Rerum Naturalium Fragmenta

No. 400

QVOL Version 2.1
User's Guide

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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 permit input and display of multiple data sets, transformation of data and read-out of specific function values.

As the planimetry function requires digitiser input, this program can only be run from a work-station with attached digitiser tablet.

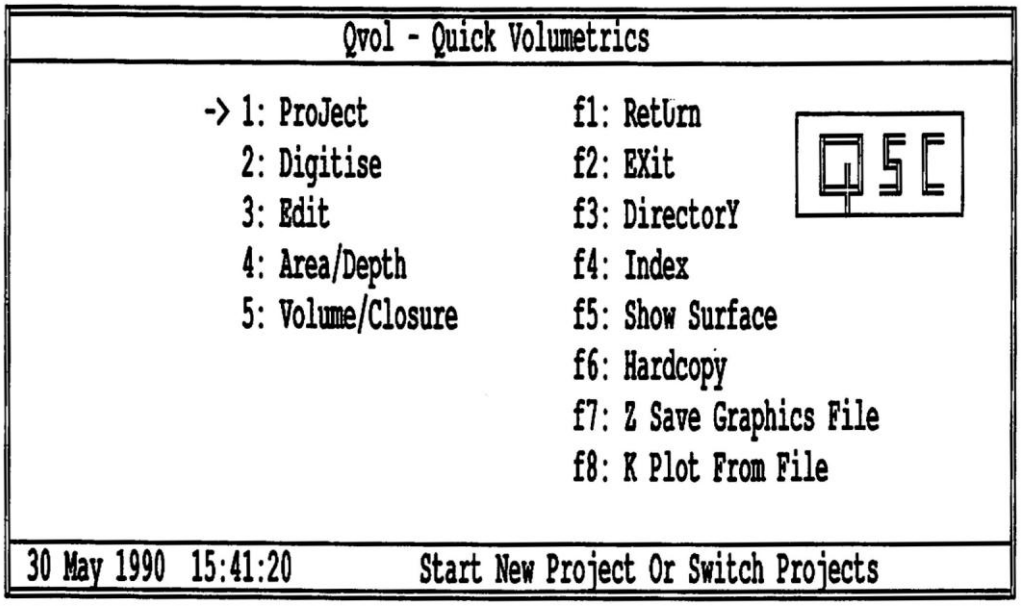


Fig. 1

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 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.

The QVOL Menu

The QVOL menu is displayed (see Fig. l). The left column of the menu lists the most important functions.

Press

1 - for specifying the Project
2 - for Automatic planimetry
3 — for Editing and Transforming Data
4 - for Area/Depth curve
5 — for Volume/Closure curve

The second column of the menu contains utility functions.

Press

f1 - to Return to Pegas (if installed)
f2 - for exit to DOS
f3 - to list the Directory of Projects
f4 - to list the Index of files by Author
f5 - to produce paper Plots

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

Specifying a project

Data files are grouped into projects and the first thing when entering QVOL you should select a project before proceeding to other menu options.

