

DETERMINATION OF CHANGES IN PEBBLE SPHERICITY AND ROUNDNESS
IN A DOWNSTREAM DIRECTION IN CLEAR CREEK, FAIRFIELD --
HOCKING COUNTIES, OHIO.

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Abstract

Evaluation of the data obtained is used to show the relationships between roundness and sphericity of pebbles and the distance downstream these pebbles were collected, with lithology of the pebbles and glacial boundaries crossed by the stream taken into account. Evaluations are based on data taken from sixteen locations on Clear Creek and one location on the Hocking River in Fairfield-Hocking Counties, Ohio.

Introduction

Particle roundness and sphericity have long been studied in an effort to determine what effect stream transportation has on particles, with distance carried downstream and lithology considered. During transportation by streams, rock particles undergo changes in their roundness and sphericities due to the abrasion of the stream bed, stream walls, water, and the contact with other particles within the stream. As previously stated, the two most important factors involved in the shaping of particles are the distance downstream the particle has traveled and the lithologies of the particles under investigation.

It has long been thought that the farther downstream a particle traveled, the roundness and sphericity would correspondingly increase. This is for the most part true.

However, if one were to take a random sampling from different locations along the stream, he might find roundness and sphericity varying somewhat from the expected. This is where the lithology begins to play an important part in the roundness and sphericity. Also, part of understanding the lithology is being able to identify the source area involved. In dealing with the histories of Fairfield and Hocking Counties, the authors have tried to gain a working understanding of the glacial history and have applied this history in their evaluation of the changes in particle roundness and sphericity in a downstream direction.

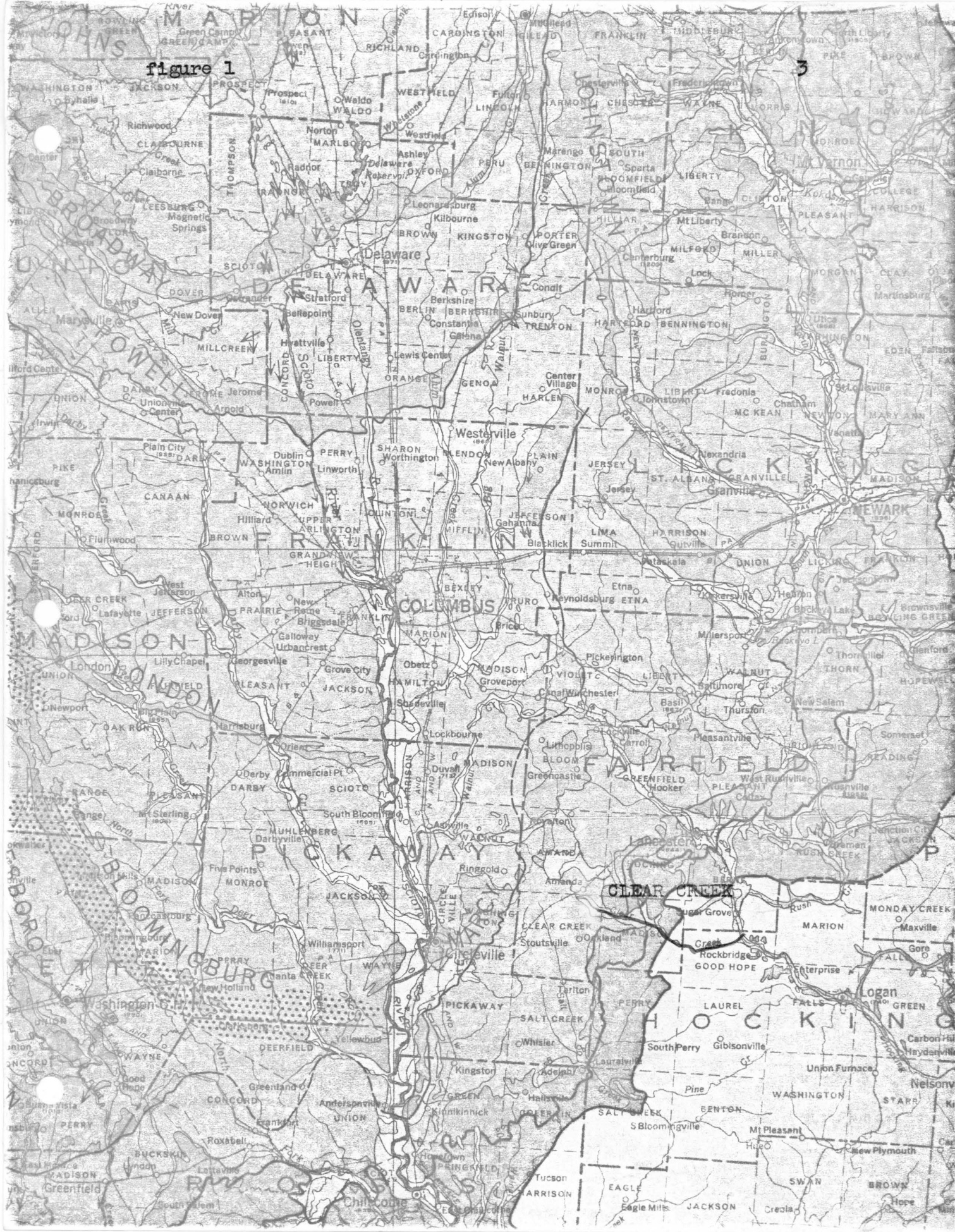
Since a great deal of stress is being put on the role that lithology plays in evaluating roundness and sphericity, graphs have also been prepared for the roundness and sphericity for each lithology encountered as well as for the total roundnesses and sphericities of all lithologies. The authors believe this added data will help in determining the effects downstream distance has on the particle roundness and sphericity.

Geology of the Study Area

Clear Creek is a tributary to the Hocking River originating in the northwestern corner of the Clearport Quadrangle (see fig. 1) in Fairfield County, Ohio and flows southeastward through Hocking County, Ohio into

figure 1

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the Hocking River, five miles south of Lancaster, Ohio. All of the area covered by Clear Creek is underlain by rocks that are Mississippian in age. The surface of the region through which Clear Creek flows is covered by glacial till, ground moraines, end moraines, kames and eskers. In Fairfield County, Clear Creek flows across several of these glacial boundaries (see fig. 2) and these boundaries must be taken into account later on in the interpretation of the obtained roundness and sphericity values.

Procedure of Sample Collection

Samples from sixteen separate locations were taken from the stream bed of Clear Creek from its head waters to its mouth, where it empties into the Hocking River along route 33, five miles south of Lancaster, Ohio. Samples were also taken from one location on the Hocking River north of where Clear Creek empties into the river.

The sample pebbles were taken directly from point bars located on the creek bed and not from the stream edge. This was done to minimize the possibility of pebbles freshly fallen from the stream bank getting into the samples. The pebbles were collected at random from the total number present without regard to their form, with the exception that an effort was made to choose rocks that

were of medium size (50-90 mm.) with some being slightly larger, but none smaller.

After all sample pebbles were collected, they were taken to a location where they were cleaned to remove stream sediments and algal growth which could hinder the process of identification later on when it came to classifying the pebbles according to lithology.

Particle Sphericity

Particle sphericity can best be described as a measurement of its total shape, entirely independent of whether the edges or corners are sharp or round. The shape is a measure of the ratio of the surface area of a particle to its total volume. When this shape is a sphere, the ratio is at a minimum and for all other forms it increases. Essentially then, the ratio of surface area to volume shows how closely or remotely the particle approaches a spherical form. In reality, the ratio is quite difficult to measure and the actual measurement is then expressed in terms of the ratio of the volume of the particle to the volume of the circumscribing sphere. The cube root of this ratio is called the sphericity of the particle. Krumbein (1941) devised this method of measurement and it is the accepted method today in making calculations concerning sphericity.

This method was put to use in this study and is based on a triaxial ellipsoid as the reference solid. The method is basically simple, but care must be taken in choosing the right diameters of the pebble to be used for accurate measurement. Therefore, certain steps should be followed in choosing and measuring the particle.

- 1) The first axis is termed the "a" axis and is simply the longest intercept through the particle.
- 2) The particle is then rotated about the ends of this longest axis until the largest cross-section is seen.
- 3) Holding the particle with this plane horizontal, the widest part is measured in a direction perpendicular to the long or "a" axis. This intercept or diameter is then termed the "b" axis.
- 4) While still holding the particle by its "a" axis, the plane through the cross-section is rotated to a vertical position, which places the short particle diameter in a horizontal plane.
- 5) The widest part of the particle in this horizontal plane is then measured, carefully making sure this is done perpendicular to the "a" axis. This measurement is then termed the "c" axis.

All of the axes measurements done in this study employed a millimeter ruler secured to a section of board

with vertical supports at either end. Each pebble was measured by placing it firmly against one end of the board while another piece of board was also placed firmly at the other end of the pebble. The measurements were then read directly from the millimeter scale and recorded on data sheets specifically designed for these type measurements. Sphericity was then calculated using a computer.(later to be discussed).

The results of the sphericity calculations (see data sheets) were somewhat erratic. As can be seen from figure 3, the values obtained for each location show no overall increase in sphericity in a downstream direction, as was anticipated. There does appear to be a general tendency for the sphericity to increase on both ends of the graph. (Overall, the average sphericity remains constant from location seventeen to location two**, if not decreasing slightly.)

What happens between location fourteen and location six is the problem. As shown by figure 3, the highest sphericity occurs at location fourteen. From the data obtained, it is interesting to note that carbonates are highest here also (59%), suggesting a relationship between

**note: Location one was omitted from the graphs as it lies in the Hocking River and was collected for the purpose of comparing it to location two at the mouth of Clear Creek to show evidence, if any, of Hocking River sediments dumped in Clear Creek during flood state.

carbonates and sphericity. This is also shown in locations fifteen through seventeen, where the carbonates remain relatively high (53%, 41%, & 42% respectively). The locations where sphericity is lowest (10,9,8,6,5), show a decline in carbonates. (see data sheets)

It can be also shown from the data that crystallines have an effect on sphericity also. Crystallines remain relatively constant from location seventeen to location two, with the exception of locations nine, eleven and twelve. At location nine, crystallines suddenly decrease to eight per-cent. Sphericity is also at its lowest here. (.6453). There are also a fair amount of carbonates present (21%). But from figures 3c and 3b, crystalline and carbonate sphericities are at a low. Thus, apparently both affect sphericity (clastics have less affect on sphericity).

The question now presenting itself is where did the large amounts of carbonates and crystallines upstream come from? From figure 2, the increases are probably due to the presence of Wisconsin ground moraine and outwash terraces (from location eleven and upstream), particularly the carbonates. The crystallines actually peak down in the Illinoian outwash and ground moraine, by decreasing (i.e. returning to constancy established downstream) at location fourteen. But crystallines are at a



