Rerum Naturalium Fragmenta

No. 415

QVOL
Version 3.4
User's Guide

by

T. Jasko

Watford
1992

.

Rerum Naturalium Fragmenta
Tamas Jasko editor
16 Melrose Place, Watford WD1 3LN, England

Chapter 1
INTRODUCTION

The QVOL Quick Volumetrics program system includes programs for automatic planimetry, computation and plotting of area/depth and volume/closure curves, The programs will input, edit and display data sets, perform depth, thickness, area and volume unit conversions, compute, list and plot areas and volumes.

As the planimetry function requires digitiser input, this program can only be run from a workstation with attached digitiser tablet. The curve generating and drawing programs don't need a digitiser and can be run from any PC. To plot the area/depth and volume/closure curves you need a postscript or HP compatible laser or ink jet printer.

To access the system, switch on the PC and type QVOL.

Alternatively, if other programs of the PEGAS system are also installed, you can select QVOL from the PEGAS menu.

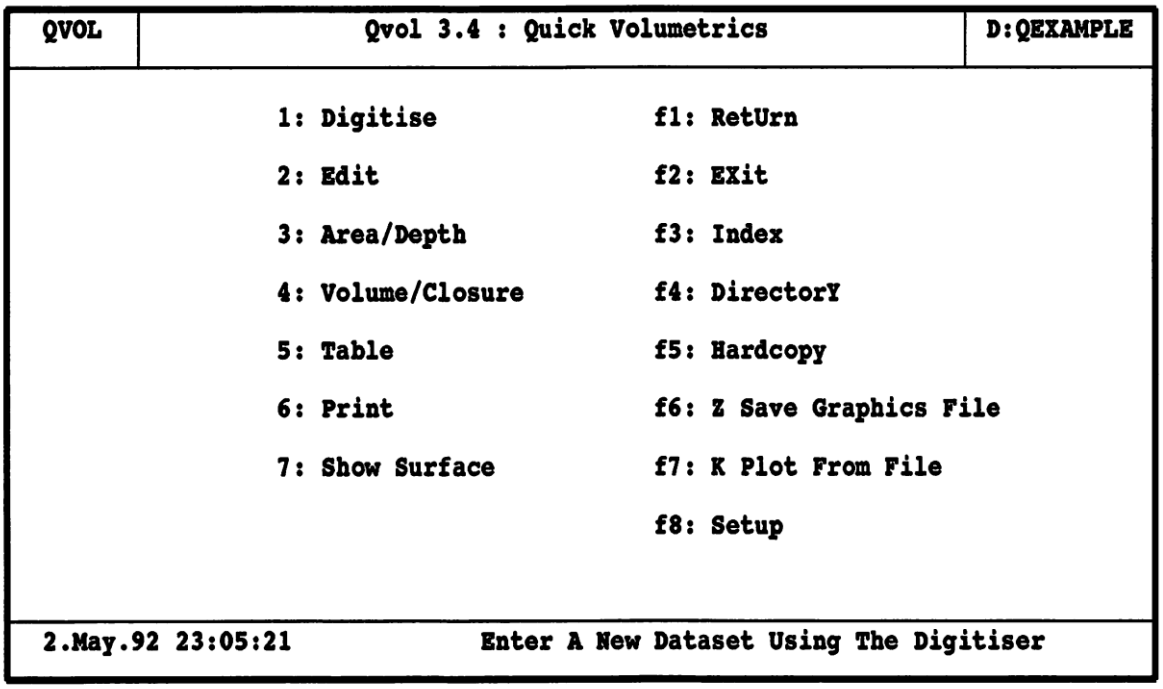


Figure 1.1: The QVOL menu

The QVOL Menu

The QVOL menu is displayed (see Fig.1.1). The left column of the menu lists the most important functions: Digitise, Edit, Area/Depth, Volume/Closure, Table, Print Table and Show Surface.

The second column of the menu contains utility functions: Return, Exit, Directory, Index, Hardcopy, Save Graphics, Plot from file and Set-up.

Each of these functions can be selected by pressing the highlighted initial or the corresponding number key or function key.

Press **U** to Return to Pegas (if installed), **X** to exit to DOS. Press **Y** for Project Directory, and **I** for the Index of data files in the current project directory.

After performing the requested operations the program will return to the menu.

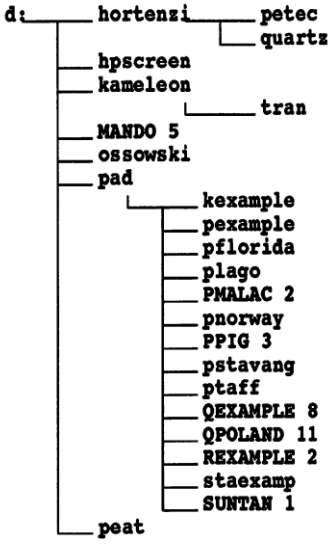
Specifying a project

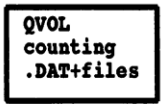
Data files are grouped into project directories. The current directory is shown in the top right hand corner of the menu screen. To change to a different project directory select Directory by pressing **Y** in the menu.

To start a new project, press Insert and enter a name of up to 8 characters. Letters can be typed in upper or lower case. To use an existing project, move up or down the directory tree using the arrow keys until the highlight is moved to the correct directory. Press Enter or End to return to the menu.

The program remembers the directory and in later sessions you only need to use this option if you want to change directories.

You can also use the Directory option to display the list of existing project directories. Press Esc to escape back to the menu without changing the current directory.





Disk Drive	Total Mbyte	Free Mbyte	Substituted Drives
C	32.0	7.9	IJKLMNOPQRSTUVWX
D	32.0	13.5	YZ
E	32.0	14.2	
F	28.5	10.5	
G	2.9	2.8	

Figure 1.2: Directory selection

Chapter 2
PLANIMETRY

To use this option, you need a digitiser connected to the PC. Check that the digitiser is switched on. Press D for Digitising in the menu to access the planimetry program.

File

The program will ask for the File name. This is the name of the data file to store the data. Names of up to 8 characters can be entered. To add to an existing file select it from the list then press Enter. The Index option can be used to list files contained in the currently selected project.