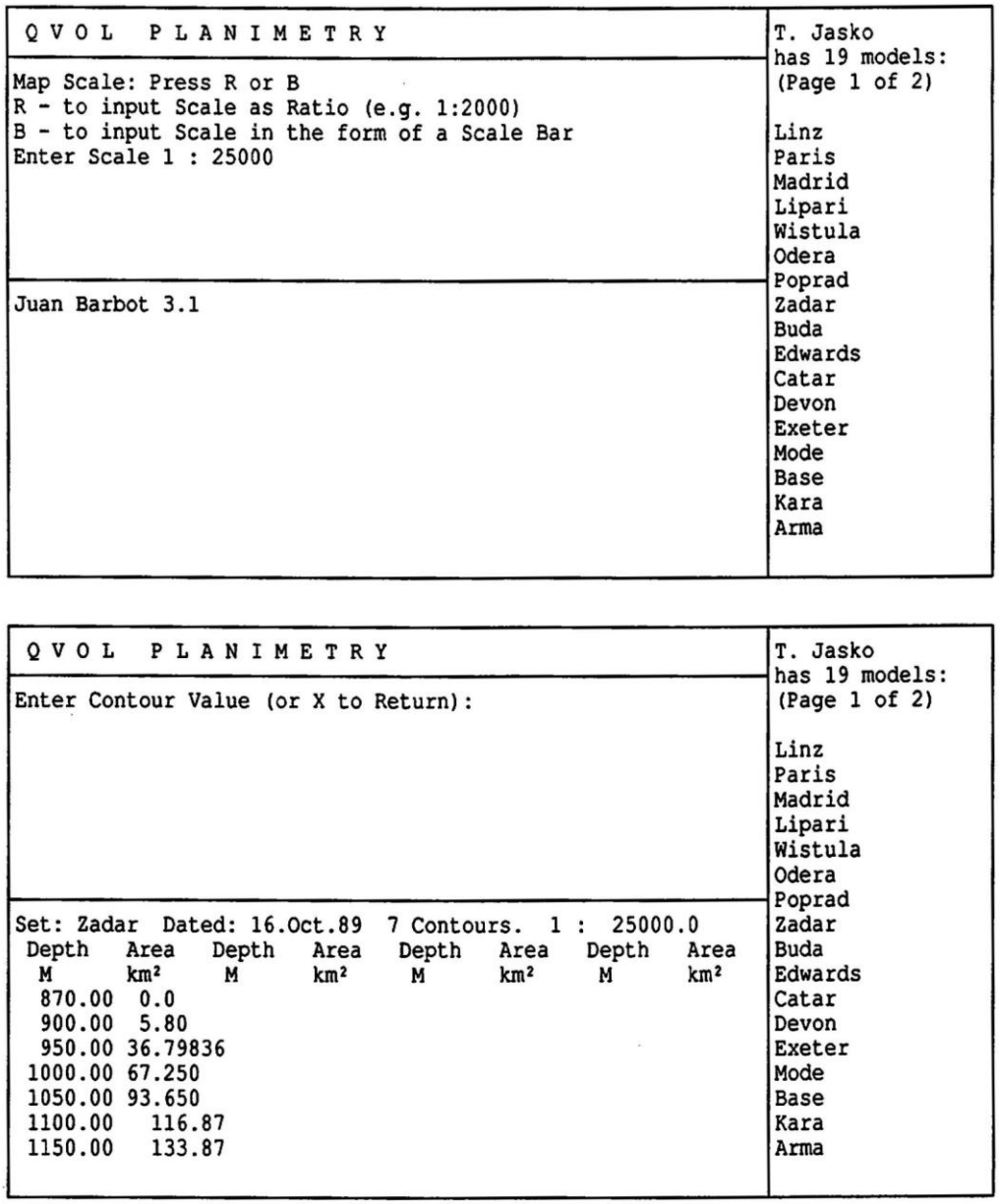


Fig.2

To start a new project, select Project from the menu and type in a name of up to 8 characters. To use an existing project, select Project and type in the correct name. Letters can by typed in upper or lower case.

You can use the Directory option (in the second column of the menu) to see a list of already existing projects.

Chapter 2
PLANIMETRY

To use this option, you need a digitiser connected to the PC. Check that the digitiser is switched on.

Select Enter (option 2) in the menu to access the planimetry program.

Author

First the program asks for the Author name. This is the name of the data file to store the data. Names of up to 8 characters can be entered including blanks between letters, longer names will be truncated e.g. C. Columbus would become C. Colum. To add to an existing file, enter its name. The Index option can be used to list files contained in the currently selected project.