fig.3

SPHERICITY IN A DOWNSTREAM DIRECTION

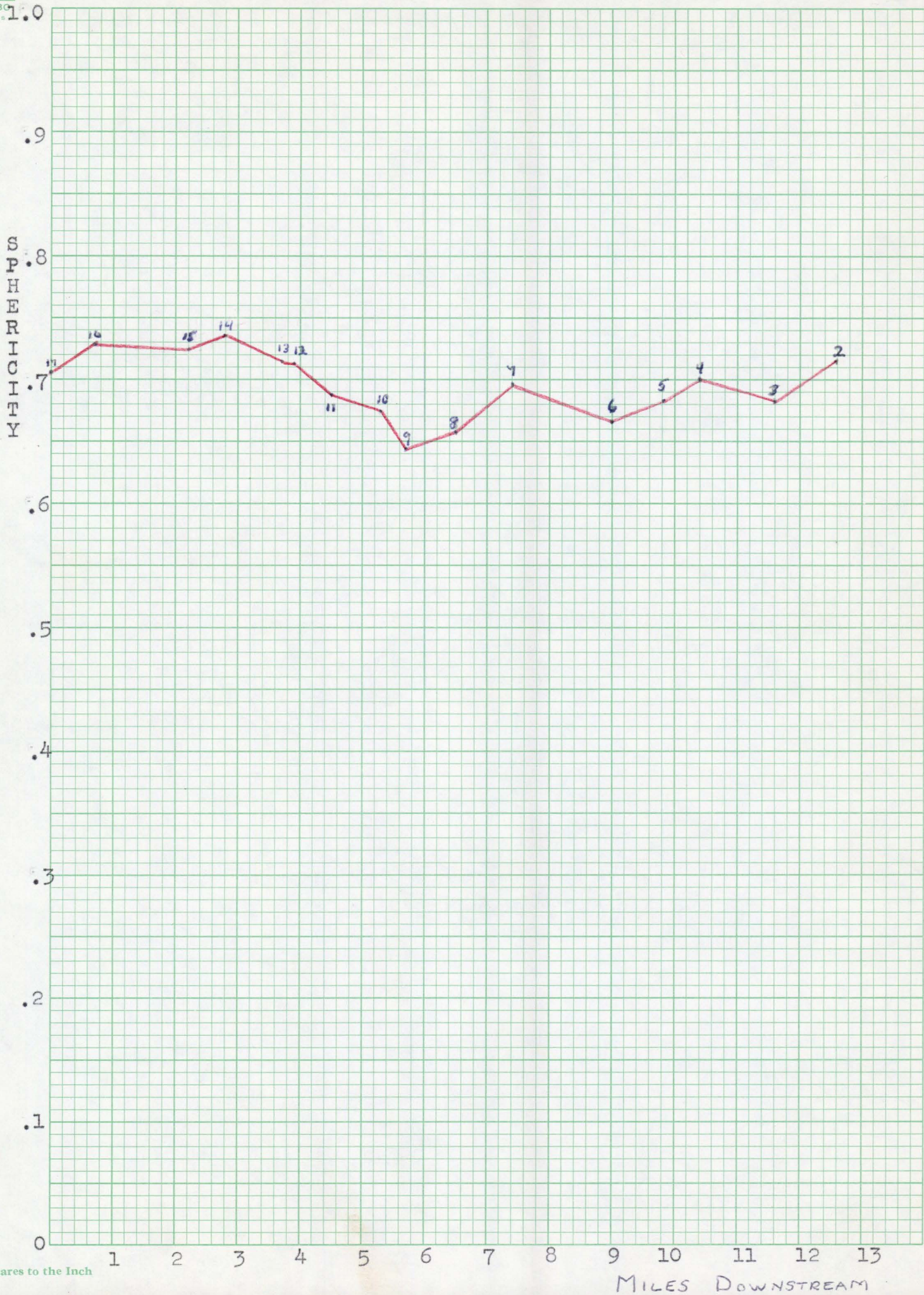




fig. 3a CLASTIC SPHERICITY IN A DOWNSTREAM DIRECTION

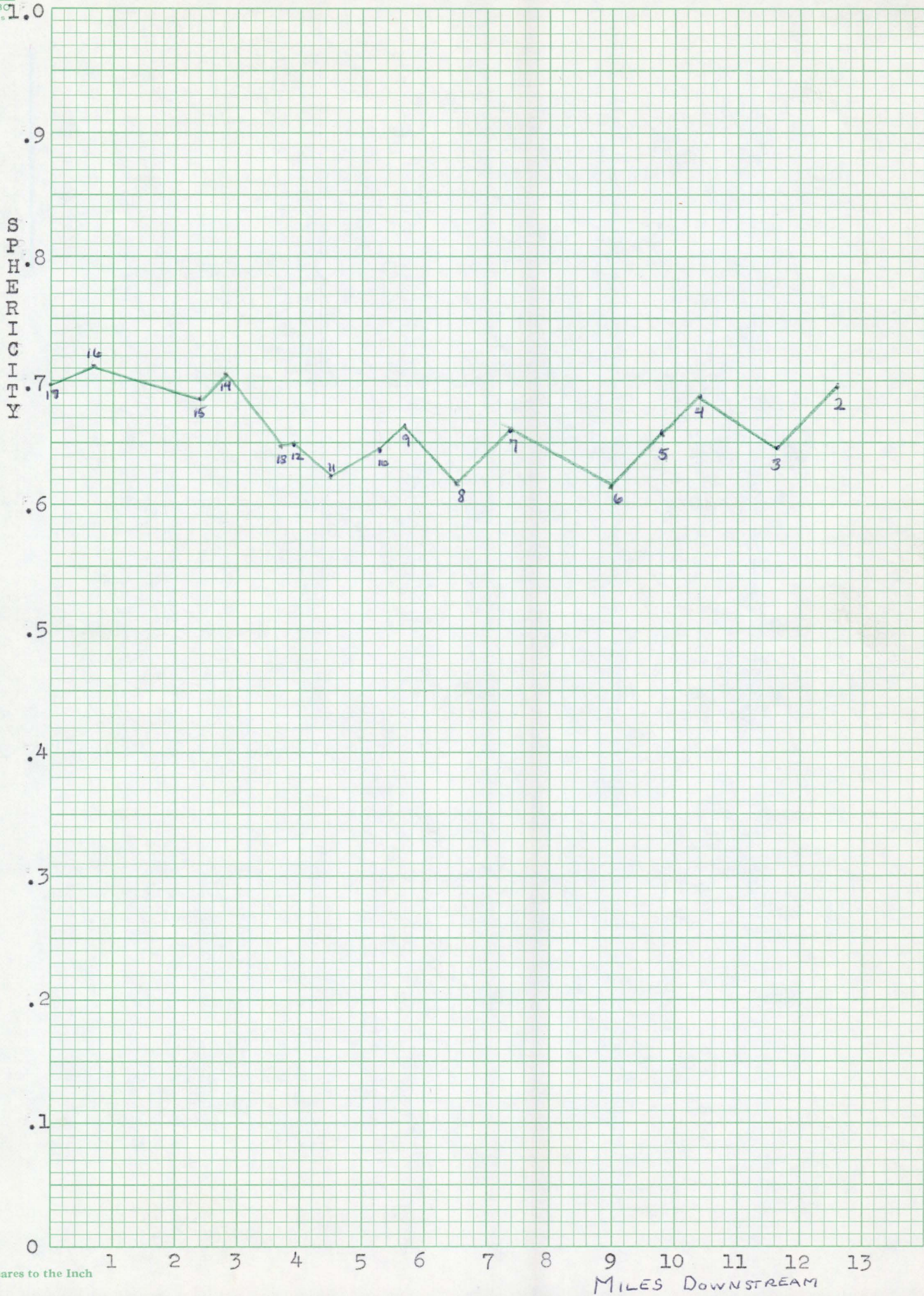
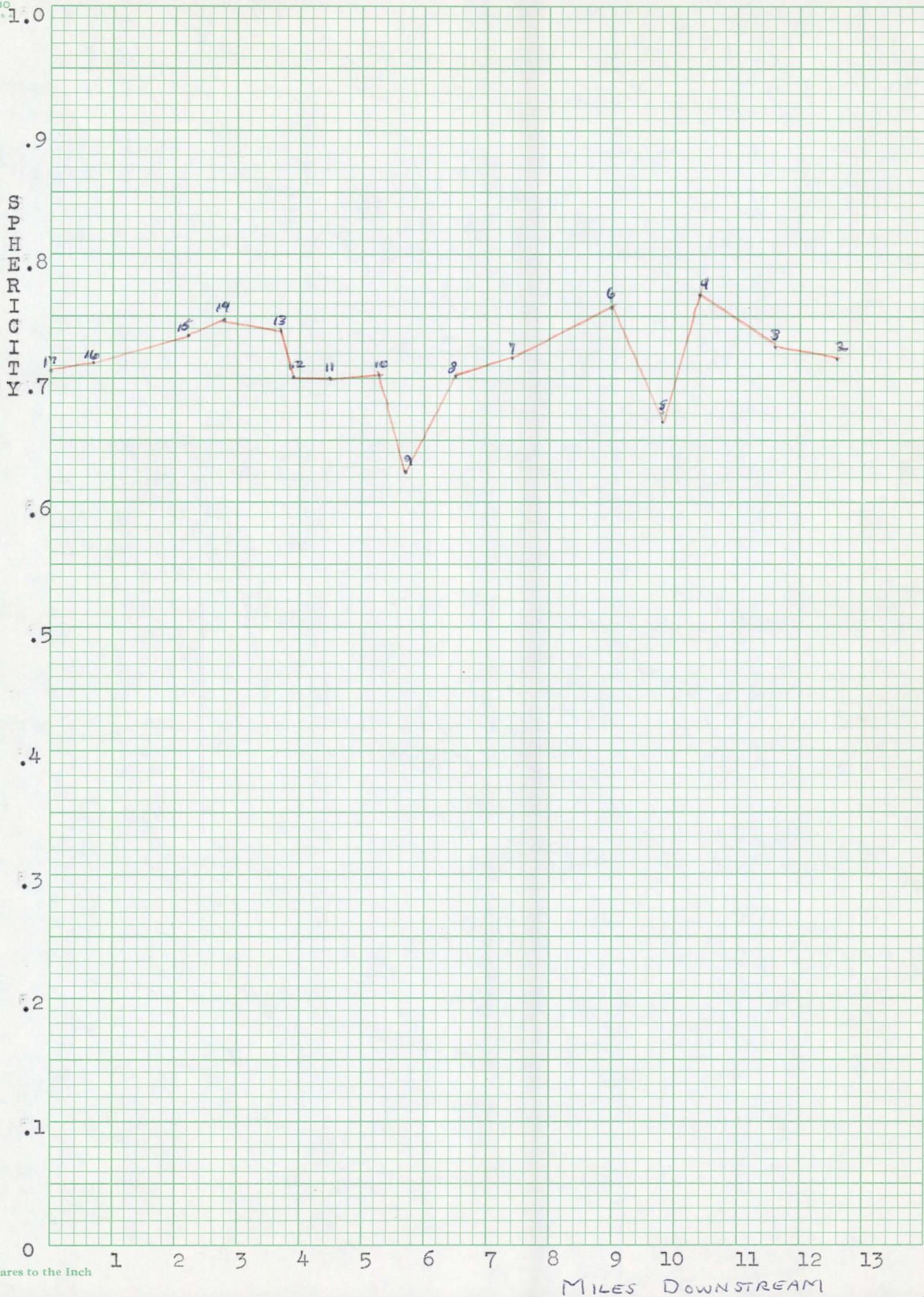




fig.3b CARBONATE SPHERICITY IN A DOWNSTREAM DIRECTION





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minimum at location nine, which is within the Illinoian boundaries, which tends to imply that the crystalline increase is not closely related to the Illinoian material. Possibly the apparent decrease in crystallines is due to a large increase in clastics (71%), but where the clastics come from is a problem in itself. It is unlikely that they were brought into Clear Creek by the two streams above location nine, as these streams both originate in Illinoian material. Thus, the problem remains.

Computer Applications

The method used by the authors to calculate sphericity is based on W. C. Krumbein's presentation (1941) of Wadell's theory of intercept sphericity. Wadell proposed that sphericity (Ψ) equalled the cube root of the volume of the particle divided by the volume of a sphere circumscribing the particle. He then expressed the volume of the particle in terms of a triaxial ellipsoid of diameters a, b, and c, where $a > b > c$. (Wadell's derivation of what follows may be obtained from the appendix of Krumbein (1941)). Thus, Ψ became equal to the cube root of bc divided by a^2 :

$$\Psi = \sqrt[3]{bc/a^2}$$

Using this theory, Krumbein then derived the graph (fig. 4) consisting of hyperbolic curves representing

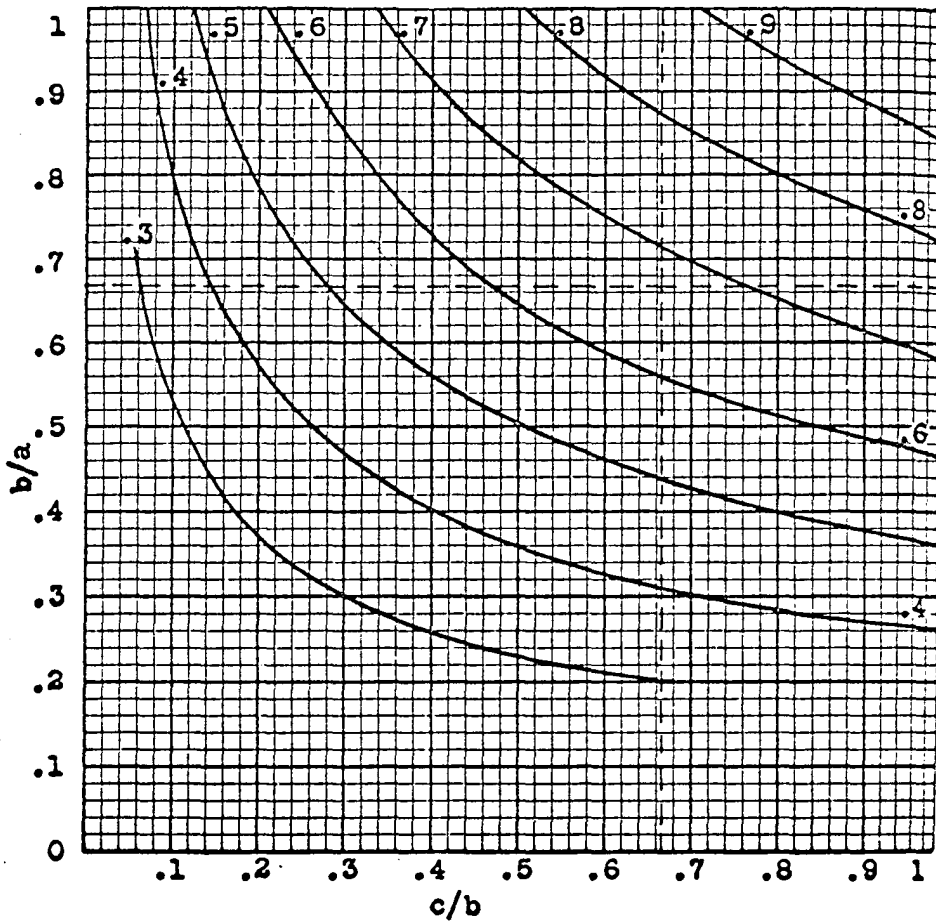


FIG. 5.—Detailed chart for determining sphericity.

possible solutions to the equations. From this graph, the sphericity may be obtained by relatively simple visual means involving a few simple calculations. This method is satisfactory when one is dealing with a relatively small number of rocks. However, the authors felt that this method was too cumbersome and time consuming, considering 1700 calculations had to be made. Thus an IBM 370 computer was employed.

