ROSE DIAGRAM PROGRAM

by

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INTRODUCTION

The ROSE program is written to generate a circular histogram, the 'ROSE' diagram, for weighted and unweighted directional data. The program is written in Microsoft FORTRAN version 5. Input is from either keyboard or disk file. Output is a plot file which can be sent to one of several models of Hewlett Packard plotter or imported into Microsoft Word or Corel Draw. An option is available to save data which was input from keyboard.

This program was written because currently existing rose programs treated all measurements equally. In the case of paleocurrent data, it was desirable to provide some way to have the thickness or volume of beds influence the importance of the individual measurement. And as often happens, the request for other options increased and 'ROSE' is the result. A companion spreadsheet template, XBED.WQ1 for Quattro-Pro (PDF 91-15A) was written to facilitate dealing with paleocurrent data and by using macros, it automatically generates a file for input into ROSE.

If any problem arises when using ROSE or you have any questions, call Shirley Liss (907)-474-7147.

I. SYSTEM REQUIREMENTS

A. HARDWARE

The ROSE program was written for an IBM/PC with 640K memory and a hard drive. Actual program size is 110K and there is no reason it will not run from floppy disks. A graphics monitor is required. Program queries system as to whether a CGA, EGA, or VGA monitor is attached and takes advantage of whatever is available. Graphic output is written to a file and to be usable requires a Hewlett Packard Plotter or a graphics printer.

B. SOFTWARE

ROSE was written in Microsoft FORTRAN 5 utilizing their graphics package which came out in that release. You do not need to have the FORTRAN compiler to run ROSE.EXE. However should you want to modify the source, you would need it. In order for the text on the graphics to look nice on the screen, the file MODERN.FON needs to be in the default directory when ROSE is run. The program will work without it.

II. RUNNING ROSE

To start the program simply type "ROSE". After that you will be prompted for input and options. Every response requires a carriage return. If you intend to use a screen capture program like CAPTURE.COM, you'll want to start that up first. CAPTURE.COM is provided by

Microsoft WORD and more information is available with WORD documentation. By default, CAPTURE results in graphics captured in reverse video, white on black background. To change this, start that program by typing CAPTURE/s and change the necessary setting for your machine configuration. You may have to adjust what is set for your display adapter in addition to the reverse video setting. Microsoft provides a file, CAPTURE.DOC, on one of the WORD disks which gives additional information.

III. PROGRAM DESCRIPTION

        ROSE was designed to generate a circular histogram. The original application was to graphically illustrate directions of paleocurrents but the program is applicable to any directional data. Wind directions is just one other example.

A. INPUT

        Data for ROSE consists of a set of azimuth angles with or without weighting factor. The azimuths run from 0 to 360 degrees clockwise with 0 and 360 degrees both equal to north. The weighting factors, when present, are the users choice and can be thickness or volume of beds, hours the wind blows, or whatever. You will be prompted as to whether input will be from keyboard or from disk file.

1. KEYBOARD

        The first item to be entered is a title or file identification. The first character determines whether weighting factors are going to be entered or not entered. If it is a zero or a blank, then no weighting factors will be entered. If the first character is anything else, then weights will be entered. The rest of the title is unused by this program. However it is written as first record if and when the data set is saved. When data is entered from the keyboard, azimuths are checked to be sure they are between minus 360 and plus 360 degrees. If not, an error message is written and that entry not accepted. The minus values get 360 added to them later so all values end up positive. The weights, if present, are checked to be sure all are positive and an error message if not. Data entry is terminated by 999 or a pair of 999's. Data entry is also terminated when 1000 points have been entered. If this limit is too low call Shirley Liss (907)-474-7147 and program can be modified. When running ROSE, if you select to enter a second data set, you will be given the option to save the first one.

2. DISK

        The first record read from disk is a title or ident. If the first character is non zero and non blank, then a weighted set of data is expected to follow. Each line of input data is in the format of 1 azimuth or 1 azimuth and 1 weight separated by at least 1 blank. Data is read until 999 or a pair of 999's is read, or until the end of file.

Data read from disk file is not check for errors like it is when entered from keyboard. After disk file is input, you have the option of adding extra data from keyboard up to the 1000 point limit.

3. EDITING DATA

Data entered from either keyboard or disk can be changed or corrected. If input file was not weighted, you cannot add weights at this point. You must first save the file - a weight of 1 will be assigned to all azimuths and then re-input it as a weighted file. Positive values only will be accepted here.