The planimetry program reads the file and on the right hand side of the screen it displays the list of digitised contour sets. You can select the operation from a menu displayed in the central window of the screen.

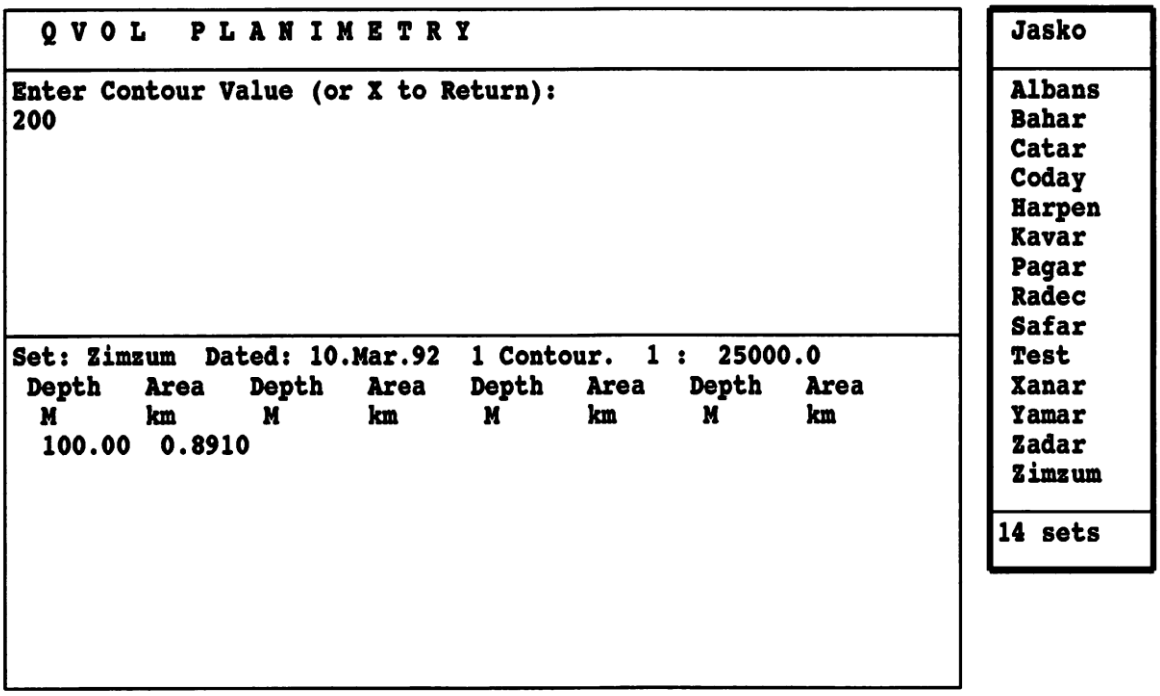


Figure 2.1: planimetry entry screen

Press **A** to Add further contours to a contour set, **C** to Create a new contour set or **X** to exit from the planimetry program and return to the Qvol menu.

Map Scale

The program will prompt for the entry of the map scale: this can be specified by typing in the scale as a ratio or by digitising a scale bar from the map. If the scale is entered as a scale bar, then the program first asks you to type in the length of the scale bar in kilometres or miles, then to position the cursor and press any digitiser button at each end point of the bar.

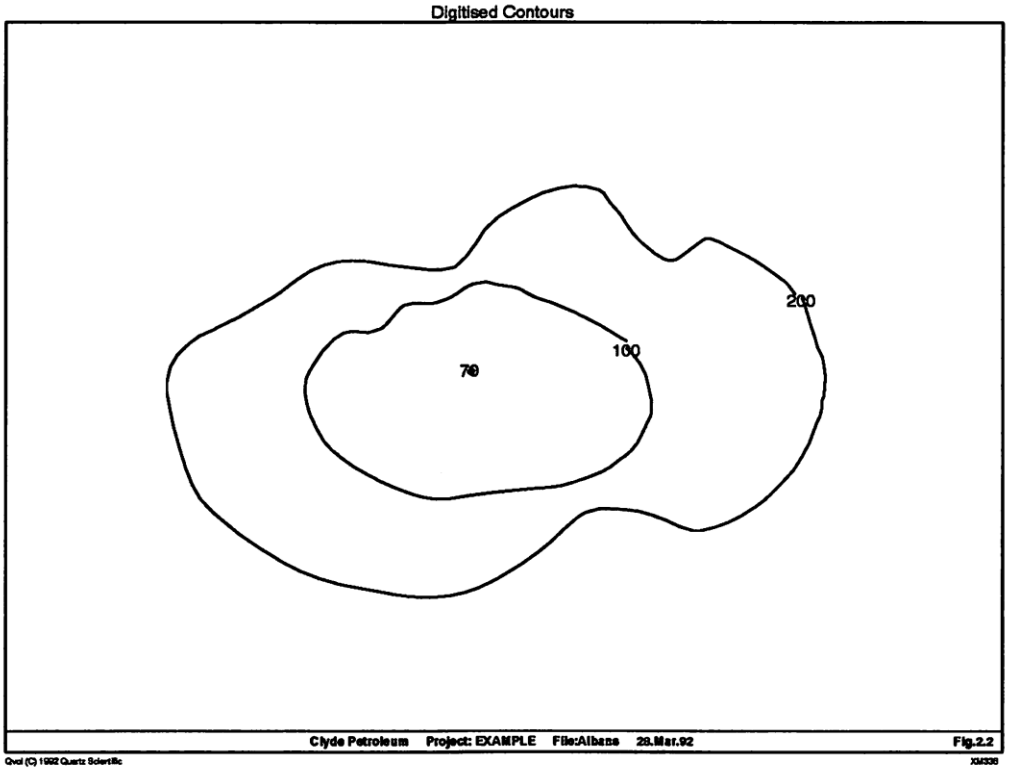


Figure 22: Check plot of depth contours

Digitising Contours

Contours should be entered top to bottom, by specifying the contour value and then digitising a number of points on the contour that form a closed curve. Move along the contour with the cursor and at each point to be digitised press button **1**. If the digitiser hardware permits it curves can be digitised without lifting your finger from the button (The examples shown were digitised this way.) At the last point press button **2**. The registration of each point is indicated on the screen.