This task was fairly simple. Using the Fortran language, Wadell's equation was used, feeding the measured values for a,b, and c in, thus letting the computer do the majority of the tedious work. Average sphericities for each 100 pebbles and for each of the three lithologies were then calculated, (using the common average equations), with a simple "sort" employed to sort the lithologies into the three types so these calculations could be made. On top of all this, average roundness was then calculated for each location (100 pebbles) and each of the three lithologies. (Unfortunately, the actual roundness of the individual pebbles could not be calculated with the computer-a visual method outlined in Krumbein (1941) was incorporated).

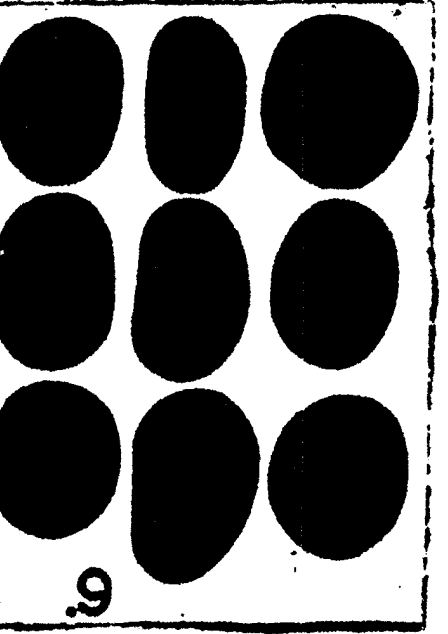
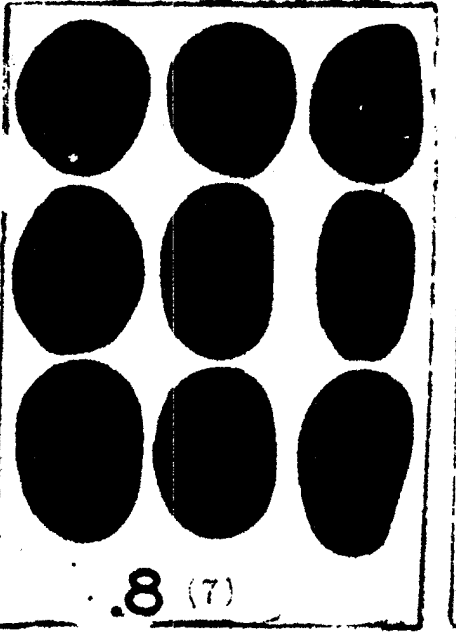
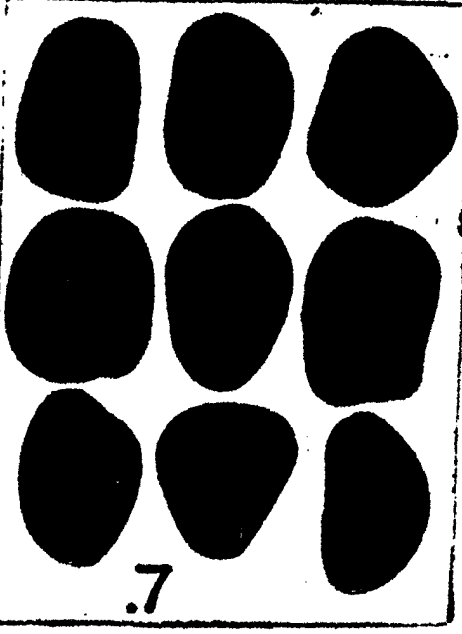
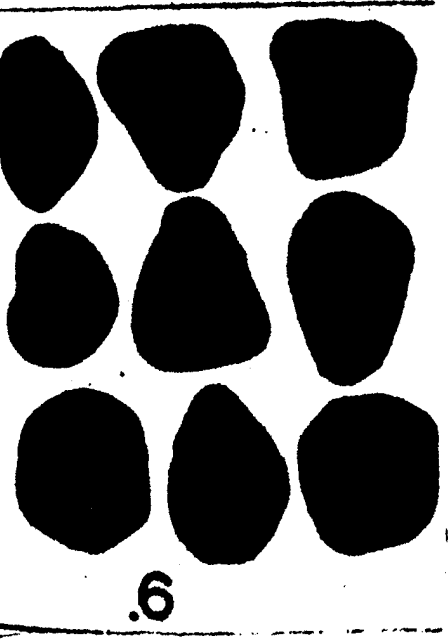
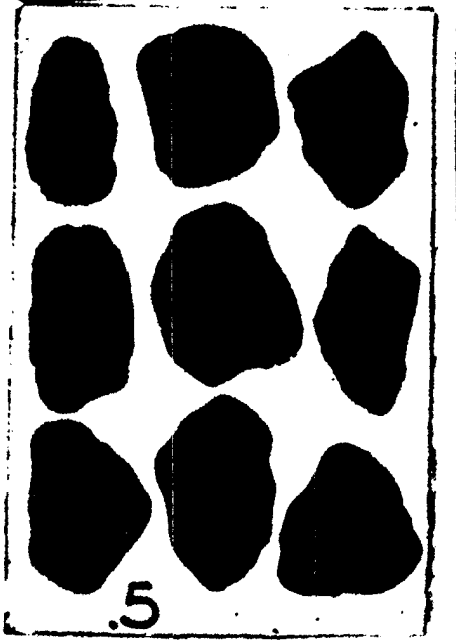
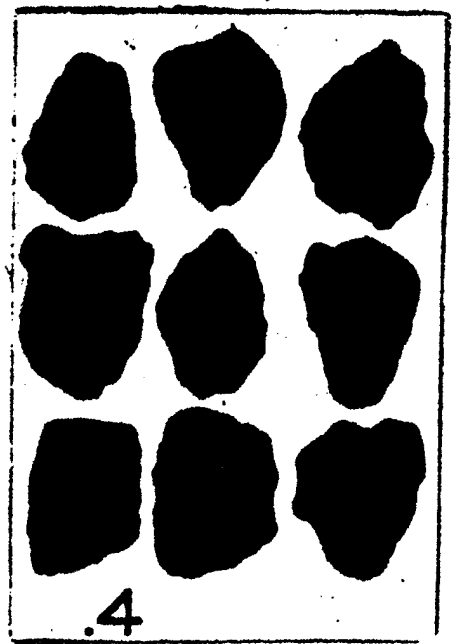
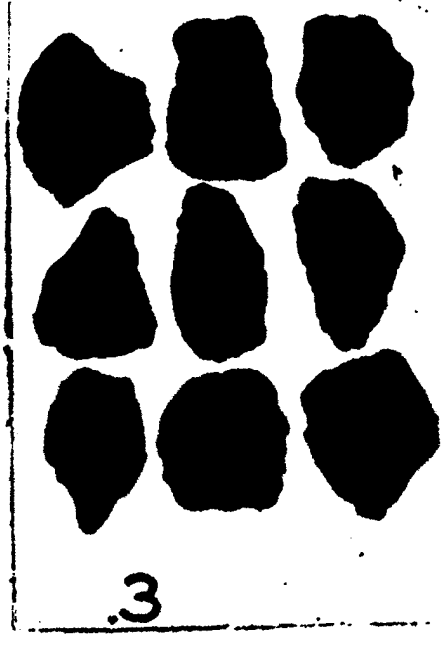
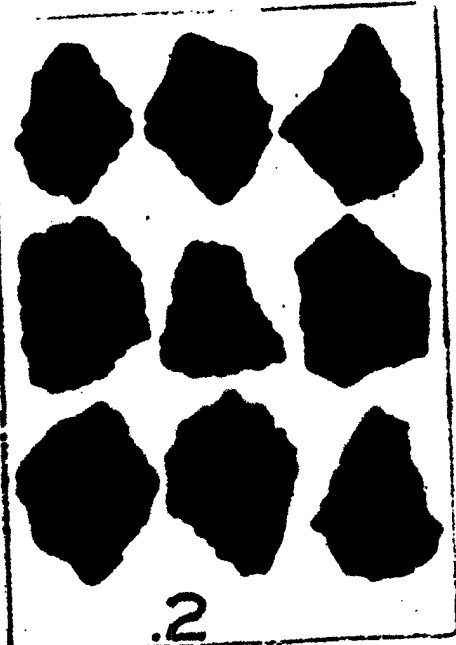
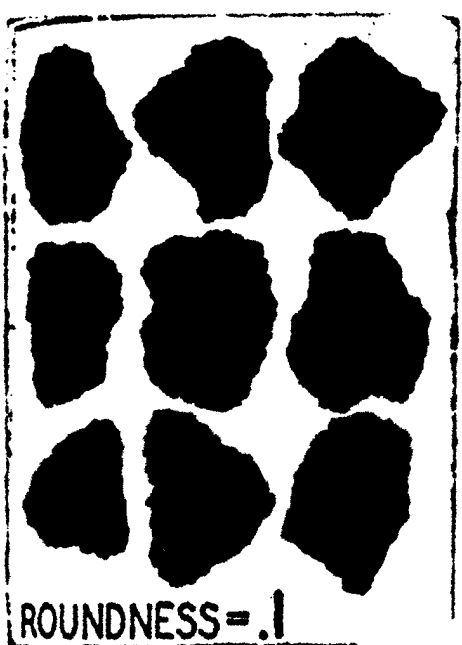
In conclusion, the authors feel that much time was saved by using this valuable tool. The total time for the computation was .67 minutes. Granted, the time required

to write the program itself was considerably more than this, but this program is now available for any future work of this type. But most important is the fact that human calculation error has been virtually eliminated.

Particle Roundness

Krumbein, in 1941, wrote a paper dealing directly with particle roundness (Journal of Sedimentary Petrology, 1941). In it, Krumbein defined roundness as a measurement of the curvature of the corners and edges expressed as a ratio to the average curvature of the particle as a whole, independent of its shape or form. From this definition it can be clearly seen that roundness and sphericity are two entirely different variables. A particle can be spherical in shape while not possessing a high degree of roundness, and conversely, a particle can be quite round and have a low sphericity. For example, forces which act in such a way as to break off the corners of a pebble and thereby increase its sphericity, may, at the same time, decrease the roundness by increasing the angularity of the pebble and decrease the radius of the curvature of its corners.

Krumbein's method (1941) of determining roundness, which is used in this study, is simply a visual comparison (see fig. 5) with a chart containing the images of



of pebbles having a standard roundness from .1 to .9 as calculated by the Wentworth (1922)- Wadell (1932) method.

The Wentworth-Wadell method measured the roundness of pebbles by drawing an image of each particle, measuring the radii of the corners and edges of the pebble and the radii of the largest circle which can be inscribed within the image of the pebble, and then establishing a ratio between the two. The images used for the comparison were redrawn from pebbles which were measured by Wadell's method, and statistical studies have shown that the average values agree well with Wadell's values.

The roundness of the pebbles from each sample collected from Clear Creek were determined using Krumbein's method of rapid roundness calculation. After the individual roundnesses were determined, the averages for each total sample and the average for each type lithology at each location were calculated and the results were plotted as a graph (see fig. 6) of downstream distance vs. average roundness.

The results show that roundness does tend to increase in a downstream direction as expected. The roundness behaves normally and can be shown from locations four and five (see fig. 2) Here the number of clastics is at a high just as one would expect and the number of carbonates are at a low. The clastics, being softer than the car-

bonates and crystallines generally, are more easily abraded and angularities are reduced.

One interesting fact is that at location four, carbonates are at a low, but this fact must be taken lightly as there was only one carbonate rock found at this location and the measurement therefore, is inadequate to base any conclusions on.

Between locations fourteen and nine, Clear Creek flows through an area of Wisconsin outwash, Illinoian outwash, and Illinoian ground moraine. This results in a variation in the abundance of carbonate and crystalline rocks. Carbonates peak at fourteen, corresponding to the Wisconsin glaciation and crystalline rocks peak at eleven corresponding to the Illinoian glaciation. There is also a general decrease in roundness for the area and can at least be partly attributed to the increase and decrease of the individual rock types.