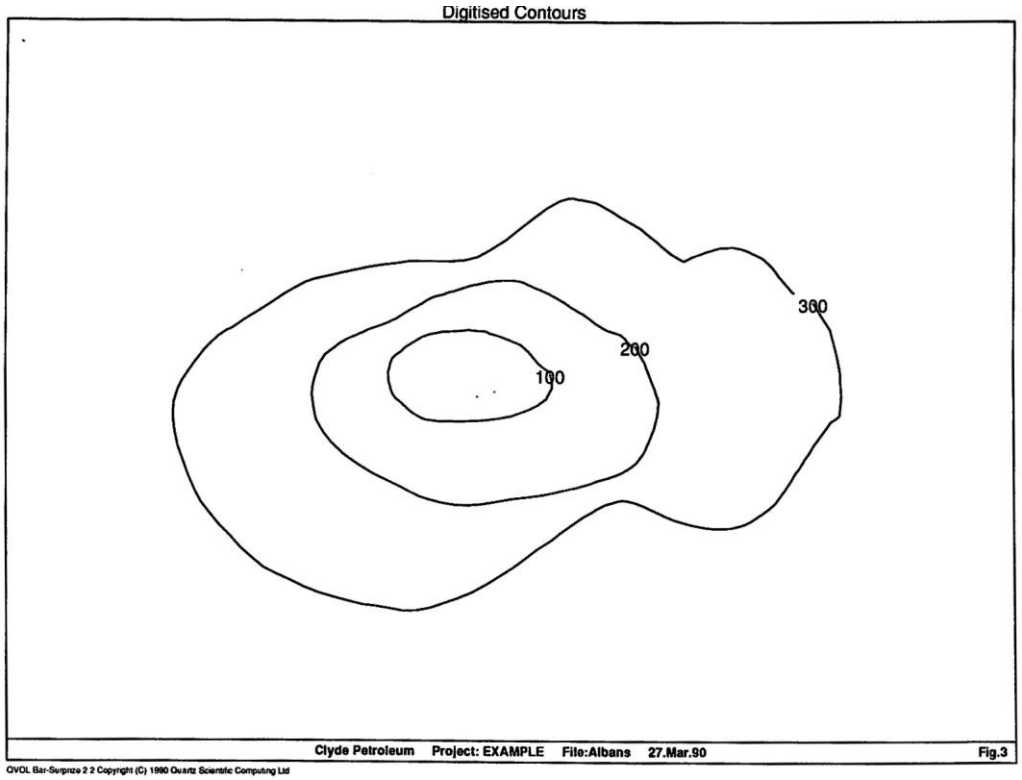


Fig.3

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 centre window of the screen.

Select
A - to add further contours to a contour set
C - to create a new contour set
P - to display another page of the index of contours (the screen shows 17 entries at most, but this option can be used to show the rest if there are more to see)
X - to exit from the planimetry program.

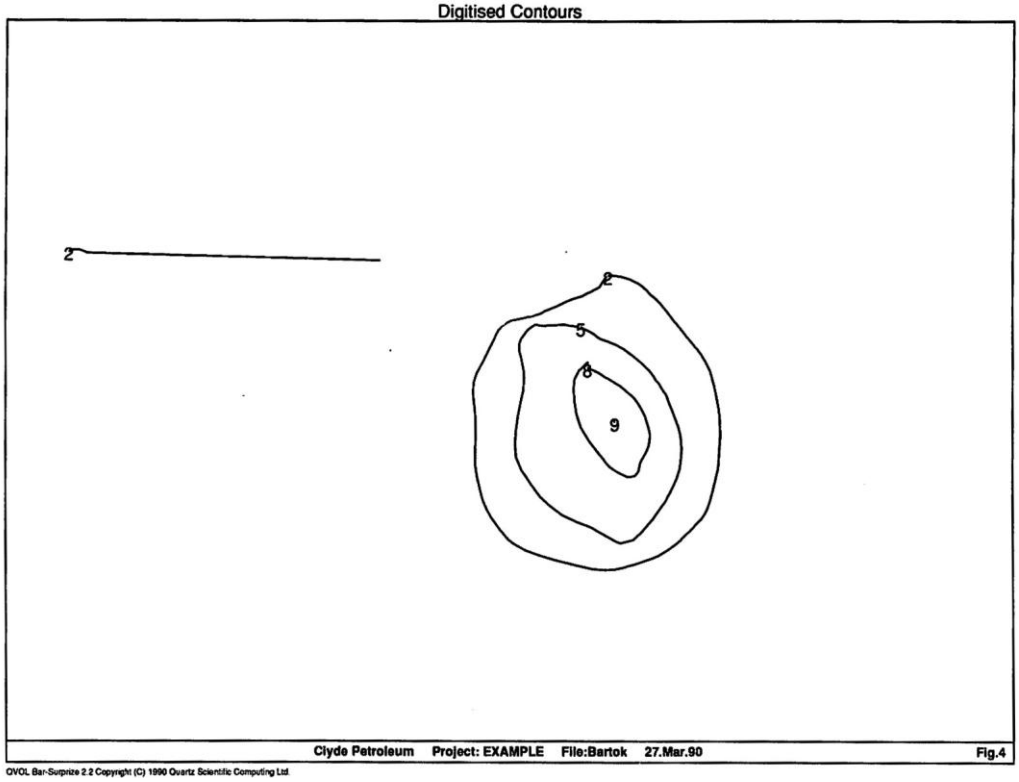


Fig. 4

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.