8. OUTPUT

Primary output from ROSE is the rose diagram plot both on the screen and as a plot file. Some statistics about the input data are listed on the screen. And, the input data can be saved as a file for later use.

1. SCREEN

The screen is sometimes set in text mode and sometimes in graphics mode. In text mode, you can input and edit data and control flow of program. Text output from the program first consists of an 8 line summary of statistics regarding the input data. The example in the appendix explains the method of calculation of these statistics so the users can be the judges of what is useful for them. Currently the user must do a "print-screen" if he wants a printed record of this information. All the statistical information is presented visually on the rose plot. The second text output comes after a class size is chosen for the rose diagram. Each class interval is listed along with the number of samples or total weight for each class and the percent this represents. Again, use print-screen if you want a permanent record of this information.

In graphics mode, the screen displays the rose diagram. The actual display will be different for CGA, EGA, and VGA monitors. The number of colors available and the pixels per inch are different for each and an attempt was made to utilize the better features for each monitor and still have it work for all. If you plan to use Microsoft's CAPTURE.COM or another screen capture program, there is an option to only display screen graphics in black and white. Read the details under plot options, cautions and results are listed there.

2. FILES

There are two types of output files from ROSE. The first is the input data. For description of file see write-up under input part of documentation. All output data files will be weighted files. Weights are all set to '1' if original input was unweighted.

The second type of output is the plot file. Before it is written you are asked whether file is for input to WORD or for plotting directly on Hewlett Packard Plotter. The documentation in the Microsoft WORD manual says files written for the HP 17440 in HPGL format (which also works for the HP 7475A Plottr) can be imported into WORD. This is NOT TRUE. None of the convenient functions work with WORD. So instead of simply using commands which draw arcs and shade wedges, it is necessary to write all the individual pen up, pen down, and move instructions to do these functions. So a file written for WORD will by necessity be much larger than one for the plotter. If you plan to use Corel Draw, write the file as if it were for WORD as that program does not interpret all HPGL commands correctly either. Give the file the extension .HP, if you plan to import it into WORD or Corel Draw. Files written for WORD of course work on the plotters and the plotter can be driven directly from the program if you name the output file COM1. Since the author likes color, 5 different pens are requested for various parts of the plot. At this time, if an all black plot is wanted load the first 5 pen positions with black pens in the 6 or 8 pen plotters. Titles and boxes are drawn with pen 1, the rose and any shading with pen 2, the scale bar and value with pen 3, the vector mean arrow and north indicator with pen 4, and the statistics with pen 5.

C. GRAPHIC OPTIONS

     Just about everything about the graph can be changed by resetting one of the options. Some changes ,like figure size, will only affect the plot file and not the screen. Others, like requesting screen capture, will only affect the screen. Some options, like shading, were done in an unorthodox way (this will be explained) and may yield unexpected results if imported into WORD or Corel Draw. The initial default settings work everywhere.

1. CLASS SIZE

     This parameter which must be specified for each individual plot, determines the angular size of each wedge drawn. It must be an integral value 5 degrees or larger and must evenly divide 360 degrees. You will continuously be asked for input until an acceptable value is entered.

2. FIGURE SIZE AND ENVIRONMENT

     The figure size parameter only affects the plot. The default size is 100 or 100% of a 6.5 x 6.5 inch plot generated on the plotter. Acceptable values are from 10 to 100% with any value less than 10 being set to 10 and greater than 100 being set to 100. It is left to the user to determine if later settings of title print sizes will yield a readable result. The plot is centered in a 8 1/2 x 11 sheet of paper, portait orientation. A second or third plot can always be made. Figure environment refers to whether or not a box is drawn around the plot. The default is to draw a box.

3. TITLES

This option affects both screen and plotter. The positioning parameters and number of lines (up to 3) affects both the same way. Default is for 0 lines but put them at the bottom of the page if any are selected. Sizing parameters only affects the plot files. The screen sizes are predetermined and based on the number of pixles/inch for each monitor type. The default size is 3% of figure size for all lines. You can change default size and will be warned when that results in print smaller than 6 point. For any value you choose, you will be told the resulting point size type which will result so you can change it again if it is unacceptable. You have the option to make all three lines the same size or have lines 2 and 3 smaller than line 1. If smaller, the size is 2/3 of line 1, no choice here. And when you input the title, you will be told how many characters will fit on a line for your current size selections. If you plan to use Corel Draw, omit all titles - its easier to add them under that system, then it is to change what would be generated in a plot file. For WORD, additional sizing down can be done when the *.HP file is imported into your WORD document. If you use CAPTURE.COM, the