Conclusions and Discussions

The basic conclusions that can be immediately drawn from this study are that 1) in general, roundness does tend to increase in a downstream direction and 2) clastics tend to have a higher roundness than do carbonates and crystallines. 3) Sphericity, unlike roundness, tends to be fairly constant. This is due in part because sphericity

fig. 6

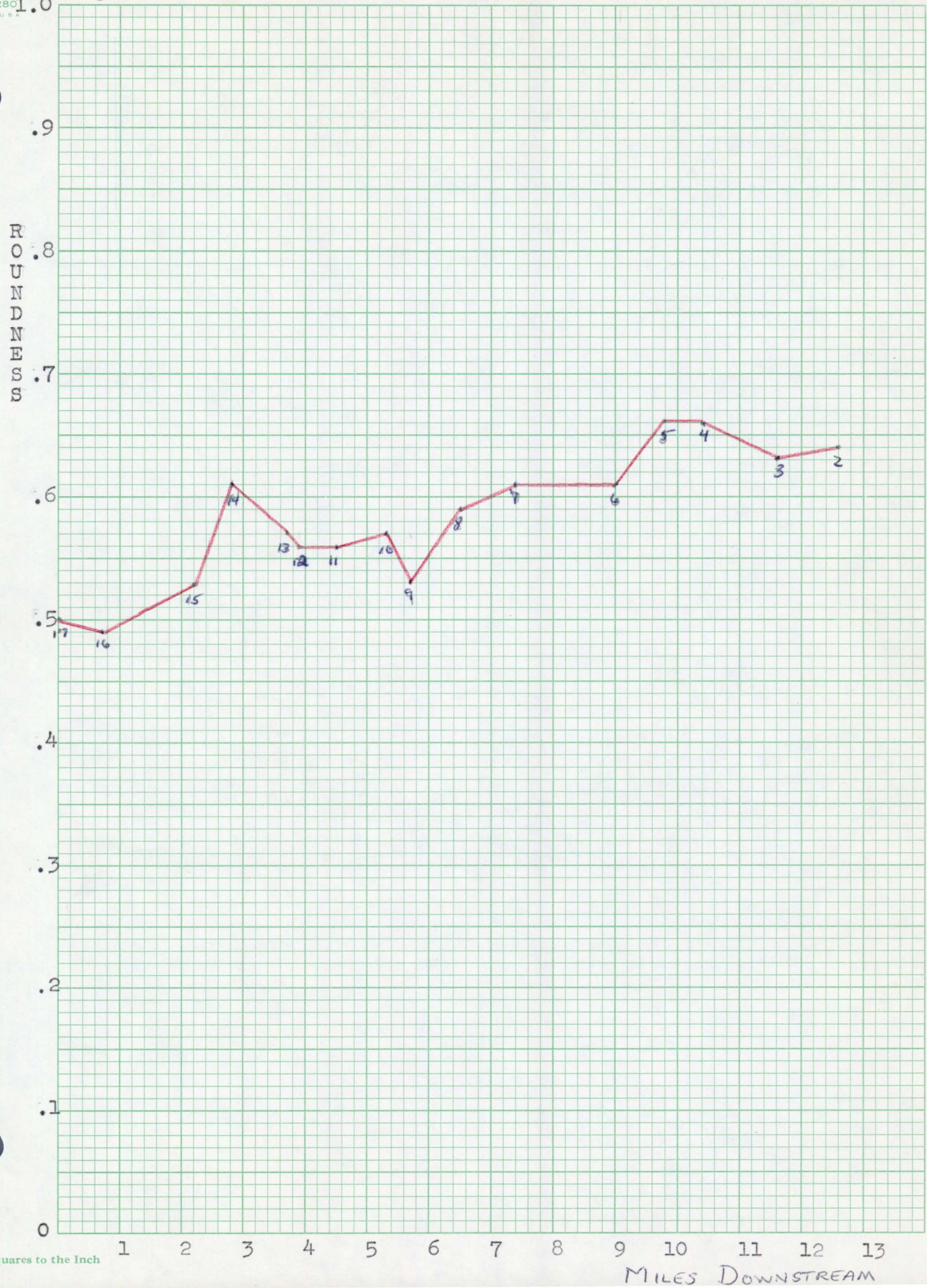


fig. 6a CLASTIC ROUNDNESS IN A DOWNSTREAM DIRECTION

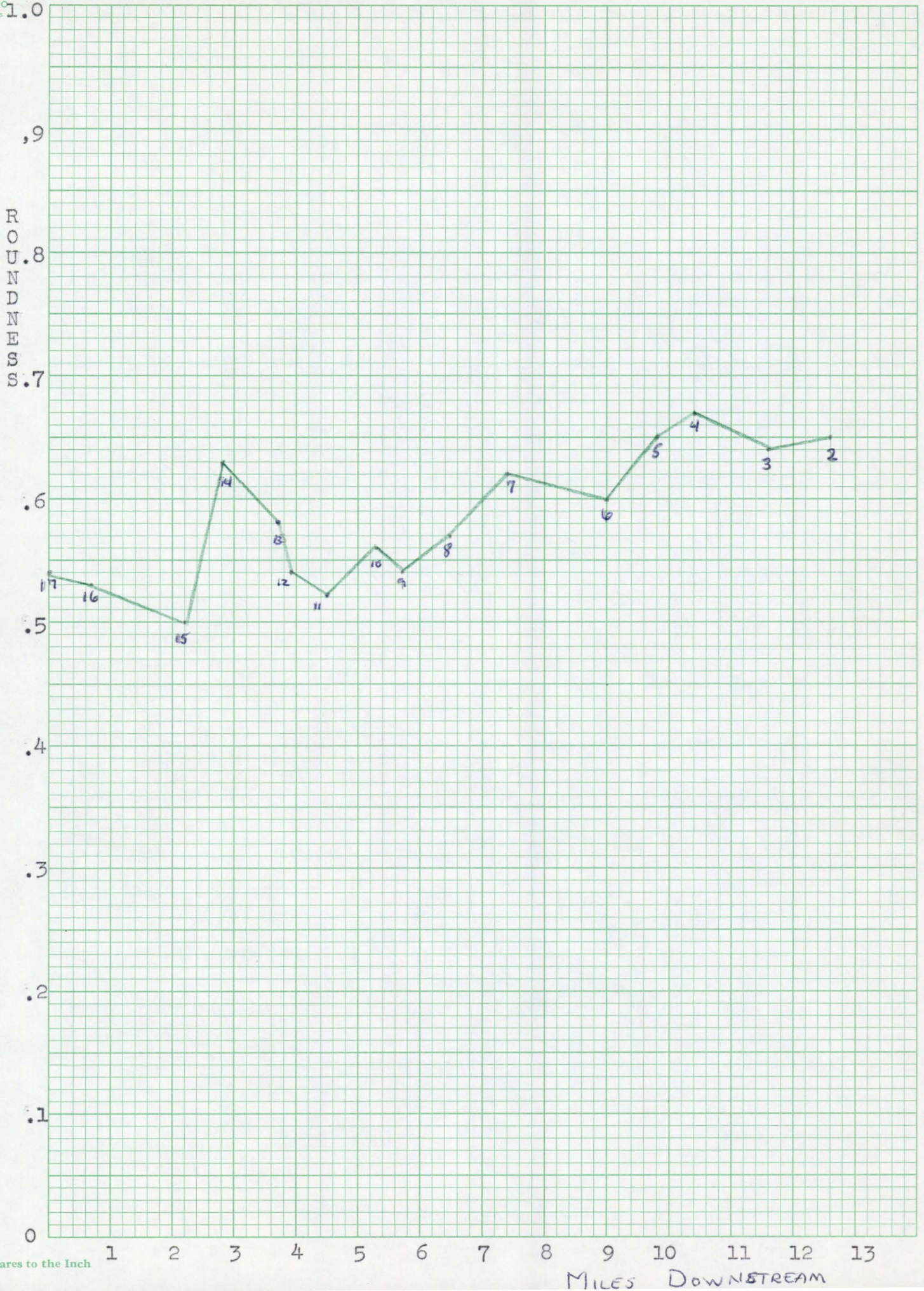


fig. 5b CARBONATE ROUNDNESS IN A DOWNSTREAM DIRECTION

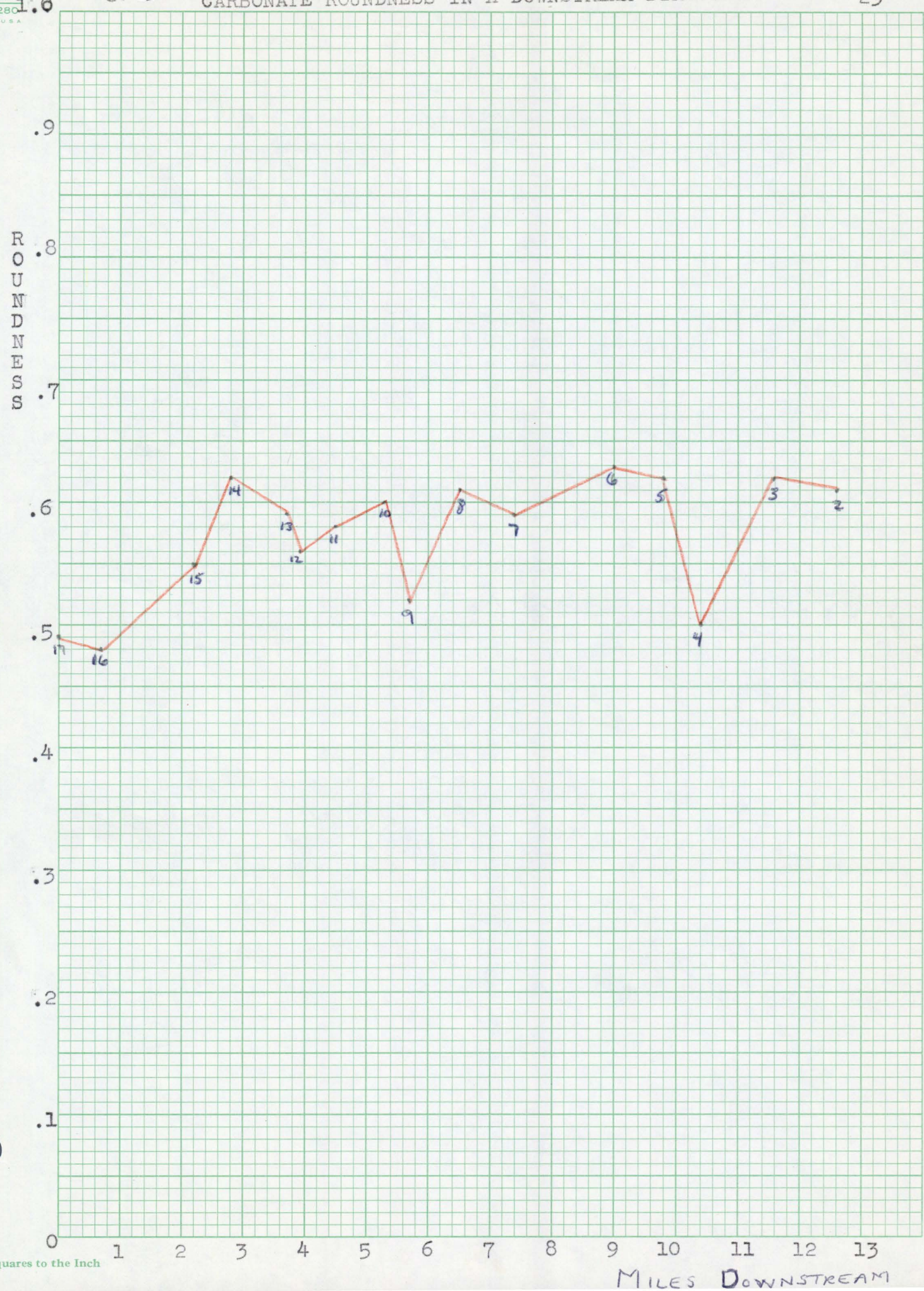
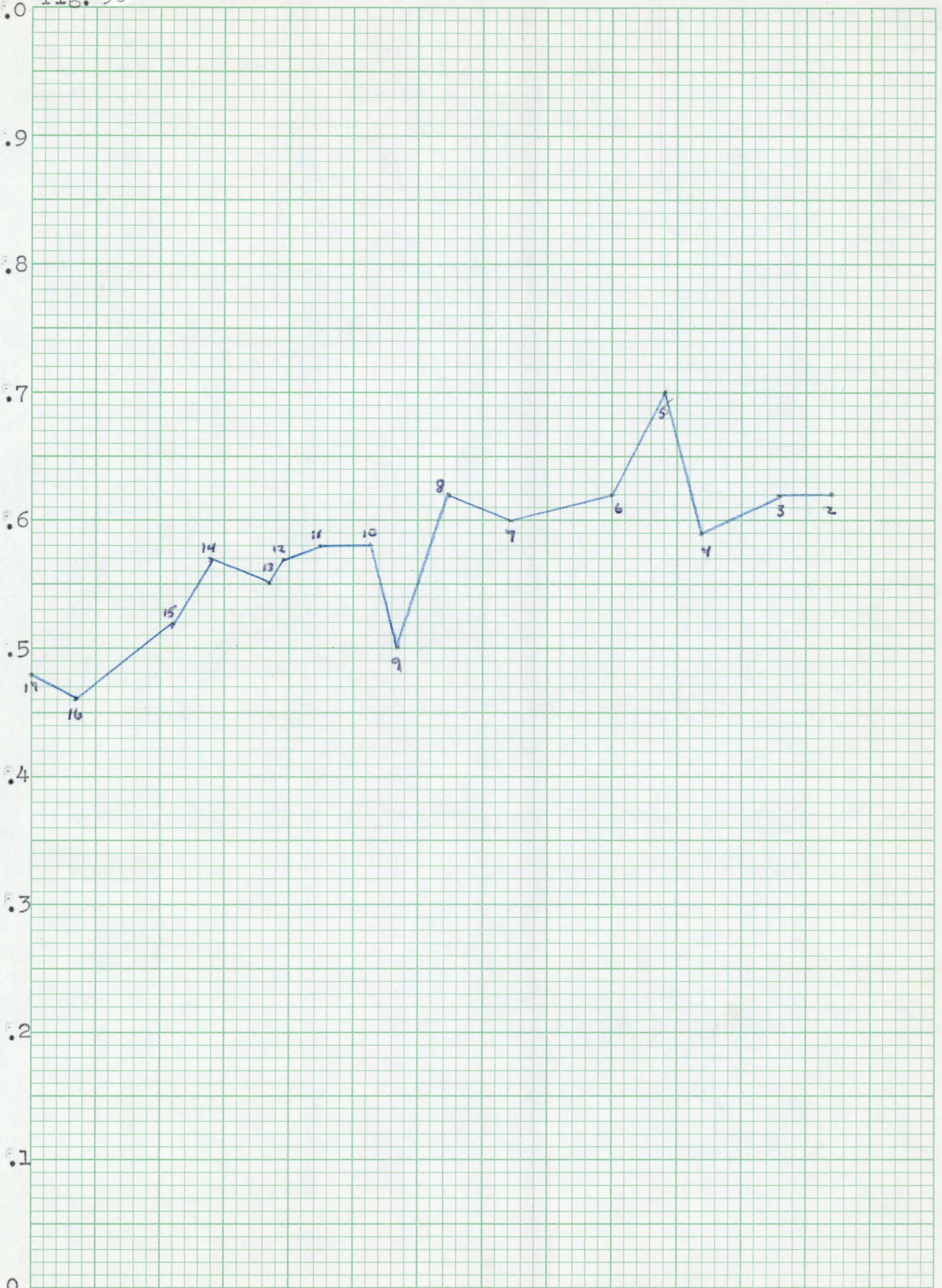