If a contour consists of more than one closed curve, each is to be entered separately as if they were different contours. The program will add areas of the same contour value together and record the total area of the contour.

Show Surface

The outlines of digitised contours are saved by the program. The contours can be displayed on screen or plotted by printer at a later date. Note that the graphics data of digitised contours will not change if the dataset is subsequently modified by the Editor program.

Press **S** in the main menu to Show the digitised contours of a surface on the screen. After displaying on the screen, a control plot can be generated by pressing **H** for Hardcopy.

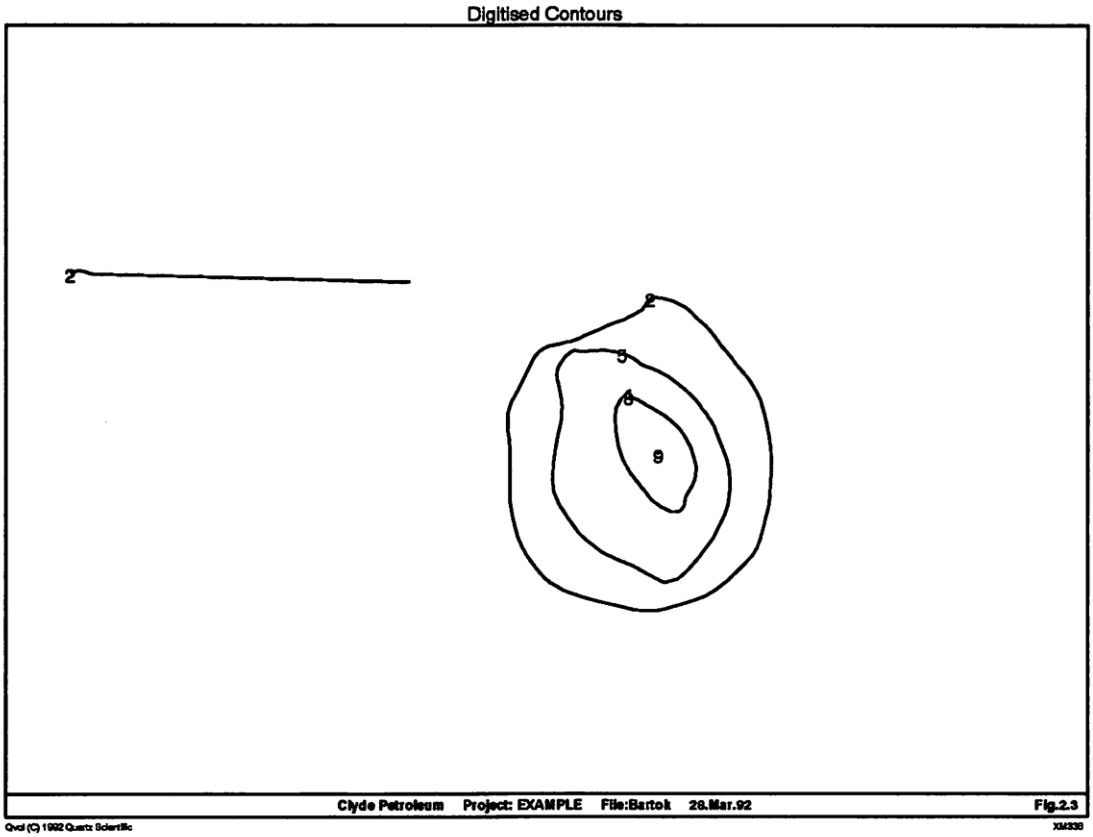


Figure 2.3: Thickness contours with digitised scale bar

The paper plot is at the same scale as the original and therefore can be used to check the accuracy of digitising. The size of the plot is A4 and so it can only show a map of A4 size without folding at the edges.

Chapter 3
EDITING

Press **E** in the main menu to Edit the data on screen. The editor program can be used to change a single contour value or area as well as applying changes or corrections to every contour in a dataset.

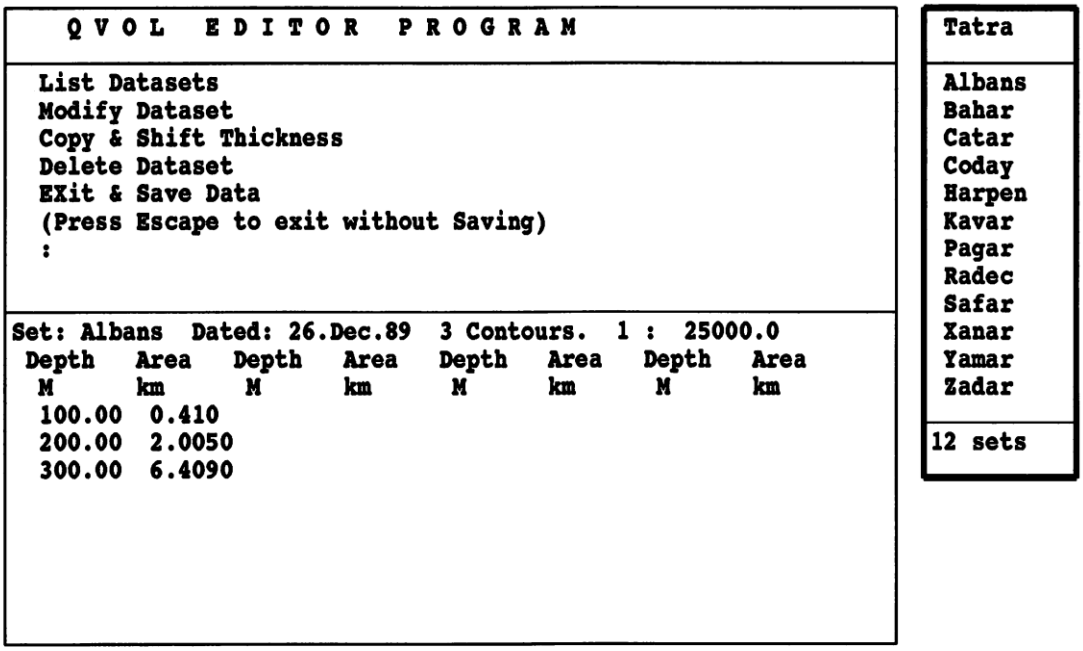


Figure 3.1: The Editing screen

Select the data file. The editor program will show the list of digitised data sets in the right column. Data sets are sorted on saving so the list shown on screen will be in alphabetic order except for the odd item added in the current session. In the central window the editor program presents you with a menu of functions at this point (See Fig. 3.1). Select the required option by pressing the corresponding initial letter.

