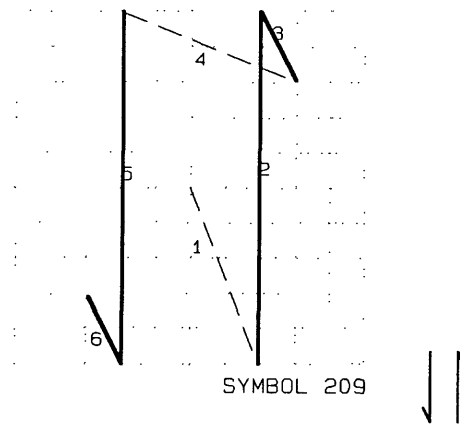of this one.

SYMBOL 209

SYMBOL 14

SYMBOL 77

Figure 13._ Examples of coding of symbols. Unit square shown by dotted lines, pen up moves by dashed lines, pen down moves by solid lines.

Plotter Information

Rotation

Rotation is a plotter feature enabling rotation of a plot by 90 degrees on the plotter media. Check the plotter manual for rotation instructions. In most cases if the X dimension of the plot exceeds the Y, no "rotation" should be specified.

Speed and Force

Speed and force are plotter characteristics. Pen speed is specified in (cm/sec) and force by integers 1 to 8 that set the force. Optimum speed and force depend on pen type and plot media. Default settings provided by Hewlett-Packard are given here in parentheses. The quality of final plots is generally improved by slowing the pen speed.

PEN TYPE	SPEED cm/sec	FORCE values	Force values = grams
			1 = 10 g
Fiber	25 (50)	1 (2)	2 = 18 g, 3 = 26 g
Roller	30 (60)	3 (6)	4 = 34 g, 5 = 42 g
Refillable ink pens	12 (30)	2 (2)	6 = 50 g, 7 = 58 g
Disposable ink pens	15 (15)	1 (1)	8 = 60 g

Scaling Points P1 and P2

Specification of scaling Points is required if plots are sent to a file rather than to a plotter. Scaling points P1 and P2 are discussed in the documentation for each plotter. The values of scaling points depend on the kind of plotter and on the size of the plot paper. Values for two plotters are provided below. Paper dimensions are in inches.

For the HP 7550A

	P1x,P1y	P2x,P2y
A size paper 8 1/2 x 11	80,320	10080,7520
B size paper 11 x 17	620,80	15820,10080

For the HP 7585/7586

	P1x,P1y	P2x,P2y
A size paper (8 1/2 x 11	-2790,-4500	2790,4500
B size paper 11 x 17	-7100,-4500	7100,4500
C size paper 17 x 22	-7090,-10075	7090,10075
D size paper 22 x 34	-15710,-15060	15710,15060
E size paper 34 x 44	-20840,-16180	20840,16180

Line types and fill types: GSLXY Version 1.0.

A line type is a plotter defined pattern. e. g. solid, dotted, dashed. Line types are specified by a number, 0-12. Examples of these line types are shown in the diagram at the bottom of the page.

A fill type is a pattern of lines specified by a number 0-2.

0 -- A line outlines the polygon **but there is no fill.**
1 -- A set of parallel lines fill the polygon
2 -- Two sets of mutually perpendicular parallel lines (a rectangular grid) fill the polygon

Line types and fill types can be combined to create different graphic effects.
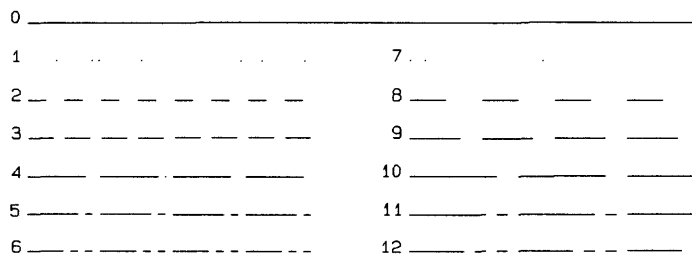
Figure 14._ Line types
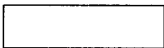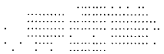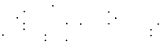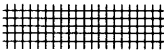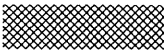
L1,1,0,1,0.03,90   Polygon 1   [fill pattern] 1