fig. 5c

ROUNDNESS



apparently requires a longer distance to change its values due to the larger surface areas involved in the calculation of sphericity as opposed to the smaller surface areas in calculating roundness.

The glacial areas encountered also had an effect on the sphericity with sphericity showing a peak where carbonates peaked in abundance and sphericity hitting a low where crystalline abundance was at a low and carbonate abundance was also fairly low.

One of the most significant things to come out of this study is not the results of the data necessarily, but the manner in which the data was calculated. The computer has proven to be a valuable tool in this area of study and the authors believe that further investigations into the subject can be made by using the computer to do all the work after the samples have been collected, measured and classified. It must be clear, however, that the computer will never replace the work of the geologist in the field and without good field work, the computer can offer little aid.

DATA SHEETS

Diameters, roundnesses, sphericities, lithologies and Locations of seventeen pebble samples collected from Clear Creek and Hocking River.

LOCATION # 1

Elev. 755', Hocking Co. Ohio. Rockbridge
 Quad., T13N, R18W, Sec 15, .3 mile N. Hocking
 River and Clear Creek junction, in Hocking
 River, Point Bar on east side of river.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	55.00	40.00	28.00	.6	.7181
CLASTIC	63.00	49.50	11.00	.9	.5157
CLASTIC	51.00	45.50	16.00	.9	.6541
CLASTIC	46.00	44.00	23.00	.9	.7820
CRYSTALLINE	42.00	35.00	32.00	.6	.8595
CLASTIC	68.00	44.50	41.00	.5	.7335
CARBONATE	72.00	57.00	20.00	.6	.6036
CLASTIC	77.00	53.00	23.00	.6	.5902
CRYSTALLINE	51.00	44.00	29.00	.8	.7887
CLASTIC	50.00	40.00	21.50	.8	.7007
CLASTIC	67.50	58.00	15.00	.6	.5758
CRYSTALLINE	64.00	41.00	35.00	.7	.7050
CLASTIC	82.00	44.50	40.00	.7	.6421
CRYSTALLINE	57.00	34.00	30.00	.5	.6796
CARBONATE	57.00	37.00	27.00	.6	.6750
CARBONATE	71.00	44.00	30.50	.7	.6433
CRYSTALLINE	54.50	36.00	32.00	.5	.7293
CLASTIC	63.00	48.00	27.00	.8	.6886
CLASTIC	94.50	54.00	18.00	.6	.4775
CRYSTALLINE	65.00	41.00	30.00	.5	.6628
CLASTIC	131.00	61.00	53.00	.4	.5733
CLASTIC	64.00	61.00	27.00	.5	.7381
CRYSTALLINE	60.00	42.50	31.50	.5	.7191
CLASTIC	68.00	51.00	37.00	.6	.7417
CARBONATE	56.00	37.00	30.00	.6	.7074
CLASTIC	54.00	45.00	19.50	.5	.6701
CLASTIC	45.00	44.00	21.00	.7	.7699
CLASTIC	75.50	43.50	22.50	.5	.5558
CLASTIC	50.00	41.00	26.00	.7	.7527
CLASTIC	74.00	36.00	23.00	.7	.5327
CARBONATE	90.00	39.50	32.00	.8	.5384
CLASTIC	43.00	43.00	16.00	.5	.7193
CLASTIC	73.50	35.50	19.50	.6	.5042
CLASTIC	81.00	60.00	26.50	.4	.6235
CRYSTALLINE	57.00	47.00	39.00	.6	.8263
CLASTIC	45.00	40.00	12.00	.6	.6189
CLASTIC	68.00	58.00	41.00	.6	.8012
CARBONATE	74.00	55.50	39.00	.4	.7339
CARBONATE	58.50	34.50	12.50	.6	.5013
CARBONATE	67.00	42.00	34.00	.5	.6826
CRYSTALLINE	57.00	42.00	37.00	.6	.7820
CARBONATE	49.00	33.00	27.00	.6	.7186
CLASTIC	75.50	51.00	19.50	.5	.5588
CLASTIC	44.00	43.00	29.00	.5	.8636
CLASTIC	65.00	52.00	30.50	.6	.7214
CLASTIC	96.00	40.50	32.50	.5	.5227
CARBONATE	63.00	49.50	31.00	.6	.7285
CLASTIC	82.00	50.50	33.00	.5	.6281
CLASTIC	72.50	53.00	15.00	.4	.5328
CLASTIC	75.50	48.00	44.00	.6	.7182
CARBONATE	72.00	42.00	30.00	.5	.6241
CLASTIC	59.00	41.00	39.00	.6	.7716
CLASTIC	74.00	54.00	45.00	.6	.7627
CLASTIC	55.00	35.00	20.00	.8	.6139
CRYSTALLINE	38.00	29.00	26.00	.7	.8053
CARBONATE	46.00	35.00	27.00	.6	.7644
CLASTIC	61.00	51.00	45.00	.6	.8512
CLASTIC	71.00	45.00	36.00	.6	.6850
CLASTIC	70.00	53.00	35.00	.6	.7234
CLASTIC	56.00	31.00	22.00	.6	.6014
CRYSTALLINE	76.00	50.00	43.00	.7	.7193

LOCATION # 1 (continued)

CRYSTALLINE	55.00	35.00	32.00	.6	.7181
CLASTIC	47.00	41.00	37.00	.5	.8823
CLASTIC	62.00	45.00	29.00	.6	.6976
CRYSTALLINE	55.00	49.00	33.00	.5	.8116
CRYSTALLINE	65.00	51.00	29.00	.5	.7048
CLASTIC	53.00	40.00	31.00	.6	.7614
CARBONATE	48.00	41.00	35.00	.6	.8540
CLASTIC	66.00	63.00	44.00	.8	.8601
CRYSTALLINE	40.00	37.00	25.00	.7	.8331
CRYSTALLINE	74.00	40.00	30.00	.7	.6029
CARBONATE	56.00	35.00	31.00	.6	.7020
CLASTIC	93.00	51.00	38.00	.6	.6074
CLASTIC	66.00	57.00	20.00	.5	.6396
CARBONATE	98.00	51.00	38.00	.7	.5865
CARBONATE	55.00	48.00	40.00	.8	.8594
CLASTIC	77.00	54.00	35.00	.7	.6831
CLASTIC	52.00	45.00	22.00	.8	.7154
CLASTIC	45.00	41.00	21.00	.8	.7520
CLASTIC	50.00	39.00	18.00	.7	.6548
CARBONATE	50.00	40.00	35.00	.6	.8243
CRYSTALLINE	65.00	45.00	25.00	.5	.6433
CLASTIC	70.00	50.00	30.00	.7	.6740
CLASTIC	75.00	68.00	50.00	.6	.8455
CRYSTALLINE	50.00	40.00	30.00	.6	.7830
CLASTIC	52.00	35.00	20.00	.6	.6373
CLASTIC	67.00	45.00	20.00	.6	.5853
CLASTIC	60.00	40.00	24.00	.6	.6437
CLASTIC	49.00	40.00	26.00	.8	.7566
CLASTIC	83.00	53.00	43.00	.8	.6916
CLASTIC	60.00	50.00	30.00	.5	.7469
CLASTIC	60.00	52.00	35.00	.7	.7966
CLASTIC	85.00	50.00	45.00	.6	.6778
CARBONATE	90.00	55.00	50.00	.5	.6976
CLASTIC	60.00	40.00	30.00	.4	.6934
CLASTIC	80.00	55.00	50.00	.8	.7546
CRYSTALLINE	72.00	55.00	35.00	.6	.7188
CRYSTALLINE	60.00	32.00	30.00	.6	.6437
CLASTIC	45.00	35.00	25.00	.7	.7560
CLASTIC	55.00	40.00	25.00	.7	.6914