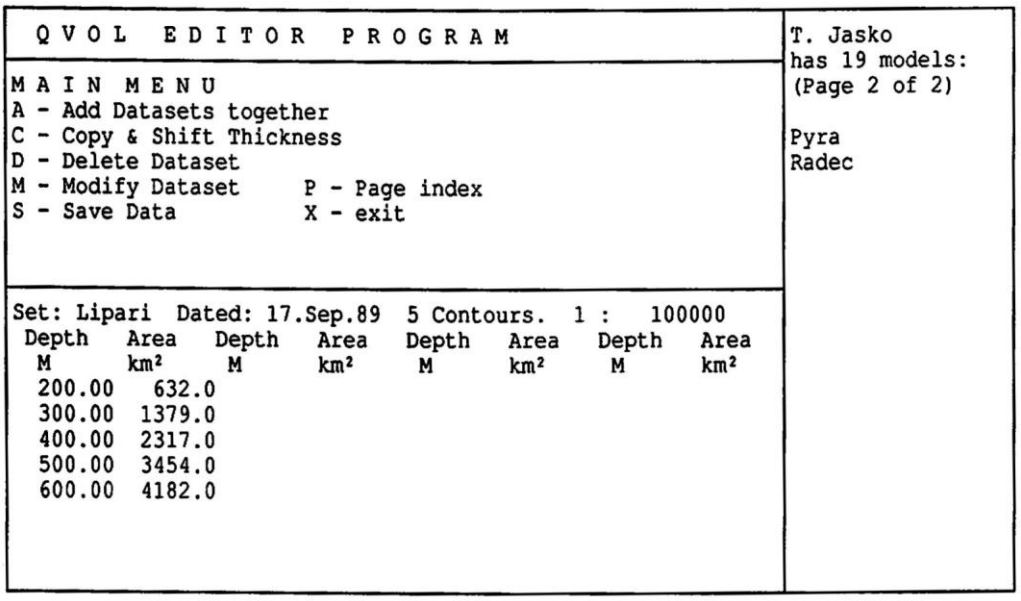
Digitising Contours

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.) Press button 2 at the last point. 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 output the contour areas.

Chapter 3
EDITING

By selecting this option, data can be modified. The editor program can be used to change a single contour value or area as well as applying changes or corrections to complete contour sets.