Select the surface to edit from the list on the right hand side.

You can select a dataset by moving the highlight over it and pressing Enter to select the highlighted item. Press Esc if you do not want to select any (more) items. If there are more items than the screen can show, press PageUp or PageDown to page through the list.

When the program waits for you to select a menu option, you can press Esc as well as X to retum to a higher level. If you are in the main editor menu, pressing **X** will exit and save the data, while pressing Esc will leave the file unchanged.

Modify

This option permits changing individual values, adding or deleting contours from the selected data set. You have to specify which set you want to edit. Once in the Modify option press **I** for insert, **M** for modify or **D** for delete a single contour. Press **C** to convert depth or thickness units, **S** to shift all contours by a given thickness. The Convert and Shift options change every depth/thickness value in the dataset.

Select Full screen editing by pressing **F**. The screen will be cleared and the selected dataset will appear with the data fields shown in separate boxes. Every item can be edited by moving around with the cursor and overtyping where you want a change. When all the changes are entered press End to validate the items and retum to the main editor program.

Copy with Depth Shift

This option asks for two data set names. First you enter the name of the *new* data set you want to create, then the name of the *original* data set that will be copied into the new set. Next, enter the required depth shift.

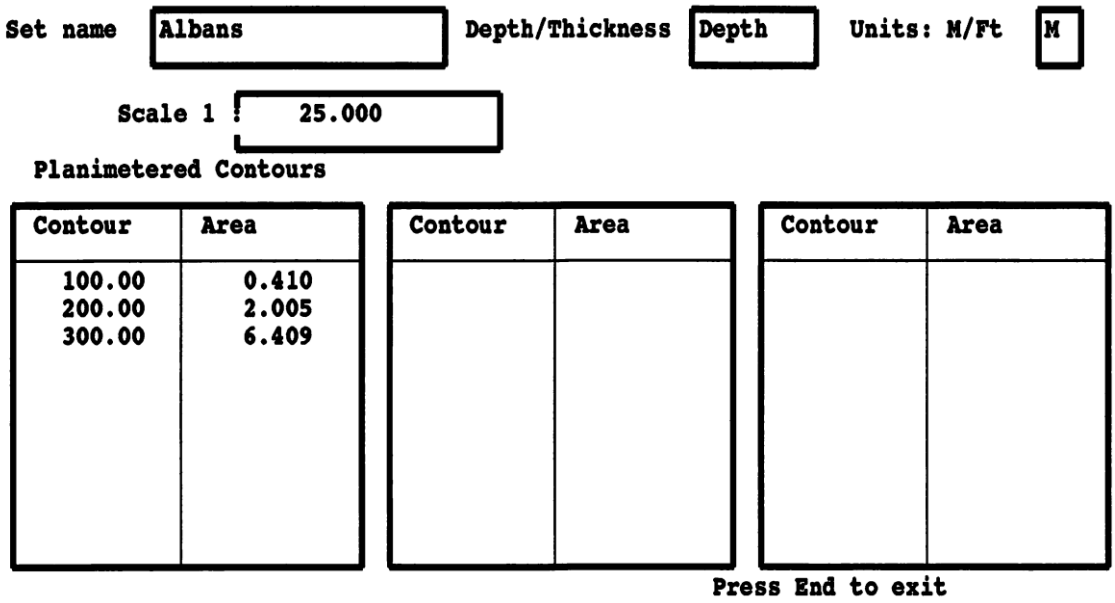


Figure 3.2: Full screen editing

This option can be used to create data for parallel surfaces like the top and bottom of a formation. It is enough digitise the top, and the base then can be created by copying and depth shifting.

Delete

This option will delete a contour set from the data file. It requires the name of the set to be deleted.

Insert

This option allows you to create a new data set where all values can be entered from the keyboard.

List

This option will show on screen the currently available datasets listing the name, date, scale, and depth/thickness range for each set. The program will pause after each page of 20 records.

Unit conversion

This option can convert the depth units from feet, metres or milliseconds to feet or metres. You have to specify the data set name and the unit to convert to. Converting metres and feet into each other is straightforward using the built in constants. For conversion from milliseconds, you have to supply the conversion constants according to the formula on the screen.

Chapter 4
AREA/DEPTH CURVE

Press **A** in the main menu to access the area/depth curve program. Select the file to use and from the file select one or more sets of contour data. The program will ask for the depth and area scale range and the units to be used for plotting the area depth curve. When it asks for the depth/thickness of contacts you can enter up to six values.

Interpolation

The curve is generated by Akima interpolation. This method honours the planimetered areas of the contours and connects them with a smooth line.