4. SHADING

Shading affects both screen and plot files but results look different. Values from 0% - blank to 100% - solid are acceptable. First considering the plotter file. Values from 0 to 100 are acceptable and what you specify is what you will get IF you are using a HP plotter. The shading was done by assigning various pen thicknesses. When a solid is requested, a pen thickness of .5mm is assigned so that there is 0 mm space between each .5mm thick line and the next. When 50% shading is requested, a pen thickness of 1.mm is assigned which gives .5mm line and .5mm blank, etc. If you write a file for WORD, shading is disabled - assigning pen thicknesses does not work. If you   imported a file which used the PT function into Corel Draw, you would actually get lines of that thickness, which is not what is wanted. So import the WORD file and add shading in that system. For the screen, the value specified for shading is rounded to the nearest 10%. Then there is an array in the program with 11 fill masks representing 0, 10, 20, ... 100% and that is what is shown on the screen. Some transfer ok using CAPTURE.COM and some do not - try different variations and see what works with your setup. Default is no shading or 0%.

5. SCALE

As used here, scale does not mean size of plot. Scale refers to what the radius of each rose wedge represents. The default choice is absolute values - the actual number of samples, or total thickness represented by the azimuths in the wedge. The alternative option is relative values - the percent of the total represented by that wedge. There is an option to include and position a scale bar. Defaults are to include it and orientate in either the north or east position depending

on which radial has the minimum. Options exist to not include it or to
orientate along the azimuth of the mode. The number indicated at the
end of the scale bar is the value required for a radius of that length.
The values chosen is the first multiple of 5 greater than or equal to
the maximum value for any wedge given the chosen class size.

6. ACCESSORIES

Two accessory items are available to add to the rose diagram. The
first is an arrow indicating vector mean angle. By default this is
present. The length of the vector mean arrow is the same as the maximum
value indicated on the scale bar. This is because the actual vector
mean radius can be short and not seen amongst the other drawings on the
plot. The second in the letter 'N' at the top of the diagram to
indicate the north direction. By default this is not present. This
option works the same way on screen or for plot.

7. STATISTICS

This last option works the same for screen and plot file. You
have the choice of printing the number of samples, the mean, and the
standard deviation in any cornor of the plot and optionally drawing a
box around these values. The default is to list these values in the
lower left cornor without a box. Sizes are predetermined and will vary
along with your original choice of figure size. For a weighted data
set, N - the number of samples will most likely be less than the value
at the end of the scale bar which can represent a thickness or some
other value.

APPENDIX A.

Test example for rose plot program.

	az	wt	az*wt	x sin(az)	y cos(az)	for std (az-mn)^2	for wt std (az-mn)^2*wts	wt x wt*sin(az)	wt y wt*cos(az)
9	20	8	160	0.3420	0.9397	1186.4198	3929.2915	2.7362	7.5175
	30	7	210	0.5000	0.8660	597.5309	1035.4273	3.5000	6.0622
s	40	6	240	0.6428	0.7660	208.6420	28.0497	3.8567	4.5963
a	45	5	225	0.7071	0.7071	89.1975	40.2666	3.5355	3.5355
m	55	4	220	0.8192	0.5736	0.3086	659.2403	3.2766	2.2943
p	65	3	195	0.9063	0.4226	111.4198	1564.7005	2.7189	1.2679
1	75	2	150	0.9659	0.2588	422.5309	2156.6472	1.9319	0.5176
e	75	1	75	0.9659	0.2588	422.5309	1078.3236	0.9659	0.2588
s	85	1	85	0.9962	0.0872	933.6420	1835.0804	0.9962	0.0872
sums	490	37	1560	6.8454	4.8799	3972.2222	12327.0270	23.5179	26.1373

Definitions of and values for statistics - this example.