AVERAGE SPHERICITY=.6962

AVERAGE ROUNDNESS=.62

TOTAL CLASTICS= 62

TOTAL CARBONATES= 18

TOTAL CRYSTALLINE= 20

CLASTICS

AVERAGE SPHERICITY=.6845

AVERAGE ROUNDNESS=.63

CARBONATES

AVERAGE SPHERICITY=.6914

AVERAGE ROUNDNESS=.61

CRYSTALLINE

AVERAGE SPHERICITY=.7368

AVERAGE ROUNDNESS=.60

LOCATION # 2

Elev. 754', Hocking Co. Ohio. Rockbridge
 Quad, T13N, R18W, Sec 15, 20 yards West
 US Rt. 33 Clear Creek Bridge, Point Bar on
 north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	80.00	62.00	37.00	.7	.7103
CLASTIC	62.00	31.00	29.00	.6	.6161
CLASTIC	82.00	73.00	50.00	.4	.8157
CLASTIC	82.00	49.00	30.00	.5	.6024
CLASTIC	50.00	45.00	42.00	.6	.9110
CLASTIC	90.00	75.00	30.00	.5	.6525
CLASTIC	71.00	62.00	55.00	.6	.8778
CLASTIC	58.00	53.00	35.00	.6	.8200
CLASTIC	70.00	45.00	21.00	.5	.5778
CLASTIC	60.00	54.00	34.00	.6	.7990
CLASTIC	76.00	46.00	25.00	.7	.5839
CLASTIC	80.00	50.00	43.00	.7	.6952
CLASTIC	66.00	51.00	22.00	.6	.6363
CLASTIC	80.00	50.00	40.00	.6	.6786
CLASTIC	62.00	55.00	38.00	.8	.8162
CLASTIC	62.00	41.00	30.00	.6	.6840
CRYSTALLINE	66.00	50.00	48.00	.6	.8198
CLASTIC	55.00	50.00	20.00	.7	.6914
CARBONATE	60.00	53.00	32.00	.7	.7781
CLASTIC	80.00	54.00	27.00	.6	.6107
CRYSTALLINE	69.00	56.00	52.00	.7	.8489
CRYSTALLINE	58.00	45.00	38.00	.7	.7981
CLASTIC	70.00	36.00	22.00	.6	.5447
CLASTIC	60.00	34.00	24.00	.6	.6097
CARBONATE	75.00	64.00	29.00	.8	.6910
CLASTIC	50.00	46.00	35.00	.8	.8636
CLASTIC	90.00	62.00	45.00	.9	.7010
CLASTIC	82.00	48.00	32.00	.7	.6113
CLASTIC	74.00	60.00	55.00	.6	.8447
CLASTIC	65.00	58.00	36.00	.7	.7906
CLASTIC	50.00	37.00	23.00	.6	.6982
CARBONATE	50.00	47.00	20.00	.4	.7218
CARBONATE	60.00	40.00	35.00	.6	.7299
CRYSTALLINE	40.00	30.00	26.00	.6	.7870
CRYSTALLINE	55.00	46.00	36.00	.8	.8180
CRYSTALLINE	60.00	50.00	21.00	.5	.6632
CRYSTALLINE	50.00	27.00	26.00	.6	.6548
CLASTIC	64.00	55.00	40.00	.7	.8129
CLASTIC	60.00	40.00	15.00	.5	.5503
CARBONATE	50.00	35.00	25.00	.5	.7047
CLASTIC	54.00	44.00	25.50	.7	.7273
CRYSTALLINE	48.00	40.50	30.50	.6	.8124
CLASTIC	76.00	65.00	30.50	.7	.7002
CRYSTALLINE	49.50	37.50	33.00	.5	.7964
CARBONATE	71.00	31.00	23.00	.6	.5210
CLASTIC	55.00	53.00	23.50	.7	.7439
CLASTIC	60.50	39.00	19.00	.6	.5872
CARBONATE	45.50	42.00	35.00	.6	.8921
CRYSTALLINE	51.00	33.00	30.00	.5	.7247
CLASTIC	52.00	36.00	25.00	.6	.6930
CLASTIC	81.00	73.00	18.00	.8	.5851
CARBONATE	45.00	40.00	29.50	.7	.8353
CLASTIC	56.00	42.00	27.00	.7	.7124
CRYSTALLINE	50.00	47.00	34.00	.5	.8614
CLASTIC	61.00	50.00	29.50	.6	.7346
CLASTIC	78.00	61.50	29.50	.5	.6681
CLASTIC	88.00	50.00	26.00	.5	.5516
CRYSTALLINE	54.00	48.50	36.00	.7	.8429
CRYSTALLINE	49.00	38.50	28.00	.6	.7657
CLASTIC	58.50	43.50	27.00	.8	.7001
CLASTIC	72.00	67.00	20.00	.6	.6370

LOCATION # 2 (continued)

CLASTIC	55.00	38.00	28.00	.6	.7059
CRYSTALLINE	50.00	47.00	37.00	.6	.8860
CRYSTALLINE	64.00	46.00	32.00	.5	.7110
CLASTIC	69.00	66.00	20.00	.7	.6521
CARBONATE	53.00	33.00	25.50	.5	.6691
CRYSTALLINE	58.00	53.00	22.00	.5	.7024
CRYSTALLINE	73.00	63.00	37.00	.5	.7591
CRYSTALLINE	47.00	38.00	30.00	.6	.8021
CRYSTALLINE	71.00	53.00	31.00	.7	.6882
CLASTIC	69.00	51.00	37.50	.9	.7378
CLASTIC	67.50	53.00	26.00	.6	.6712
CLASTIC	70.00	49.00	32.00	.7	.6840
CRYSTALLINE	53.00	45.00	30.00	.6	.7833
CRYSTALLINE	81.00	62.00	60.00	.6	.8277
CRYSTALLINE	50.50	47.00	30.00	.6	.8208
CLASTIC	91.00	80.00	22.00	.8	.5968
CARBONATE	57.00	54.00	20.00	.6	.6927
CRYSTALLINE	63.00	51.50	33.00	.6	.7537
CRYSTALLINE	93.00	63.00	42.00	.9	.6738
CRYSTALLINE	60.00	54.00	35.00	.7	.8067
CLASTIC	61.00	41.50	30.00	.7	.6942
CRYSTALLINE	81.00	61.00	42.00	.7	.7309
CLASTIC	98.00	62.00	41.00	.7	.6421
CLASTIC	69.00	53.00	33.00	.5	.7162
CLASTIC	81.00	60.00	30.50	.6	.6534
CLASTIC	68.00	50.00	27.00	.6	.6634
CLASTIC	52.00	38.00	20.50	.8	.6605
CARBONATE	72.00	50.00	32.50	.6	.6793
CLASTIC	88.50	65.00	26.50	.6	.6036
CLASTIC	47.00	40.00	31.00	.8	.8249
CRYSTALLINE	60.00	40.00	30.00	.6	.6934
CLASTIC	40.00	34.00	23.00	.7	.7877
CLASTIC	66.00	55.00	30.00	.6	.7235
CLASTIC	60.00	46.00	33.00	.6	.7499
CLASTIC	70.00	56.00	26.00	.7	.6673
CRYSTALLINE	62.00	47.00	30.00	.8	.7158
CRYSTALLINE	79.00	50.00	24.00	.7	.5772
CLASTIC	55.00	49.00	16.00	.9	.6376
CARBONATE	70.00	50.00	30.00	.7	.6740

AVERAGE SPHERICITY=.7163
 AVERAGE ROUNDNESS=.64
 TOTAL CLASTICS= 59
 TOTAL CARBONATES= 12
 TOTAL CRYSTALLINE= 29

CLASTICS
 AVERAGE SPHERICITY=.6935
 AVERAGE ROUNDNESS=.65

CARBONATES
 AVERAGE SPHERICITY=.7158
 AVERAGE ROUNDNESS=.61

CRYSTALLINE
 AVERAGE SPHERICITY=.7629
 AVERAGE ROUNDNESS=.62

LOCATION # 3

Elev. 759', Hocking Co. Ohio. Rockbridge
 Quad, T13N, R18W, Sec 16, 1.0 mile West
 US Rt. 33 Clear Creek Bridge, Point Bar
 on north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	68.00	47.00	11.50	.7	.4889
CLASTIC	49.00	44.00	14.00	.5	.6354
CLASTIC	55.00	40.00	16.00	.7	.5959
CARBONATE	85.00	56.00	31.00	.7	.6217
CLASTIC	83.00	50.50	20.50	.5	.5317
CLASTIC	58.00	46.00	20.50	.6	.6545
CLASTIC	55.00	50.00	31.00	.6	.8002
CLASTIC	54.00	45.00	24.00	.5	.7181
CLASTIC	55.00	36.00	14.00	.7	.5503
CRYSTALLINE	42.00	35.00	30.00	.8	.8412
CLASTIC	64.00	57.00	16.00	.6	.6061
CLASTIC	51.00	42.00	16.00	.5	.6369
CLASTIC	42.00	36.50	28.00	.7	.8337
CLASTIC	59.00	52.50	16.00	.8	.6226
CLASTIC	66.00	64.00	24.00	.7	.7065
CLASTIC	115.00	97.00	52.50	.5	.7275
CRYSTALLINE	46.00	39.50	30.00	.6	.8243
CRYSTALLINE	48.00	34.00	29.50	.7	.7579
CLASTIC	62.00	37.00	12.00	.7	.4870
CLASTIC	80.00	52.00	25.50	.6	.5917
CLASTIC	49.50	33.00	20.00	.7	.6458
CLASTIC	78.00	64.00	43.00	.7	.7676
CLASTIC	81.00	50.00	16.00	.7	.4959
CLASTIC	55.00	49.00	22.00	.5	.7090
CRYSTALLINE	56.00	45.00	38.00	.6	.8170
CLASTIC	75.00	57.00	18.00	.6	.5671
CLASTIC	71.00	47.00	14.00	.7	.5073
CARBONATE	54.00	34.00	30.00	.8	.7046
CLASTIC	69.00	29.50	13.00	.6	.4319
CLASTIC	50.00	48.00	19.00	.6	.7145
CLASTIC	83.00	75.00	21.50	.6	.6163
CRYSTALLINE	89.50	63.00	47.00	.6	.7177
CRYSTALLINE	81.00	55.00	53.00	.5	.7631
CLASTIC	65.50	45.00	29.00	.7	.6725
CRYSTALLINE	54.00	34.50	27.50	.7	.6878
CLASTIC	68.00	40.00	23.50	.7	.5880
CLASTIC	71.00	60.00	30.00	.8	.7094
CLASTIC	87.00	41.00	30.00	.5	.5457
CRYSTALLINE	74.00	44.00	39.00	.6	.6792
CLASTIC	110.00	75.50	22.00	.5	.5159
CLASTIC	78.00	36.00	19.00	.7	.4826
CARBONATE	47.00	41.50	28.50	.6	.8120
CRYSTALLINE	82.00	69.00	45.00	.6	.7729
CRYSTALLINE	90.00	66.00	42.50	.6	.7022
CRYSTALLINE	71.00	61.00	29.00	.6	.7053
CRYSTALLINE	55.00	53.00	33.00	.6	.8331
CLASTIC	50.00	32.00	17.00	.7	.6015
CLASTIC	85.00	57.00	35.50	.6	.6543
CLASTIC	57.00	51.00	22.00	.6	.7016
CARBONATE	55.00	41.00	26.00	.5	.7063
CRYSTALLINE	61.00	42.00	26.00	.6	.6645
CLASTIC	54.00	46.00	14.00	.5	.6045
CRYSTALLINE	53.00	45.00	26.00	.6	.7468
CLASTIC	80.00	72.00	25.00	.6	.6552
CRYSTALLINE	65.00	45.00	34.00	.7	.7128
CLASTIC	55.00	49.00	34.00	.7	.8197
CRYSTALLINE	51.50	33.50	23.00	.6	.6623
CARBONATE	60.00	47.00	36.00	.5	.7775
CRYSTALLINE	72.00	61.00	35.00	.7	.7440
CARBONATE	70.00	41.50	39.00	.6	.6913
CRYSTALLINE	49.00	31.00	22.00	.6	.6574

LOCATION # 3 (continued)

CRYSTALLINE	39.00	30.00	25.00	.6	.7900
CLASTIC	45.00	42.00	17.00	.7	.7065
CLASTIC	71.00	53.00	16.00	.7	.5520
CLASTIC	55.00	42.00	38.00	.9	.8080
CLASTIC	62.00	60.00	47.00	.9	.9019
CRYSTALLINE	46.00	28.00	28.00	.6	.7182
CRYSTALLINE	61.00	34.00	29.00	.5	.6423
CLASTIC	58.50	51.00	22.50	.6	.6947
CLASTIC	73.00	69.50	33.00	.5	.7550
CLASTIC	80.00	64.00	34.00	.5	.6980
CLASTIC	65.00	35.00	32.00	.7	.6424
CRYSTALLINE	66.00	55.00	51.50	.6	.8664
CLASTIC	77.00	48.50	21.50	.6	.5603
CLASTIC	84.00	47.50	34.50	.6	.6147
CRYSTALLINE	42.00	36.50	23.00	.6	.7807
CRYSTALLINE	68.00	61.00	36.00	.6	.7802
CLASTIC	50.00	48.00	24.00	.8	.7724
CLASTIC	73.00	47.00	23.00	.6	.5876
CLASTIC	64.00	44.00	21.00	.6	.6087
CRYSTALLINE	86.00	58.00	49.00	.6	.7270
CLASTIC	106.00	72.00	64.00	.6	.7430
CLASTIC	79.50	51.00	39.50	.6	.6831
CLASTIC	74.50	52.50	34.50	.6	.6885
CRYSTALLINE	84.00	65.00	60.00	.7	.8207
CLASTIC	55.00	50.00	32.00	.7	.8087
CLASTIC	77.00	69.00	29.00	.4	.6962
CARBONATE	60.00	48.00	30.00	.7	.7368
CARBONATE	61.00	53.00	30.00	.6	.7532
CRYSTALLINE	38.50	38.00	25.00	.7	.8622
CLASTIC	72.00	62.00	20.50	.6	.6259
CLASTIC	70.00	45.00	37.00	.7	.6978
CLASTIC	50.00	42.00	12.00	.6	.5864
CLASTIC	66.00	44.00	28.00	.7	.6564
CLASTIC	56.00	41.50	27.00	.6	.7096
CLASTIC	63.00	43.00	19.50	.6	.5956
CLASTIC	65.00	41.00	20.00	.6	.5790
CLASTIC	64.00	36.00	30.00	.7	.6412
CLASTIC	103.00	65.00	62.50	.7	.7262
CLASTIC	78.00	40.00	19.00	.7	.4999