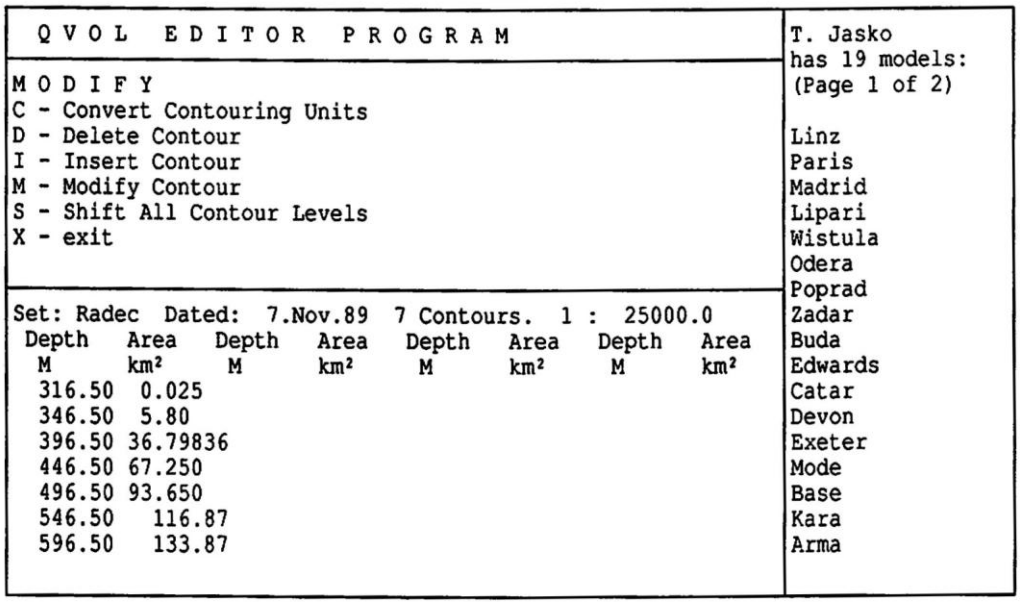


Fig.5

Again, the first thing the program asks is the Author Name. Enter your name and the list of data sets digitised by you will be shown in the right column.

The editor program presents you with a menu of functions at this point (See Fig. 5). Select the required option by pressing the corresponding letter.

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, then press I for insert, M for modify value or D for delete contour.

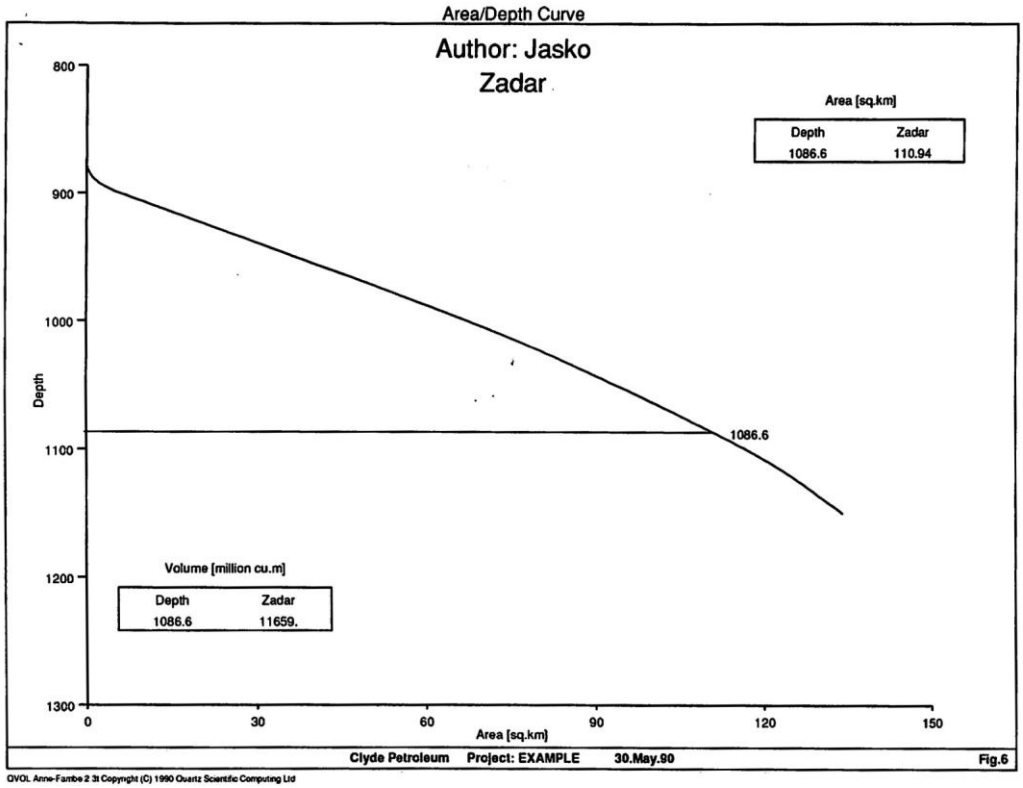


Fig. 6

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.

This option can be used to create data for parallel surfaces like the top and bottom of a formation. After digitising one of them, for example planimetering the top, the other surface, e.g. the base 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.

Add
This option will create a new data set by adding two or more existing sets together.

Where the two sets contain areas referring to the same contour value, these will be added together.

Of course, the sets must use the same units and must be of the same kind i.e. you cannot mix depth and thickness values.

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

Select menu option 3 to access the area/depth curve program. The program asks for the author name and one or more sets of contour data and interpolates the data points by a smooth curve.