Statistic	unweighted	weighted
Total wt	total number of meas - all have wt=1 9.00	sum of all weights 37.00
Mean	(sum (az))/(nbr meas) 54.44	(sum (az*wt))/(sum wts) 42.16
Std	((sum(az-mean)**2)/(nbr meas - 1))**.5 22.28	((sum(az-mean)**2*wt)/(sum wts-1))**.5 18.50
Median	middle value - 5th in this example 55.00	middle value - 19th in this example 40.00
Mode	The az which occurs the most often 75.00	The most heavily weighted az 20.00
Max Value	The number of times the mode az occurs 2.00	The weight at the mode az 8.00
Vector mean angle	arctan(sum(x)/sum(y)) 54.52	arctan (sum(wt x)/(sum(wt y)) 41.98
Vector mean radius	((x^2 +y^2)^.5)/(nbr samples) 0.93	(((wt x)^2 + (wt y)^2)^.5)/(nbr samples) 3.91

I. Example using unweighted input file.

   A. Statistics which are printed on screen.
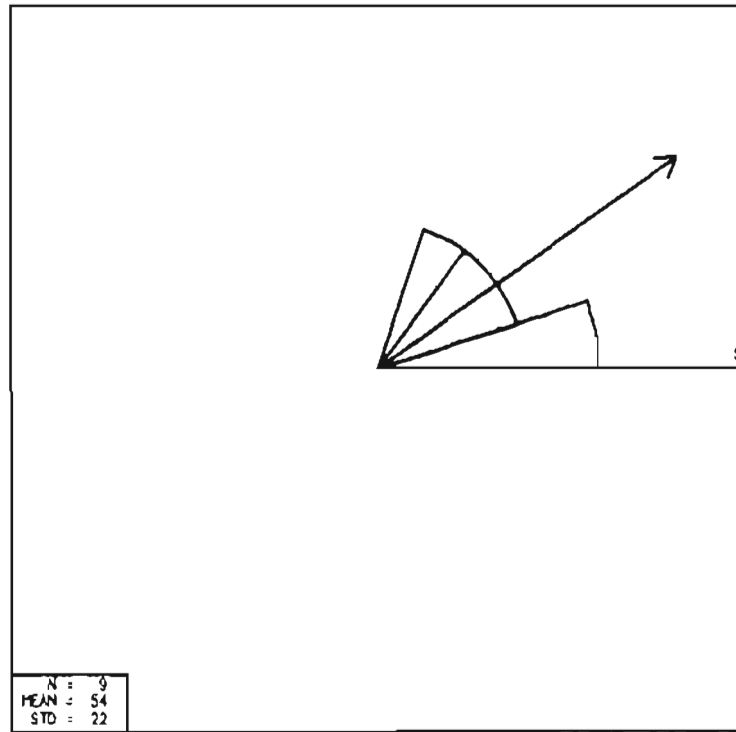
1Unweighted Junk

Stat	Value
mean	54.444
std dev	22.283
median	55.000
max valu	2.000
mode	75.000
v mean A	54.516
v mean R	.934
sum wts	9.000

   B. Class size list printed on screen for unweighted junk data
set.

Azimuths		Occurances	
From	To	# or wts	%
1	18	.00	.00
19	36	2.00	22.22
37	54	2.00	22.22
55	72	2.00	22.22
73	90	3.00	33.33
91	108	.00	.00
109	126	.00	.00
127	144	.00	.00
145	162	.00	.00
163	180	.00	.00
181	198	.00	.00
199	216	.00	.00
217	234	.00	.00
235	252	.00	.00
253	270	.00	.00
271	288	.00	.00
289	306	.00	.00
307	324	.00	.00
325	342	.00	.00
343	360	.00	.00

C. The plot file as imported into WORD as an HPGL file. Class size is 18 degrees for this plot and all others which follow.