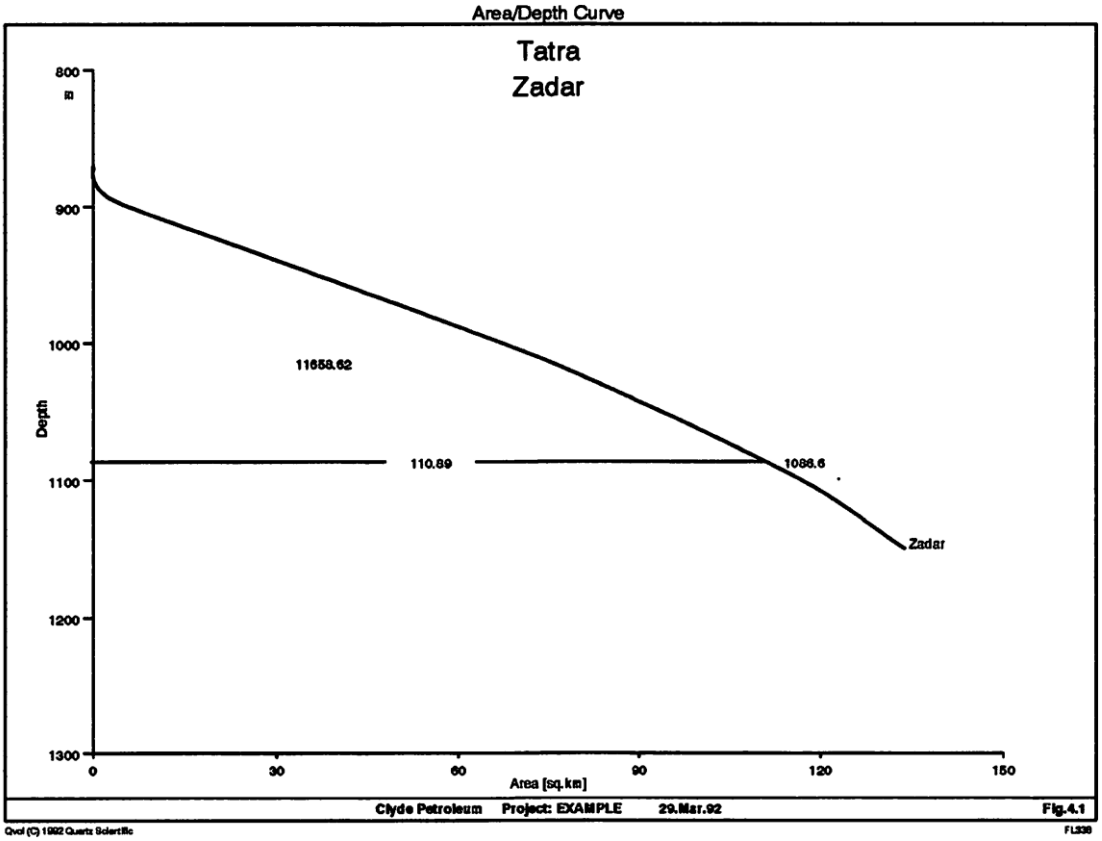


Figure 4.1: Area/Depth curve

In most cases the resulting interpolation is quite satisfactory but there may be cases where the shape of the curve as fitted by the program may look contrived in the absence of control points.

In such cases it is advisable to enter further control values of contour areas either by planimetry (if it is possible to draw intermediate contours) or by educated guess. The interpolated values are displayed in graphic form on the screen. The curve can also be plotted on a laser printer.

Depth marking

At each contact depth requested a horizontal line will be drawn to the curve(s) displayed and the value of the depth is marked on the right end of the line. The area of the formation will be shown by numbers placed on the horizontal segments. The volume of each formation between the indicated contacts is shown by the numbers in the polygonal areas (see Fig 4.2)

If there are two or more surfaces shown then the figures will show the area and volume of the formation between the surfaces. If there is only one surface displayed then the marker is drawn to the vertical axis and values show the interpolated areas/volumes for that surface alone.

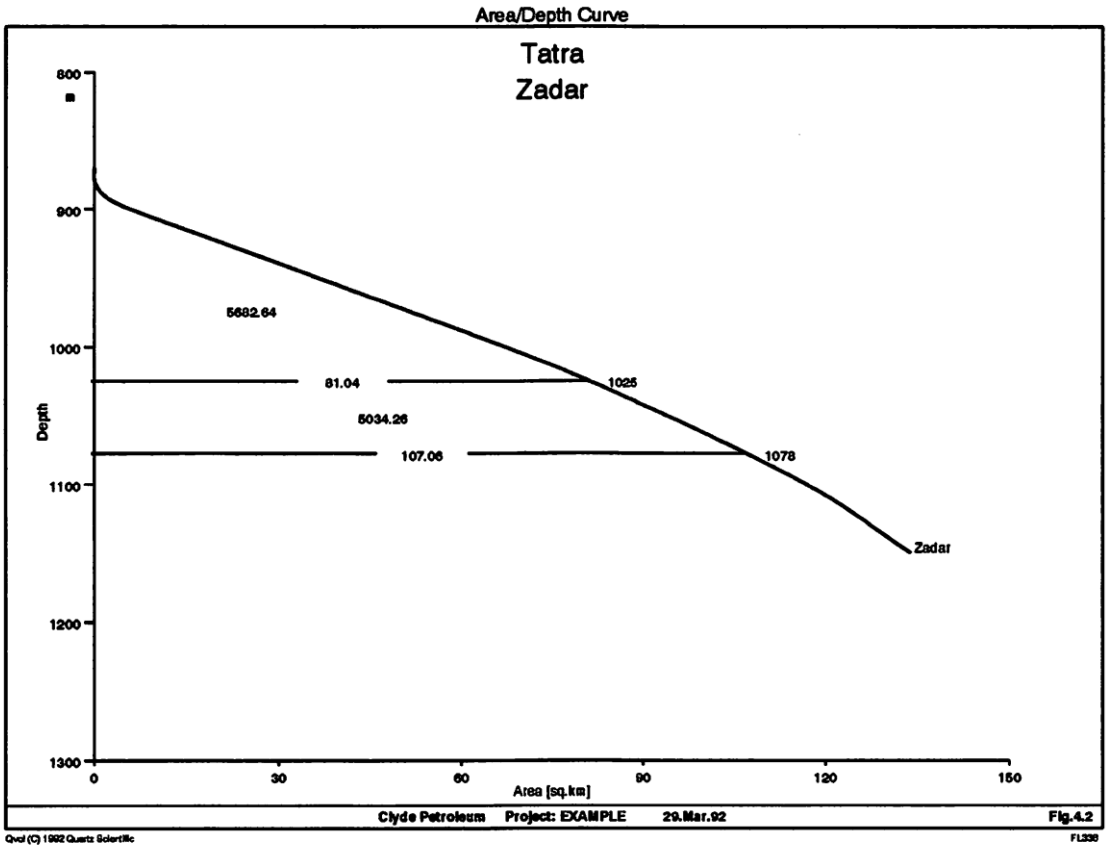


Figure 4.2: Area/Depth curve with several contacts

Plotting

Every time the program produces screen graphics it records the plot data in a file. Press H for Hardcopy to produce an A4 size paper plot. Select the printer format e.g. PostScript or HPlaser and the printer port e.g. LPTl for the destination and the program will send the formatted plot to the printer.