L2,1,0,0,0,0,   Polygon 2   [fill pattern] 2

L3,1,0,1,0.02,90   Polygon 3   [fill pattern] 3

L4,1,1,1,0.03,0   Polygon 4   [fill pattern] 4

L5,1,0,2,0.03,0   Polygon 5   [fill pattern] 5

L6,1,0,2,0.03,45   Polygon 6   [fill pattern] 6

L7,1,0,1,0.03,45   Polygon 7   [fill pattern] 7

L8,1,3,1,0.05,45   Polygon 8   [fill pattern] 8

Figure 15._ Examples of fill patterns, with unit identifier
files shown at the left of the filled areas. The number
designating fill type is underlined.

The utility program ASCLXY is supplied as a part of this release so that a formatted ASCII file can be used to to open a GSLXY data base and load data.

The file must have the format below:

The first record for each well is a "header record.

The <u>header</u> <u>record</u> contains the following:

The well identifier inside quotation marks, the X coordinate of the well, the Y coordinate of the well, the elevation of the top of the well, the total depth of the well, the bearing of the well, the plunge, and last the number of data records for the well (a number that does NOT include the header record.

These entries can be separated by a blank space (as below) or by a comma.

Each <u>data</u> <u>record</u> contains the following:

The unit identifier inside quotation marks, the depth to the top of the unit, the depth to the bottom of the unit, and finally the value the numeric variable (as in the example below).

As many as 5 numeric variables can be entered. Separate columns at the end of each record must be used for each one. each.

```
"T100" 294.80 250.70 876.10 105 270.00 65 210
"L1    "    .00    .50    .00
"L1    "    .50   1.00    .00
"L1    "   1.00   1.50    .00
"L1    "   1.50   2.00    .00
"L1    "   2.00   2.50   2.62
```

Operating ASCLXY:

With the program ASCLXY.EXE in the default area, start
operations by entering **ASCLXY** . The program operates from prompts
on the screen. The entries required in response to the prompts
follows the practice of GSLXY and will not be described here.

ENTER DATA BASE NAME:

ENTER MAP TITLE(36 CHARACTERS):

ENTER X,Y OF NW CORNER
ENTER X,Y OF SW CORNER
ENTER X,Y OF NE CORNER
ENTER X,Y OF NE CORNER

ENTER THE NUMBER OF NUMERIC VARIABLES:
ENTER FILENAME OF ASCII DATA

After entry of the file name for the ASCII data, the program
will operate. When it finishes, operation of the system will
return to the DOS prompt.

If you select a data base name that is already in use, a
prompt will call this to your attention: you can choose to
continue and overwrite the old data base or to use a different
name.

Files on release disk, labeled GSLXY_1, Open file report 88-XXB

The files needed to operate the program are marked with an asterisk. These files should be in the default area on the computer. Files with PLT extension are the plot files used to plot the figures in this report generated using GSLXY. The Data base DRILL provides the data used to plot these figures.

*GSLXY	EXE	GSLXY executable
GSLXY	BAS	GSLXY source code (QuickBASIC)
PLOTLIB	BAS	Source code plot module (QuickBASIC)
PLAN	PLT	
COVER	PLT	
EXAM1	PLT	
EXAM2	PLT	
EXAM3	PLT	
P1	PLT	
P2	PLT	
P3	PLT	
P4	PLT	
EXAM4	PLT	
EXAM5	PLT	
CONFIG	EGA	Configuration file EGA screen, example
*CONFIG	DIG	Configuration file, digitizer
*CONFIG	PLT	Configuration file, plotter
*CONFIG	SCR	Configuration file, screen (CGA)
DRILL	BED	Unit identifier file
TRACE	VAR	Example, TRACE numeric variable file
HIST	VAR	Example, HIST numeric variable file
DRILL	LSF	Data file, data base DRILL
DRILL	NDX	Index file, data base DRILL
E1	ASC	ASCII file specifying wells and plot positions
ASCLXY	BAS	Source code ASCLXY (QuickBASIC)
ASCLXY	EXE	Executable ASCLXY program