N :	9
MEAN :	54
STD :	22

Unweighted Junk File - no fill option
For importation into WORD as HPGL file

D. Next page has same plot as drawn on HP 7475A Plotter but with the shading option set at 30%.

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| N =	9
MEAN =	54
STD =	22
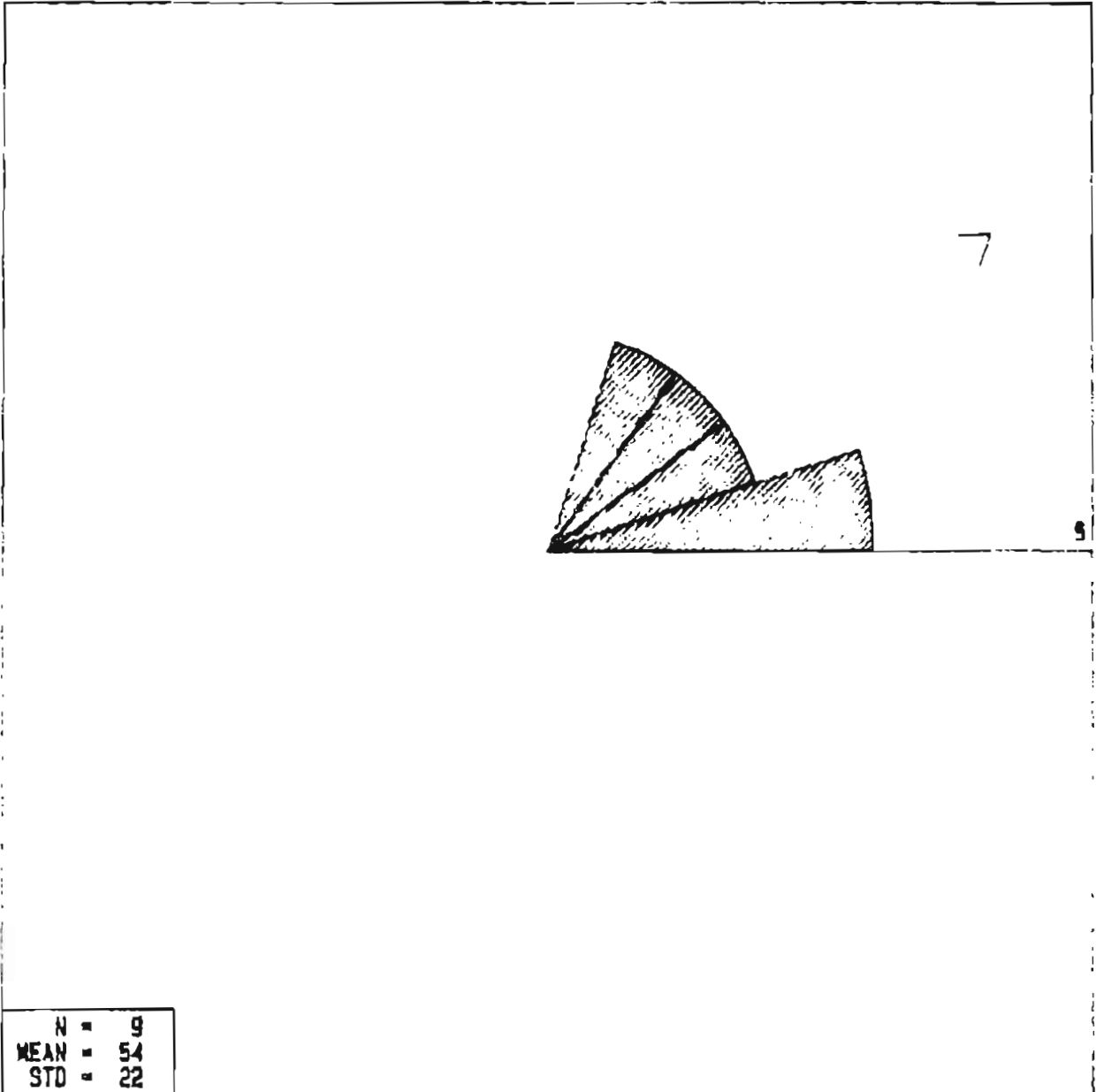
Unweighted Junk - test File - 30% fill
Version for HP Plotter and Screen Capture from CGA

E. Plot brought in as screen captured file from a CGA screen. It would look smoother if a VGA screen was available.


N = 0
MEAN = 54
STD = 88

Unweighted Junk — test File — 30% fill
Version for HP Plotter and Screen Capture from CGA
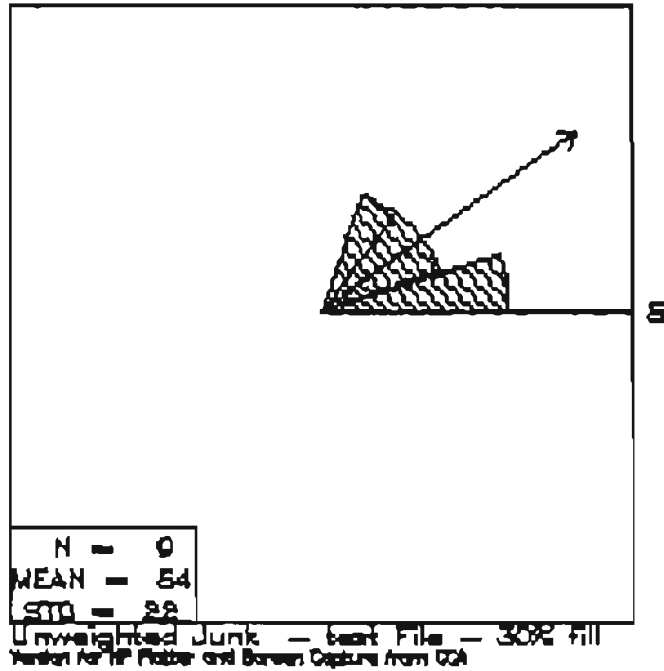
F. Next page has plot from HP 7475A plotter with example of solid fill or shading set to 100%.