The plot data are always recorded in the same temporary plot file which is reused by the next program drawing on the screen. To keep a plot, use the Save Graphics Plot option of the main menu. Plots saved in named permanent files can be transferred to another PC for printing on a particular printer. To print a named plot file use the option Plot from File.

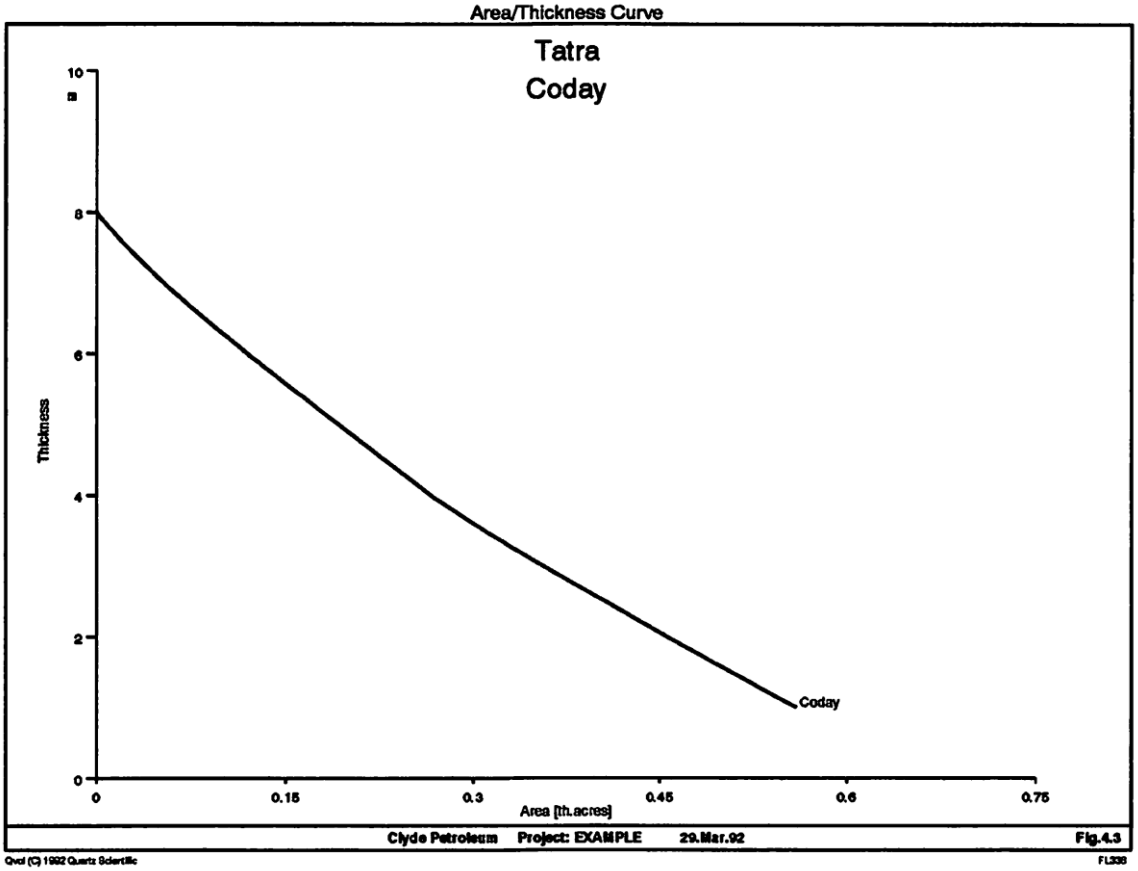


Figure 4.3: Area/thickness curve

Chapter 5
VOLUME/CLOSURE CURVE

Press **V** in the main menu to generate volume/closure curves. Select the file, then select one or more sets of contour data. A smooth curve is fitted to the contour areas using Akima interpolation as for the area/depth curve. Same considerations apply for the shape of the curve. For correct closures at the top of a structure it is best to enter the top as a contour of zero area. Select the area and volume scale units. Enter the closure depth values.