AVERAGE SPHERICITY=.6811

AVERAGE ROUNDNESS=.63

TOTAL CLASTICS= 65

TOTAL CARBONATES= 8

TOTAL CRYSTALLINE= 27

CLASTICS

AVERAGE SPHERICITY=.6467

AVERAGE ROUNDNESS=.64

CARBONATES

AVERAGE SPHERICITY=.7254

AVERAGE ROUNDNESS=.62

CRYSTALLINE

AVERAGE SPHERICITY=.7510

AVERAGE ROUNDNESS=.62

LOCATION # 4

Elev. 773', Hocking Co. Ohio. Rockbridge
 Quad, T13N, R18W, Sec. 20, 10 yards West
 of Gaging Station Bridge, Clear Creek,
 Point Bar on north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	67.00	41.00	22.50	.7	.5901
CLASTIC	54.00	35.00	20.00	.7	.6215
CRYSTALLINE	67.00	62.00	43.00	.5	.8406
CLASTIC	83.00	34.00	14.00	.5	.4103
CLASTIC	62.50	38.00	17.00	.5	.5489
CRYSTALLINE	73.00	44.00	43.00	.6	.7081
CLASTIC	62.00	44.00	18.00	.8	.5906
CLASTIC	63.00	43.00	26.50	.8	.6597
CLASTIC	79.50	50.00	38.00	.7	.6699
CLASTIC	56.00	44.00	12.00	.7	.5522
CRYSTALLINE	53.00	47.00	27.00	.5	.7673
CLASTIC	52.00	41.00	22.00	.8	.6935
CLASTIC	63.00	43.00	15.00	.6	.5457
CLASTIC	80.00	49.50	34.00	.6	.6407
CLASTIC	52.00	47.00	19.00	.8	.6912
CLASTIC	87.00	44.50	25.00	.5	.5277
CLASTIC	63.00	44.00	20.00	.7	.6052
CRYSTALLINE	57.00	49.00	36.00	.6	.8158
CLASTIC	59.00	48.00	20.00	.6	.6509
CLASTIC	61.00	40.00	18.00	.7	.5784
CLASTIC	67.00	65.00	33.00	.6	.7818
CLASTIC	55.00	49.00	31.00	.8	.7948
CLASTIC	70.50	60.50	27.00	.5	.6901
CLASTIC	70.00	60.00	19.00	.6	.6150
CLASTIC	70.00	65.00	36.00	.8	.7816
CLASTIC	70.00	60.50	16.00	.6	.5824
CRYSTALLINE	55.50	47.00	36.00	.5	.8190
CLASTIC	57.00	39.50	27.00	.8	.6898
CLASTIC	52.00	49.50	31.00	.6	.8279
CLASTIC	67.00	64.00	22.00	.6	.6794
CARBONATE	54.00	45.00	29.50	.5	.7693
CLASTIC	44.00	33.00	21.50	.9	.7156
CLASTIC	96.00	93.00	16.50	.7	.5501
CLASTIC	54.00	31.00	28.00	.8	.6677
CLASTIC	60.00	54.50	6.50	.5	.4617
CLASTIC	37.00	35.00	15.00	.9	.7265
CLASTIC	72.50	49.00	43.50	.6	.7402
CLASTIC	60.00	49.00	43.00	.7	.8365
CLASTIC	54.50	39.50	22.00	.6	.6639
CLASTIC	79.00	44.00	22.50	.5	.5413
CLASTIC	55.00	39.00	17.00	.5	.6029
CLASTIC	60.00	45.00	21.50	.5	.6453
CLASTIC	60.00	44.00	27.00	.8	.6910
CRYSTALLINE	59.00	45.50	42.00	.6	.8188
CRYSTALLINE	56.00	34.00	25.50	.5	.6514
CLASTIC	45.00	28.00	20.50	.7	.6569
CLASTIC	42.00	40.00	19.00	.8	.7553
CLASTIC	49.50	35.00	27.00	.6	.7279
CLASTIC	45.00	37.00	33.00	.9	.8448
CLASTIC	46.00	37.00	23.00	.7	.7381
CLASTIC	56.50	55.00	32.00	.6	.8200
CLASTIC	61.00	36.00	32.50	.7	.6800
CLASTIC	41.00	32.00	29.50	.7	.8250
CLASTIC	77.00	42.00	31.50	.8	.6065
CRYSTALLINE	50.00	42.00	27.00	.7	.7683
CRYSTALLINE	64.00	42.00	35.00	.6	.7106
CRYSTALLINE	68.00	46.00	45.00	.7	.7650
CRYSTALLINE	45.50	39.00	27.00	.6	.7982
CLASTIC	47.50	40.50	29.00	.7	.8044
CLASTIC	86.50	54.00	39.00	.6	.6554
CRYSTALLINE	73.00	46.00	38.00	.5	.6897

LOCATION # 4 (continued)

CLASTIC	70.00	52.00	47.00	.7	.7931
CLASTIC	77.00	48.00	29.50	.6	.6204
CRYSTALLINE	56.00	48.50	21.00	.6	.6874
CRYSTALLINE	54.00	42.50	24.00	.6	.7046
CLASTIC	42.00	37.00	37.00	.7	.9190
CLASTIC	65.00	45.50	41.50	.6	.7646
CLASTIC	77.00	55.50	29.00	.6	.6475
CRYSTALLINE	47.00	34.00	30.00	.6	.7729
CLASTIC	37.00	33.00	23.50	.6	.8274
CLASTIC	62.00	43.00	15.00	.7	.5516
CLASTIC	83.00	60.00	34.00	.7	.6665
CLASTIC	55.00	38.50	18.50	.8	.6175
CLASTIC	40.00	39.00	25.00	.8	.8478
CLASTIC	50.00	40.50	24.50	.7	.7349
CLASTIC	44.00	39.00	29.50	.7	.8407
CRYSTALLINE	62.00	53.00	43.00	.8	.8401
CLASTIC	66.00	46.50	25.50	.6	.6481
CLASTIC	87.00	33.00	31.00	.7	.5132
CLASTIC	53.00	45.00	42.00	.7	.8763
CLASTIC	49.50	42.00	22.50	.7	.7279
CLASTIC	54.00	53.00	20.50	.8	.7196
CLASTIC	52.00	37.00	27.00	.9	.7176
CLASTIC	62.50	38.00	23.50	.7	.6115
CLASTIC	45.00	39.50	26.50	.7	.8026
CLASTIC	63.00	42.00	19.50	.5	.5909
CLASTIC	57.50	53.50	45.00	.6	.8997
CLASTIC	51.00	50.00	26.00	.6	.7936
CLASTIC	49.00	39.00	20.00	.7	.6874
CLASTIC	43.00	34.00	25.00	.6	.7718
CLASTIC	70.00	67.00	22.00	.6	.6700
CLASTIC	72.00	50.50	24.00	.6	.6160
CLASTIC	55.00	38.00	25.00	.7	.6797
CLASTIC	66.00	50.50	19.00	.6	.6039
CLASTIC	53.00	42.00	20.50	.5	.6742
CLASTIC	58.00	50.00	16.00	.6	.6196
CLASTIC	54.00	48.50	35.00	.8	.8350
CRYSTALLINE	85.00	56.50	43.00	.6	.6954
CLASTIC	75.00	55.00	43.50	.9	.7520
CLASTIC	51.00	38.50	26.50	.6	.7320

AVERAGE SPHERICITY=.6997

AVERAGE ROUNDNESS=.66

TOTAL CLASTICS= 82

TOTAL CARBONATES= 1

TOTAL CRYSTALLINE= 17

CLASTICS

AVERAGE SPHERICITY=.6872

AVERAGE ROUNDNESS=.67

CARBONATES

AVERAGE SPHERICITY=.7693

AVERAGE ROUNDNESS=.50

CRYSTALLINE

AVERAGE SPHERICITY=.7561

AVERAGE ROUNDNESS=.59

LOCATION # 5

Elev. 775', Hocking Co. Ohio. Rockbridge
 Quad, T13N, R18W, Sec 20, 0.6 mile West of
 Gaging Station, Point Bar on north side of
 Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	60.00	38.00	16.00	.4	.5528
CARBONATE	52.00	32.00	30.00	.7	.7081
CLASTIC	46.00	35.00	20.00	.7	.6916
CLASTIC	63.00	41.00	17.00	.6	.5600
CARBONATE	46.00	35.00	16.00	.6	.6420
CRYSTALLINE	16.00	32.00	22.00	.6	*****
CLASTIC	71.00	34.00	12.00	.6	.4326
CLASTIC	68.00	40.00	6.00	.4	.3730
CLASTIC	59.00	46.00	25.00	.6	.6913
CARBONATE	64.00	40.00	12.00	.5	.4894
CRYSTALLINE	68.00	50.00	16.00	.4	.5572
CLASTIC	55.00	38.00	15.00	.5	.5733
CLASTIC	58.00	34.00	36.00	.6	.7139
CRYSTALLINE	60.00	50.00	25.00	.6	.7029
CLASTIC	40.00	40.00	25.00	.9	.8550
CLASTIC	60.00	29.00	14.00	.5	.4831
CLASTIC	78.00	60.00	34.00	.6	.6947
CRYSTALLINE	88.00	58.00	39.00	.6	.6635
CRYSTALLINE	71.00	52.00	26.00	.7	.6449
CLASTIC	61.00	42.00	20.00	.5	.6089
CLASTIC	51.00	34.00	29.00	.6	.7237
CRYSTALLINE	50.00	42.00	27.00	.7	.7683
CRYSTALLINE	75.00	55.00	40.00	.7	.7313
CLASTIC	61.00	46.00	24.00	.7	.6670
CARBONATE	52.00	40.00	25.00	.7	.7178
CLASTIC	48.00	39.00	21.00	.6	.7084
CLASTIC	46.00	40.00	25.00	.7	.7789
CLASTIC	45.00	36.00	15.00	.5	.6437
CLASTIC	40.00	30.00	13.00	.7	.6247
CLASTIC	55.00	35.00	10.00	.6	.4873
CLASTIC	41.00	36.00	25.00	.6	.8120
CRYSTALLINE	50.00	37.00	29.00	.7	.7543
CARBONATE	62.00	40.00	22.00	.6	.6117
CRYSTALLINE	61.00	45.00	31.00	.7	.7211
CLASTIC	53.00	30.00	16.00	.8	.5549
CRYSTALLINE	61.00	30.00	15.00	.7	.4945
CLASTIC	62.00	43.00	30.00	.8	.6949
CRYSTALLINE	62.00	49.00	33.00	.8	.7493
CARBONATE	45.00	34.00	24.00	.6	.7386
CLASTIC	60.00	45.00	25.00	.7	.6786
CLASTIC	84.00	50.00	40.00	.6	.6569
CLASTIC	85.00	50.00	40.00	.6	.6517
CLASTIC	52.00	40.00	26.00	.7	.7272
CLASTIC	74.00	59.00	20.00	.7	.5995
CRYSTALLINE	65.00	45.00	24.00	.7	.6346
CRYSTALLINE	62.00	40.00	31.00	.8	.6858
CRYSTALLINE	79.00	69.00	38.00	.8	.7490
CRYSTALLINE	63.00	40.00	24.00	.6	.6231
CRYSTALLINE	54.00	31.00	23.00	.9	.6253
CRYSTALLINE	46.00	41.00	25.00	.9	.7854
CRYSTALLINE	55.00	50.00	36.00	.8	.8411
CLASTIC	55.00	40.00	17.00	.8	.6080
CLASTIC	41.00	30.00	20.00	.8	.7094
CLASTIC	53.00	40.00	22.00	.7	.6792
CARBONATE	65.00	36.00	34.00	.7	.6617
CRYSTALLINE	38.00	30.00	20.00	.8	.7462
CLASTIC	44.00	42.00	18.00	.8	.7309
CLASTIC	42.00	35.00	22.00	.8	.7586
CLASTIC	53.00	36.00	15.00	.5	.5771
CLASTIC	51.00	32.00	18.00	.6	.6050
CRYSTALLINE	58.00	50.00	30.00	.8	.7640

LOCATION # 5 (continued)