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N =	9
MEAN =	54
STD =	22
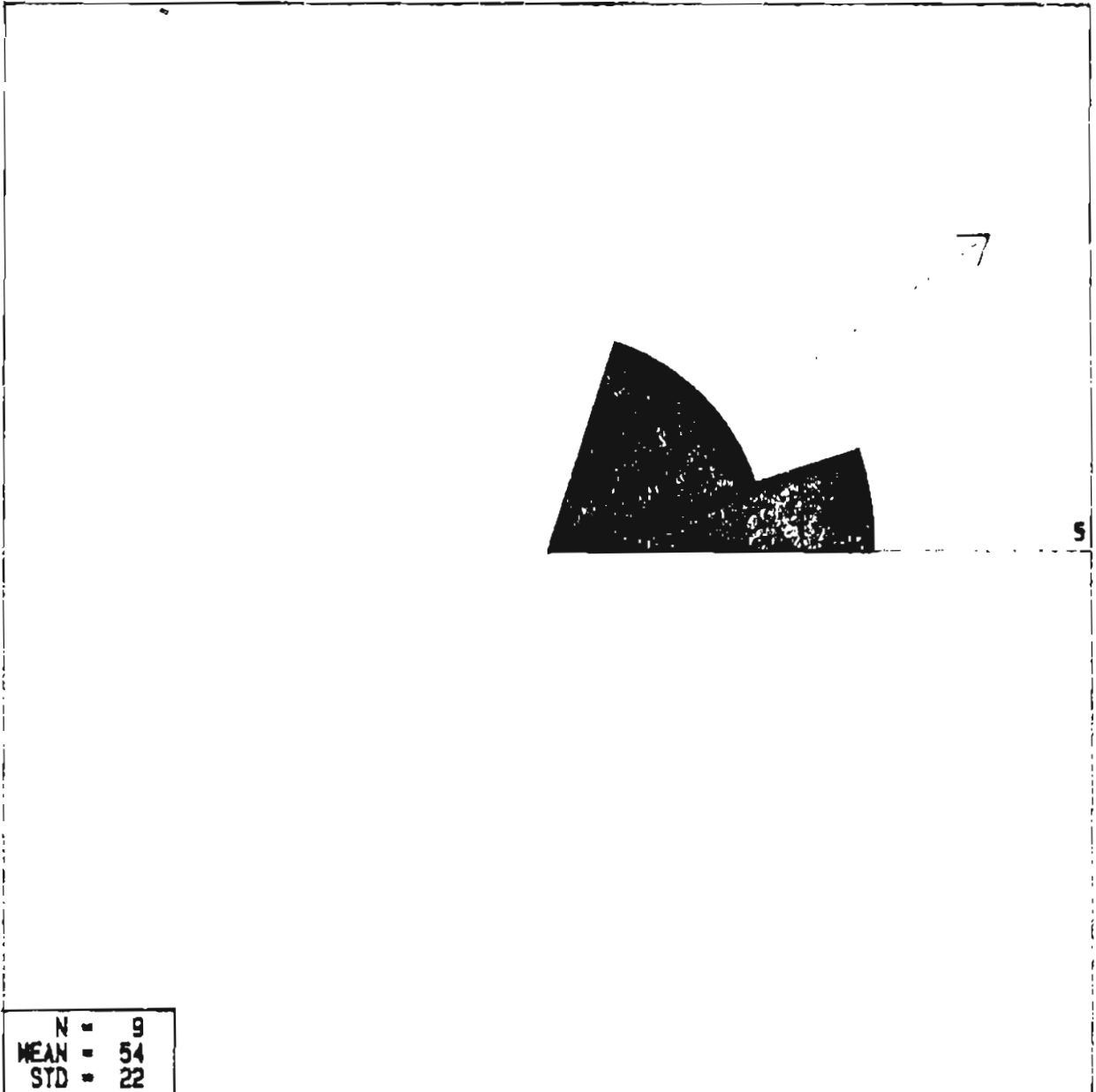
Unweighted Junk – solid fill test 100%
Version for HP plotter and screen capture