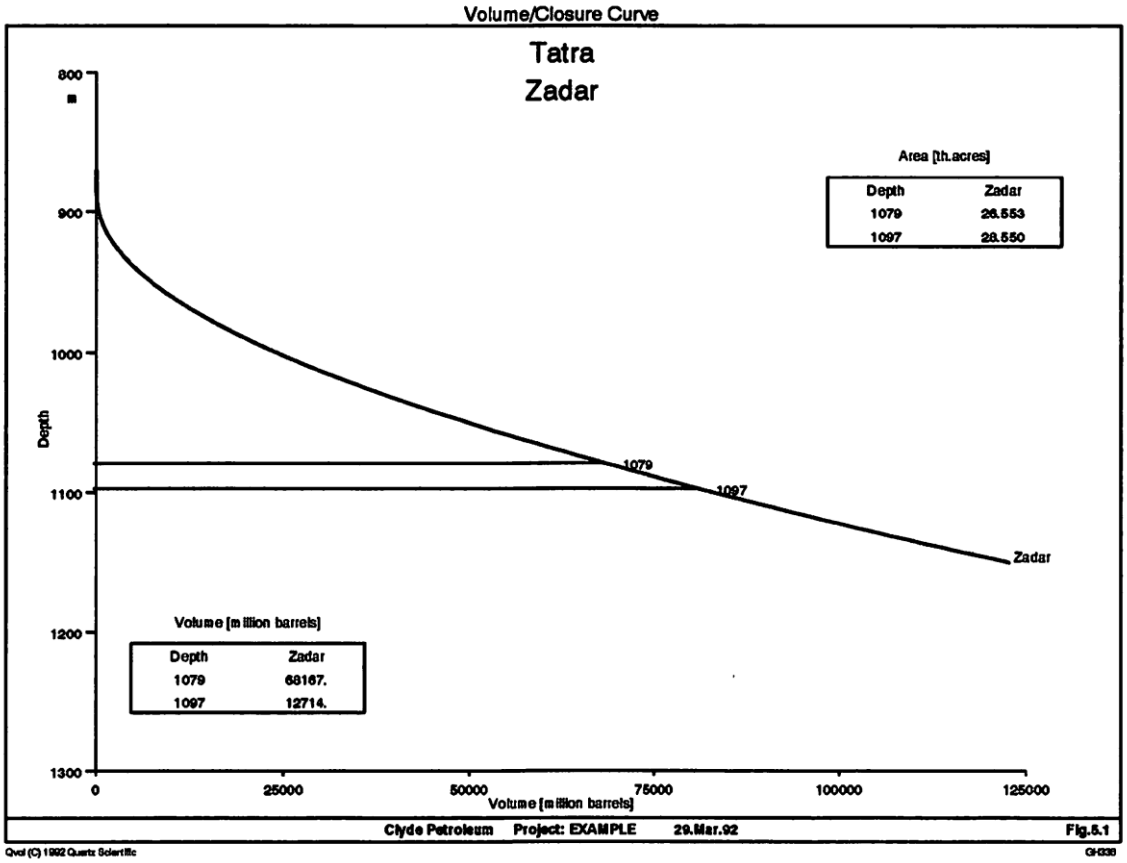


Figure 5.1: Volume/Closure curve

Integration

The interpolated data are then integrated by the trapezoidal rule to compute volumes and the integral curve is displayed in

graphic form on the screen. The curve can also be plotted on a laser printer.

Whenever a depth is marked, a horizontal line will connect the two curves displayed and the value of the depth is marked at the right end of the line. Computed areas and volumes are displayed in small tables in the top right and bottom left comers.

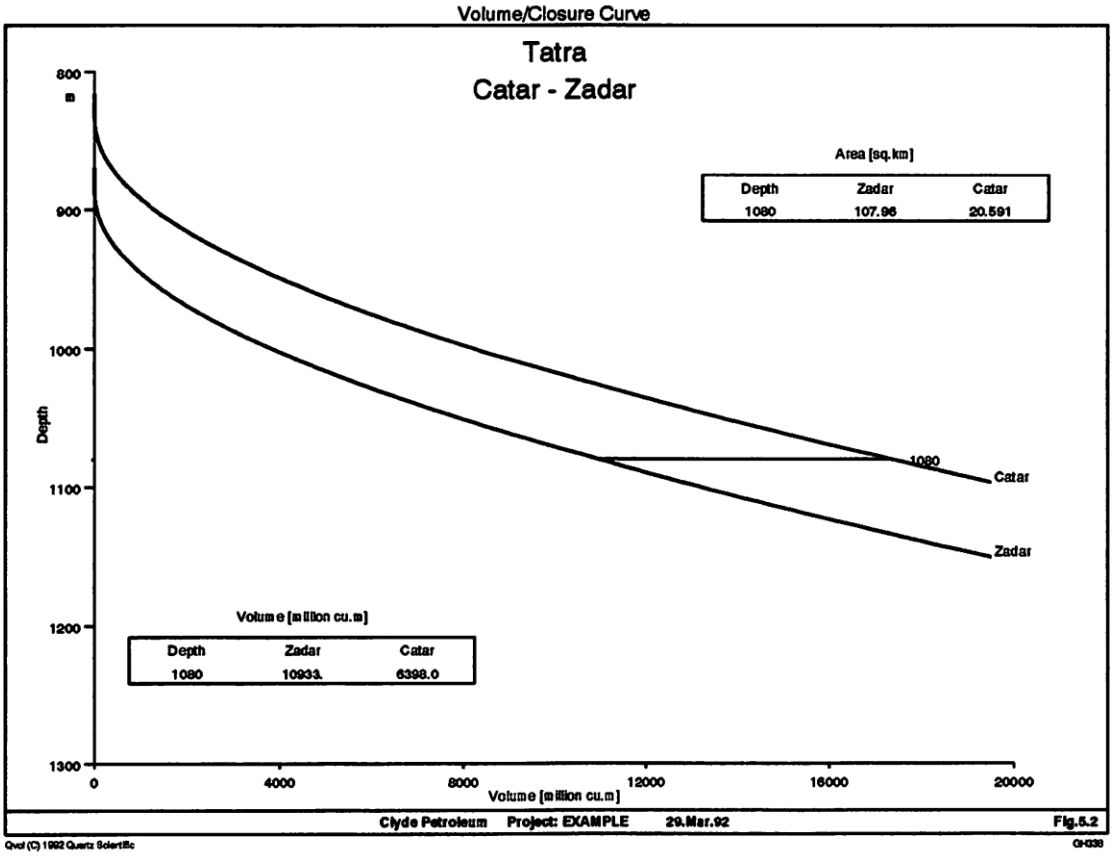


Figure 5.2: Volume/closure curve of a formation

If there are two or more surfaces shown then the markers and values show the difference between the neighbours. If there is only one surface displayed then the marker is drawn to the vertical axis and volumes are related to the closure of that surface alone.

Paper plots are produced by the same way as for Area/Depth curves, by pressing **H** for Hardcopy.

Chapter 6
AREA/VOLUME TABLES

The Table option on the main menu can be used to compute areas and volumes and to display the tabulated results.