Interpolation

The curve is fitted using Akima interpolation which honours the planimetered areas at the contour values given and connects them with a smooth line.

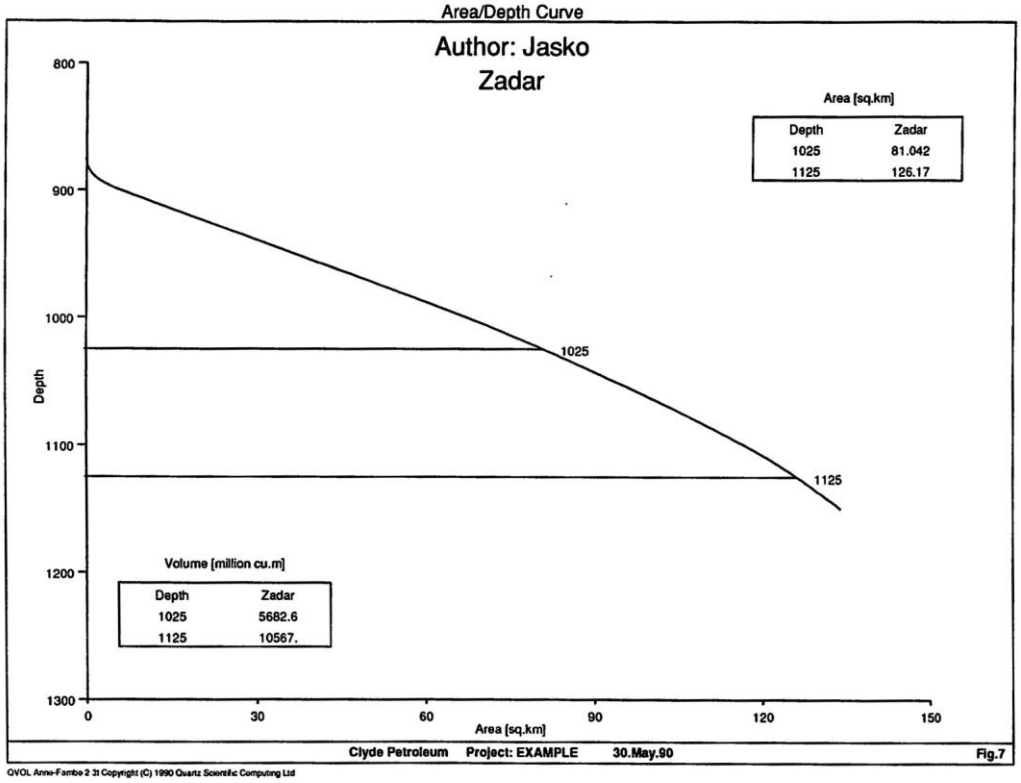


Fig. 7

In most cases the resulting interpolation is quite satisfactory but there may be cases of extreme breaks where the curve fitted by the program may not look reasonable. In such cases it is

necessary to enter intermediate values between digitised contours either by planimetry if it is possible to draw intermediate contours or by educated guess.

The interpolated values can be displayed as a series of numbers before the curve is displayed in graphic form on the screen. The curve can also be plotted on a laser printer.

Depth marking

When the curve(s) are displayed on the screen the user can select marker depth values either by positioning the cross cursor or by pressing K on the keyboard. If K is pressed then the user can enter the required depth as a number from the keyboard.