G. Same plot with 100% shading - screen captured version, again
from CGA screen.

N =	0
MEAN =	54
STD =	28

Unweighted Junk — solid fill text 100%
Version for HP plotter and screen capture
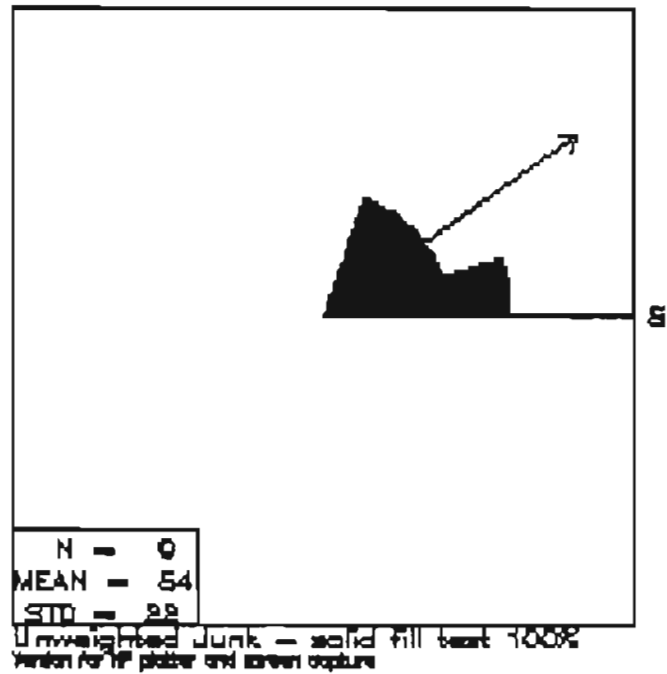
II. Example using weighted input file.

A. Statistics which are printed on screen.
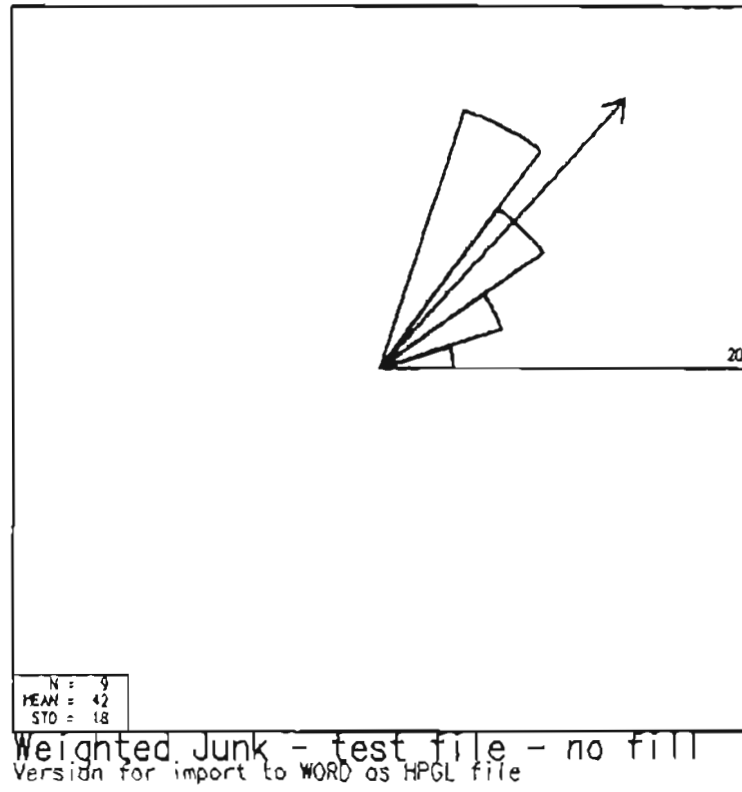
1Junk test file - weighted

Stat   Value

mean   42.162
std dev   18.505
median   40.000
max valu   8.000
mode   20.000
v mean A   41.980
v mean R   3.907
sum wts   37.000