Area [sq.km]

Depth From	Depth To	Pagar	Xanar -Pagar	Zadar -Xanar	Kavar -Zadar	Bahar -Kavar	Yamar -Bahar
---	922.00	4.94	9.67	4.81	12.15	4.74	5.69
922.00	935.00	12.88	9.75	4.91	12.01	4.94	5.48
935.00	956.00	25.97	9.65	4.85	11.94	5.33	5.01
956.00	978.00	39.55	9.71	4.69	11.81	5.37	4.36
978.00	993.00	48.74	9.82	4.49	11.34	4.90	4.05
993.00	1005.00	56.08	9.92	4.18	10.59	4.62	3.99
1005.00	1014.00	61.54	10.01	3.67	10.16	4.50	4.03
1014.00	1033.00	72.73	10.35	2.05	9.77	4.34	3.74

Depth From	Depth To	Catar -Yamar	Safar -Catar
---	922.00	10.42	7.71
922.00	935.00	10.36	7.83
935.00	956.00	9.98	8.27
956.00	978.00	8.88	9.63
978.00	993.00	8.55	9.10
993.00	1005.00	8.43	6.14
1005.00	1014.00	8.16	3.52
1014.00	1033.00	7.72	-0.10

Figure 6.1: Tabulated areas

This option allows up to 12 of surfaces (the same as for the Area/Depth and Volume/Closure plots). You can define up to 100 marker depth values which are more than the 6 that the plotting options allow.

Enter the names of the datasets as for the Area/Depth plot program. Then enter the list of marker depth values. After the last value press Enter again.

The output can be viewed on screen or printed using the Print option of the main screen.

Volume [million cu.m]

Depth From	Depth To	Pagar	Xanar -Pagar	Zadar -Xanar	Kavar -Zadar	Bahar -Kavar	Yamar -Bahar
---	922.00	39.6	169.0	136.9	514.2	278.4	361.9
922.00	935.00	127.0	126.5	62.8	157.3	62.7	72.7
935.00	956.00	426.0	203.5	104.0	250.6	108.8	109.3
956.00	978.00	740.6	211.8	105.1	261.3	119.3	102.7
978.00	993.00	675.3	145.9	69.6	173.9	76.1	62.5
993.00	1005.00	639.6	118.1	52.0	130.7	56.5	48.2
1005.00	1014.00	537.0	89.8	34.5	92.7	40.7	36.2
1014.00	1033.00	1292.7	192.5	53.5	187.6	84.3	74.0

Depth From	Depth To	Catar -Yamar	Safar -Catar
---	922.00	817.3	754.8
922.00	935.00	135.0	101.2
935.00	956.00	214.5	168.4
956.00	978.00	205.3	198.2
978.00	993.00	129.7	144.5
993.00	1005.00	101.9	88.3
1005.00	1014.00	74.4	40.0
1014.00	1033.00	149.4	20.3

Figure 6.2: Tabulated volumes

Chapter 7
INSTALLATION & SETUP

To install the programs on the hard disk insert the installation disk in the floppy disk drive. If you used drive A, type *a:pinstall*, if the floppy disk is in drive B, type *b:pinstall*. The program will ask for the destination drive and directory. You can press Enter to accept the defaults suggested (drive C, directory ROC) or you can enter your own values. The installation program will copy the contents of the floppy disk to the hard disk.

Repeat the installation procedure for any additional disks supplied e.g. printer drivers. The standard distribution disks include software for plotting on a number of popular printers, software for additional printers may be supplied, if requested, on separate disks.

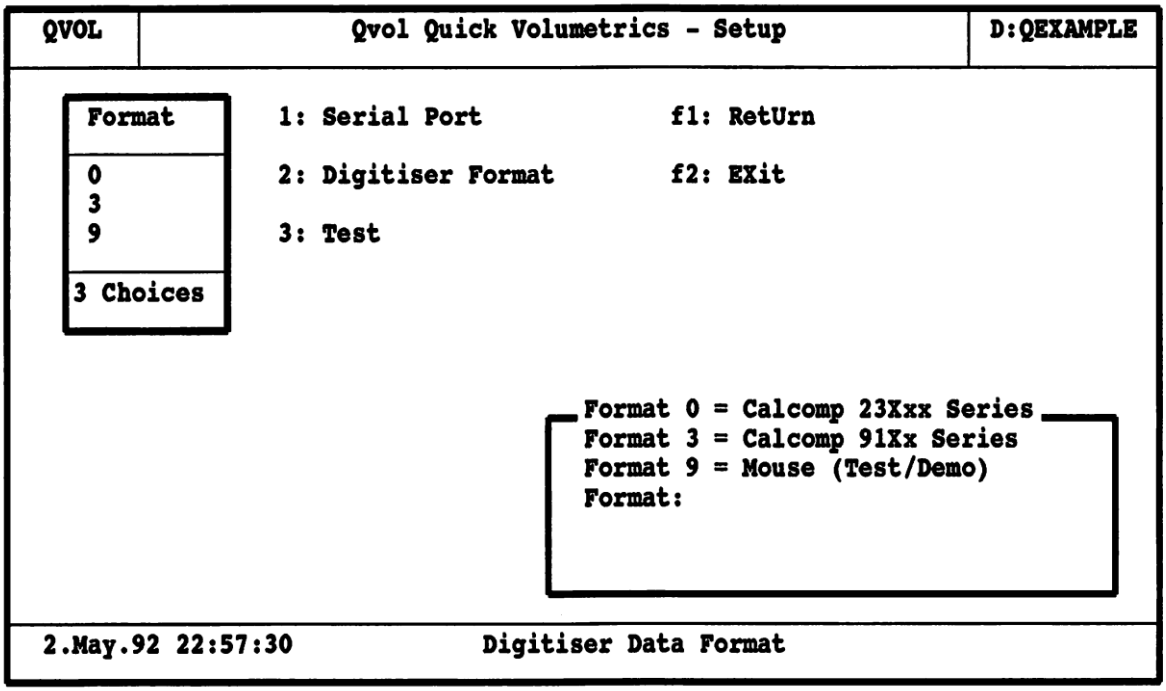


Figure 7.1: Setup menu

Setup

Following installation, use the Setup option to specify details of the digitiser connected to your PC. This option should also be used any time if you change the digitiser tablet.

Select a Serial Port by pressing **S** to set the digitiser port to COMl or C0M2. Press **D** to select the digitiser data format from the various Calcomp formats recognised. Select Test to test the digitiser connection.
(Qvol Version 3.4 User Guide. Quartz Scientific, Watford, May 1992, 22 p.)