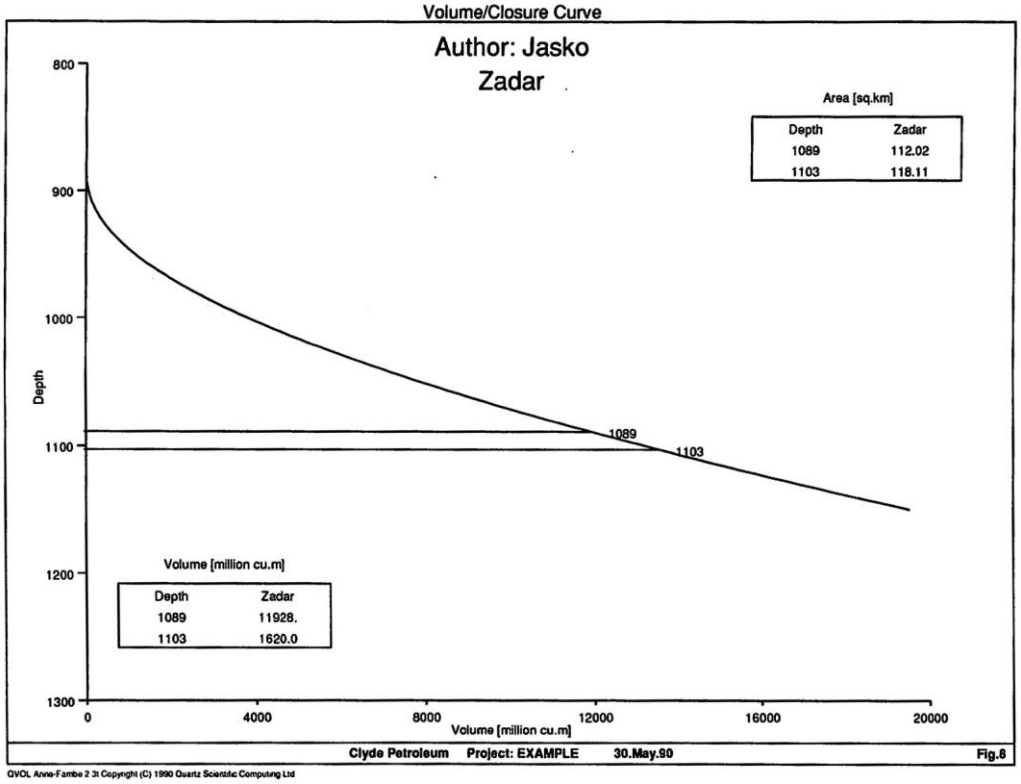


Fig. 8

Whenever a depth is marked, a horizontal line will connect the two curves displayed and the value of the depth is marked on the vertical scale on the left. At the right end point of the marked line the area difference between the curves will be shown.

If there are more than two surfaces shown then the markers and values show the difference between the last two requested by the user. If there is only one surface displayed then the marker is drawn to the vertical axis and values show the interpolated areas of that surface alone.