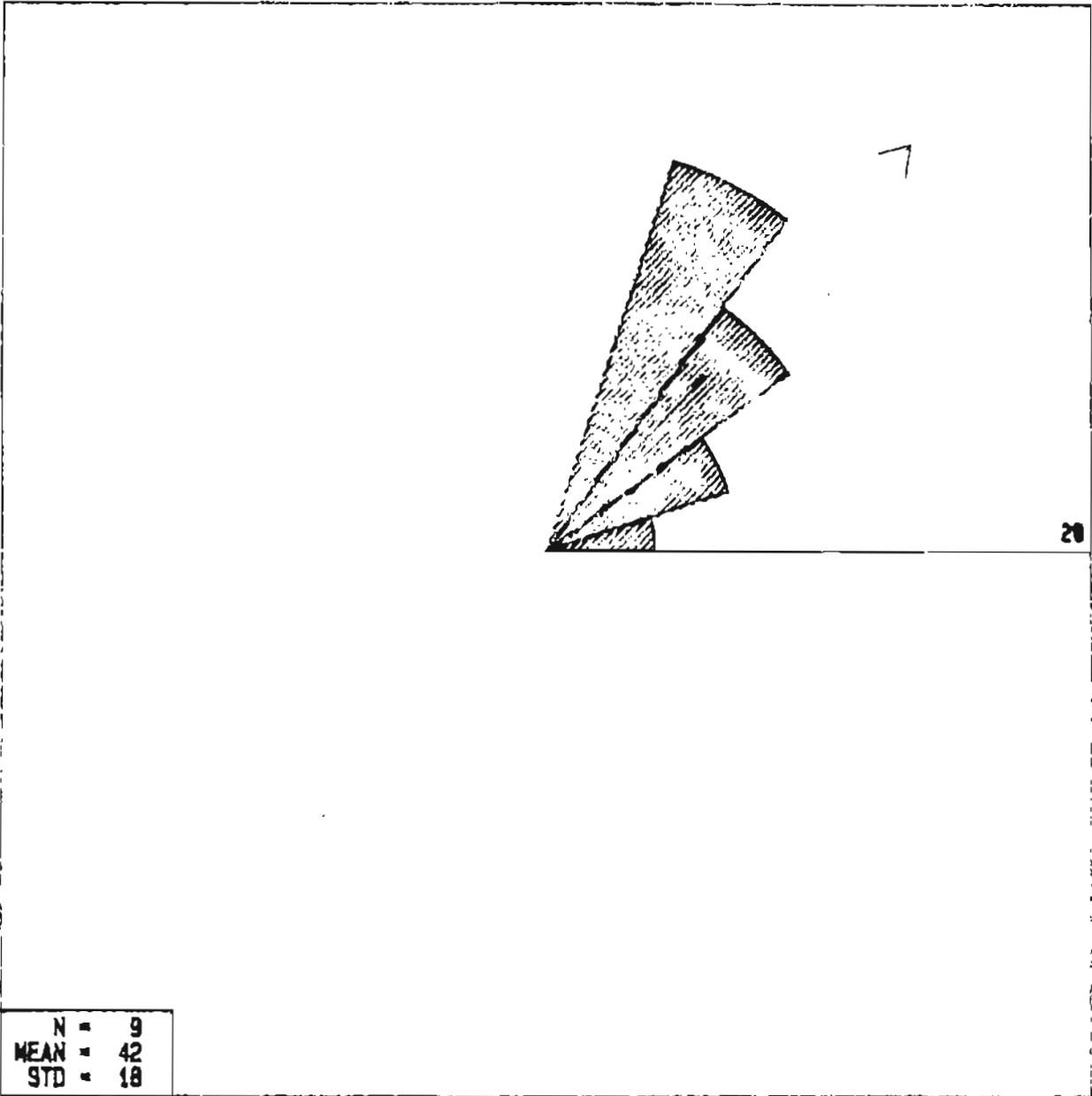B. Class size list printed on screen for weighted junk data set.

Azimuths		Occurances	
From	To	# or wts	%
1	18	.00	.00
19	36	15.00	40.54
37	54	11.00	29.73
55	72	7.00	18.92
73	90	4.00	10.81
91	108	.00	.00
109	126	.00	.00
127	144	.00	.00
145	162	.00	.00
163	180	.00	.00
181	198	.00	.00
199	216	.00	.00
217	234	.00	.00
235	252	.00	.00
253	270	.00	.00
271	288	.00	.00
289	306	.00	.00
307	324	.00	.00
325	342	.00	.00
343	360	.00	.00

C.   The plot file as imported into WORD as an HPGL file.

Weighted Junk — test file — no fill
Version for import to WORD as HPGL file

N =   9
MEAN =   42
STD =   18

20

D.   Next page has same plot as drawn on HP 7475A Plotter but with shading set to 30%.

20

N   =   9
MEAN =   42
STD =   18

Weighted Junk - test file 30% fill
Version for HP plotter and Screen capture

E. Plot brought in as screen captured file from CGA screen.

N = 0
MEAN = 42
STD = 18
Weighted Junk — test file 30% fill
Version for HP plotter and Screen capture