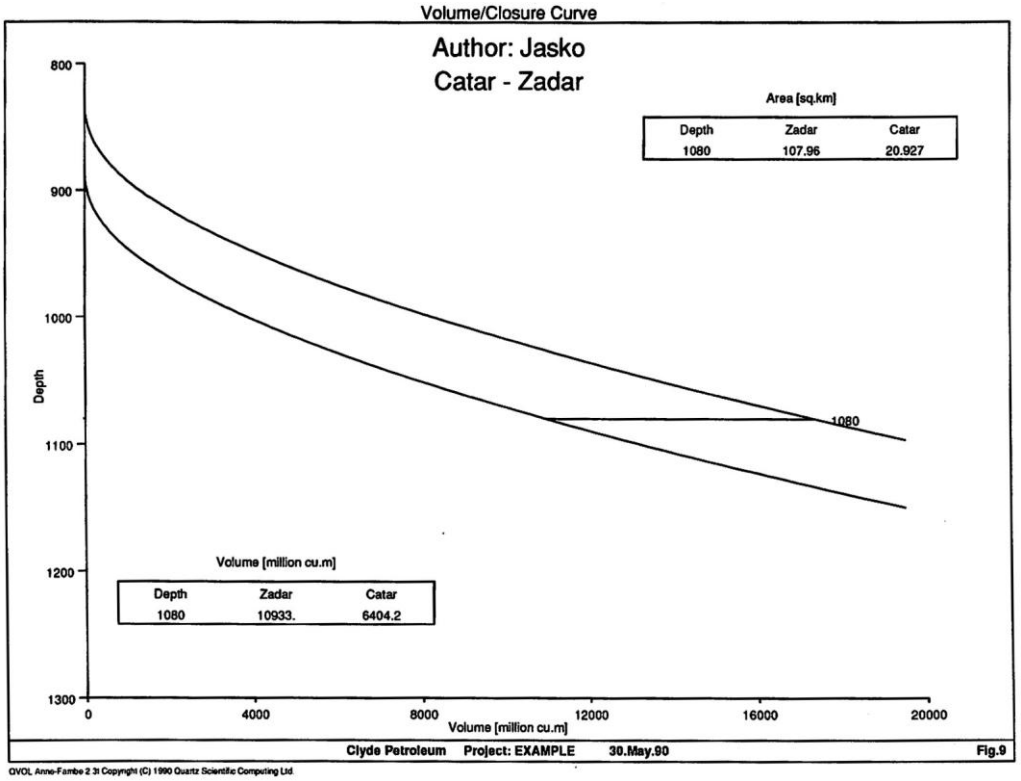


Fig. 9

Chapter 5
VOLUME/CLOSURE CURVE

Select this option to generate volume/closure curves. The program asks for the Author name first. Then you can 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.

Integration

The interpolated data are then numerically 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.

When the curve(s) are displayed on the screen the user can select marker depth values either by positioning the cross cursor or by pressing K on the keyboard. If K is pressed then the user can enter the required depth as a number from the keyboard.

Whenever a depth is marked, a horizontal line will connect the two curves displayed and the value of the depth is marked on the vertical scale on the left. At the right end point of the marked line the volume difference between the curves will be shown. This is the total integrated volume between the two surfaces from the top of the plot till this point. Midway between the marker and the previous marker the volume difference between the markers is shown.

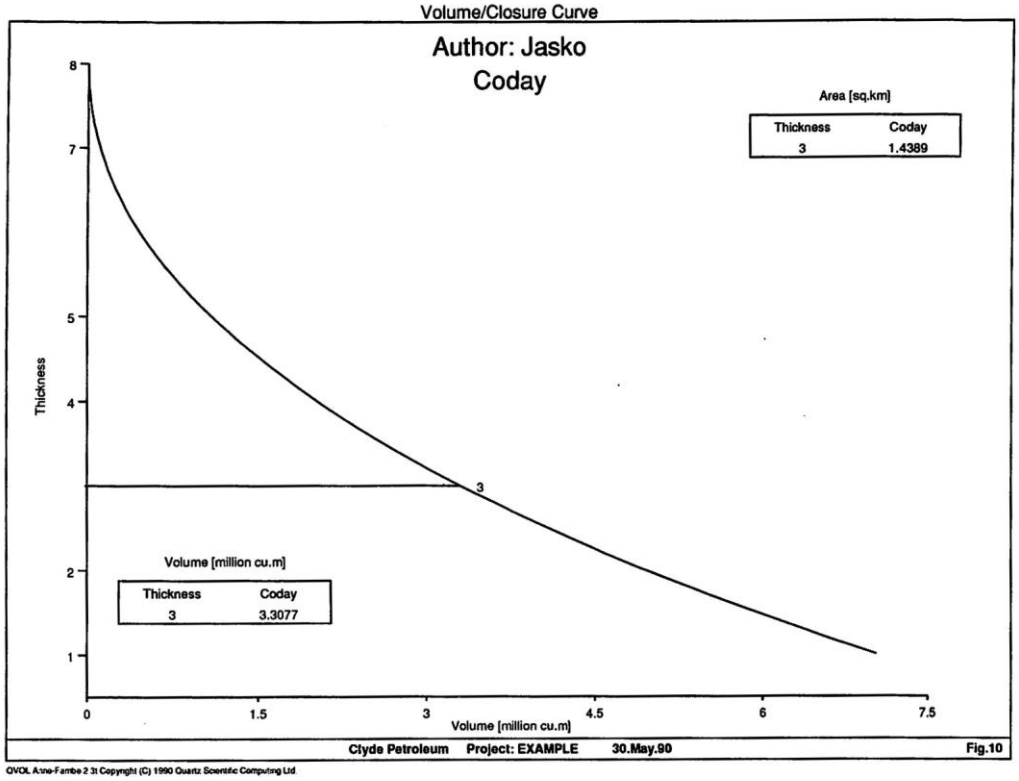


Fig.10

If there are more than two surfaces shown then the markers and values show the difference between the last two requested by the user. 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.

(QVOL User's Guide Version 2.1, Quartz Scientific, Watford, 1990)