CLASTIC	45.00	40.00	25.00	.9	.7904
CLASTIC	90.00	34.00	25.00	.7	.4717
CLASTIC	51.00	49.00	29.00	.6	.8175
CARBONATE	98.00	66.00	14.00	.4	.4582
CRYSTALLINE	70.00	45.00	32.00	.8	.6648
CLASTIC	72.00	61.00	20.00	.7	.6174
CRYSTALLINE	58.00	46.00	35.00	.7	.7822
CLASTIC	56.00	50.00	20.00	.6	.6832
CLASTIC	51.00	46.00	16.00	.6	.6565
CRYSTALLINE	80.00	68.00	25.00	.5	.6428
CLASTIC	54.00	37.00	35.00	.9	.7629
CRYSTALLINE	55.00	45.00	25.00	.5	.7191
CLASTIC	55.00	50.00	35.00	.7	.8332
CLASTIC	62.00	42.00	36.00	.7	.7327
CLASTIC	77.00	50.00	36.00	.8	.6721
CLASTIC	60.00	50.00	30.00	.6	.7469
CLASTIC	60.00	58.00	35.00	.7	.8262
CRYSTALLINE	45.00	35.00	30.00	.7	.8034
CLASTIC	50.00	40.00	17.00	.6	.6479
CARBONATE	43.00	40.00	25.00	.7	.8147
CLASTIC	40.00	30.00	21.00	.6	.7329
CLASTIC	73.00	41.00	20.00	.6	.5359
CLASTIC	74.00	50.00	14.00	.5	.5037
CRYSTALLINE	54.00	43.00	38.00	.8	.8244
CLASTIC	66.00	52.00	39.00	.6	.7750
CLASTIC	59.00	57.00	24.00	.7	.7325
CLASTIC	60.00	44.00	32.00	.5	.7313
CLASTIC	51.00	39.00	8.00	.6	.4932
CLASTIC	59.00	45.00	14.00	.6	.5656
CLASTIC	41.00	35.00	14.00	.8	.6630
CLASTIC	70.00	40.00	7.00	.6	.3852
CARBONATE	65.00	51.00	40.00	.6	.7845
CRYSTALLINE	47.00	38.00	30.00	.6	.8021
CLASTIC	50.00	39.00	25.00	.6	.7306
CLASTIC	50.00	48.00	16.00	.5	.6747
CRYSTALLINE	54.00	50.00	35.00	.8	.8435
CARBONATE	63.00	40.00	31.00	.7	.6785
CLASTIC	59.00	42.00	25.00	.6	.6706
CLASTIC	40.00	30.00	22.00	.7	.7444

AVERAGE SPHERICITY=.6814

AVERAGE ROUNDNESS=.66

TOTAL CLASTICS= 61

TOTAL CARBONATES= 11

TOTAL CRYSTALLINE= 28

CLASTICS

AVERAGE SPHERICITY=.6575

AVERAGE ROUNDNESS=.65

CARBONATES

AVERAGE SPHERICITY=.6641

AVERAGE ROUNDNESS=.62

CRYSTALLINE

AVERAGE SPHERICITY=.7402

AVERAGE ROUNDNESS=.70

LOCATION # 6

Elev. 776', Hocking Co. Ohio. Rockbridge
 Quad, T13N, R18W, sec 19, 1.4 miles West
 of Gaging Station, Point Bar on north
 side of Clear Creek

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CARBONATE	67.00	56.00	24.00	.5	.6690
CLASTIC	54.00	48.00	14.00	.6	.6131
CLASTIC	52.00	44.00	13.50	.7	.6034
CRYSTALLINE	51.00	44.00	25.00	.7	.7506
CLASTIC	62.00	59.00	13.00	.5	.5843
CLASTIC	75.00	68.00	25.00	.6	.6711
CLASTIC	61.00	52.00	13.50	.7	.5735
CRYSTALLINE	39.00	35.00	23.50	.9	.8147
CLASTIC	48.50	40.00	13.50	.5	.6123
CRYSTALLINE	45.00	31.00	23.00	.8	.7061
CLASTIC	44.00	35.00	21.00	.8	.7241
CLASTIC	94.00	83.00	24.50	.6	.6128
CLASTIC	89.00	80.00	11.50	.6	.4879
CLASTIC	60.00	43.50	19.00	.5	.6123
CLASTIC	68.50	58.00	16.50	.6	.5886
CRYSTALLINE	63.00	55.00	35.00	.6	.7857
CLASTIC	85.00	36.00	17.50	.5	.4434
CRYSTALLINE	80.50	71.00	20.50	.5	.6079
CRYSTALLINE	62.00	34.00	33.50	.6	.6667
CARBONATE	52.50	44.50	30.00	.5	.7853
CLASTIC	62.00	46.00	20.00	.6	.6209
CRYSTALLINE	71.00	65.00	43.50	.6	.8247
CLASTIC	68.00	64.00	21.00	.5	.6624
CARBONATE	45.00	33.50	26.00	.6	.7549
CARBONATE	67.00	63.00	37.00	.7	.8038
CLASTIC	77.00	65.00	26.00	.6	.6581
CRYSTALLINE	64.00	55.00	16.50	.7	.6051
CLASTIC	90.00	83.00	16.50	.6	.5530
CRYSTALLINE	72.00	55.00	10.00	.6	.4734
CLASTIC	74.50	31.50	23.00	.6	.5073
CARBONATE	63.00	48.00	43.00	.7	.8042
CRYSTALLINE	96.00	46.00	10.50	.6	.3742
CRYSTALLINE	69.00	40.00	17.00	.5	.5227
CLASTIC	59.00	39.00	13.50	.6	.5328
CRYSTALLINE	60.00	43.00	23.00	.5	.6501
CLASTIC	65.00	45.00	16.00	.6	.5544
CARBONATE	66.00	38.50	31.50	.6	.6530
CLASTIC	70.00	51.00	26.00	.6	.6468
CRYSTALLINE	53.50	42.50	25.00	.6	.7187
CLASTIC	79.00	65.00	36.00	.5	.7211
CLASTIC	95.00	94.00	33.00	.6	.7005
CRYSTALLINE	62.50	62.00	39.00	.6	.8522
CLASTIC	73.50	49.00	38.00	.8	.7011
CLASTIC	73.00	46.00	20.00	.5	.5568
CLASTIC	88.00	67.00	41.00	.7	.7079
CARBONATE	50.50	42.00	27.00	.7	.7633
CLASTIC	96.00	90.00	21.00	.6	.5897
CRYSTALLINE	85.00	73.00	44.00	.6	.7632
CLASTIC	62.00	57.50	17.00	.5	.6335
CARBONATE	48.00	47.00	38.00	.7	.9186
CLASTIC	96.00	70.50	27.00	.5	.5911
CLASTIC	105.00	67.00	27.00	.6	.5475
CARBONATE	74.00	58.00	38.00	.6	.7383
CLASTIC	70.00	42.00	18.50	.6	.5413
CLASTIC	82.50	53.00	36.50	.6	.6575
CLASTIC	61.50	33.00	23.00	.7	.5855
CRYSTALLINE	73.00	58.00	39.50	.8	.7547
CLASTIC	71.00	50.00	30.00	.6	.6676
CLASTIC	99.00	60.50	28.00	.8	.5570
CRYSTALLINE	59.00	43.00	37.00	.7	.7703
CLASTIC	82.00	56.50	39.50	.6	.6924

LOCATION # 6 (continued)

CRYSTALLINE	59.00	47.00	39.00	.7	.8075
CLASTIC	64.00	45.50	18.00	.5	.5848
CLASTIC	103.00	51.00	26.00	.5	.5000
CLASTIC	37.00	33.00	24.00	.7	.8332
CARBONATE	40.00	36.50	26.50	.7	.8456
CARBONATE	45.00	32.00	25.50	.8	.7386
CRYSTALLINE	56.00	43.00	30.00	.6	.7437
CRYSTALLINE	66.50	34.00	18.00	.6	.5173
CRYSTALLINE	46.00	41.00	26.00	.6	.7957
CLASTIC	66.00	56.00	12.00	.6	.5363
CARBONATE	41.00	34.50	19.00	.6	.7306
CARBONATE	42.50	28.50	25.00	.5	.7334
CARBONATE	45.00	40.00	25.00	.8	.7904
CLASTIC	90.50	75.00	23.00	.6	.5950
CLASTIC	44.00	31.50	22.50	.7	.7154
CLASTIC	68.50	58.00	24.00	.6	.6669
CARBONATE	88.00	60.50	40.50	.6	.6814
CRYSTALLINE	61.00	41.00	30.00	.6	.6914
CRYSTALLINE	44.00	33.00	19.50	.6	.6927
CLASTIC	96.00	37.50	34.00	.6	.5172
CRYSTALLINE	60.50	55.00	50.00	.6	.9091
CLASTIC	100.50	72.00	30.50	.6	.6013
CLASTIC	41.00	37.00	27.00	.7	.8407
CLASTIC	82.00	50.00	23.50	.5	.5591
CRYSTALLINE	68.00	60.00	43.00	.6	.8233
CLASTIC	79.00	74.00	21.50	.5	.6341
CLASTIC	80.50	78.50	26.00	.5	.6804
CLASTIC	65.50	41.00	18.00	.6	.5561
CARBONATE	44.00	32.00	24.50	.7	.7398
CLASTIC	66.00	57.00	22.00	.6	.6603
CLASTIC	103.00	97.00	17.50	.6	.5429
CRYSTALLINE	48.50	36.00	32.00	.5	.7882
CLASTIC	62.00	44.50	15.00	.6	.5579
CRYSTALLINE	49.00	42.00	20.50	.6	.7105
CLASTIC	50.00	46.00	20.50	.6	.7225
CARBONATE	58.00	41.00	24.00	.5	.6638
CARBONATE	48.00	45.00	29.00	.6	.8274
CRYSTALLINE	43.00	33.00	32.00	.5	.8297
CLASTIC	67.00	49.00	23.50	.6	.6354

AVERAGE SPHERICITY=.6684

AVERAGE ROUNDNESS=.61

TOTAL CLASTICS= 54

TOTAL CARBONATES= 18

TOTAL CRYSTALLINE= 28

CLASTICS

AVERAGE SPHERICITY=.6158

AVERAGE ROUNDNESS=.60

CARBONATES

AVERAGE SPHERICITY=.7579

AVERAGE ROUNDNESS=.63

CRYSTALLINE

AVERAGE SPHERICITY=.7125

AVERAGE ROUNDNESS=.62

LOCATION # 7

Elev. 781', Farifield Co. Ohio. Rockbridge
 Quad, T13N, R19W, Sec 24, 30 yards North of
 Private Bridge, Point Bar on north side of
 Clear Creek

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CRYSTALLINE	44.00	39.00	29.00	.6	.8360
CLASTIC	88.50	69.50	18.00	.6	.5426
CARBONATE	58.00	40.00	19.00	.6	.6090
CRYSTALLINE	44.00	34.00	30.00	.6	.8077
CLASTIC	77.00	62.50	27.00	.7	.6578
CRYSTALLINE	65.00	48.00	44.50	.5	.7966
CRYSTALLINE	48.00	47.00	22.00	.5	.7656
CLASTIC	58.00	52.00	30.00	.6	.7740
CARBONATE	47.00	40.00	26.50	.6	.7829
CLASTIC	63.00	62.00	22.00	.6	.7005
CARBONATE	53.50	52.00	35.00	.6	.8599
CARBONATE	54.00	36.00	18.50	.6	.6113
CRYSTALLINE	56.00	43.50	38.00	.5	.8078
CLASTIC	63.00	45.00	23.00	.6	.6389
CLASTIC	63.00	43.00	15.00	.5	.5457
CARBONATE	56.00	41.00	28.00	.6	.7154
CLASTIC	52.50	39.50	26.00	.5	.7196
CLASTIC	67.00	58.00	23.00	.6	.6673
CRYSTALLINE	52.50	40.00	26.00	.5	.7226
CRYSTALLINE	51.00	42.00	30.00	.6	.7854
CRYSTALLINE	43.00	34.00	19.00	.7	.7043
CRYSTALLINE	59.00	48.00	39.00	.6	.8132
CARBONATE	77.00	56.00	48.00	.5	.7682
CARBONATE	61.50	42.00	27.00	.6	.6693
CLASTIC	39.00	38.00	18.50	.5	.7732
CLASTIC	65.00	59.00	37.00	.7	.8024
CRYSTALLINE	47.00	31.00	25.00	.8	.7053
CARBONATE	54.50	46.00	36.00	.6	.8230
CRYSTALLINE	80.00	79.00	62.00	.6	.9147
CRYSTALLINE	64.50	44.00	32.00	.4	.6969
CRYSTALLINE	64.00	55.00	51.00	.5	.8814
CLASTIC	54.00	43.00	19.00	.6	.6544
CARBONATE	38.00	30.00	21.00	.6	.7584
CRYSTALLINE	69.00	54.00	42.00	.6	.7810
CLASTIC	64.00	50.00	22.50	.7	.6500
CRYSTALLINE	48.00	40.00	23.50	.6	.7417
CLASTIC	70.00	60.50	23.00	.7	.6573
CLASTIC	47.00	40.00	23.00	.8	.7468
CLASTIC	68.00	64.00	17.00	.6	.6174
CRYSTALLINE	50.00	34.50	19.50	.5	.6456
CRYSTALLINE	57.50	41.00	20.00	.5	.6283
CRYSTALLINE	51.00	40.00	24.00	.4	.7173
CLASTIC	70.00	53.00	25.00	.7	.6467
CLASTIC	51.00	37.00	24.50	.6	.7037
CRYSTALLINE	49.00	46.00	28.50	.6	.8173
CLASTIC	80.50	70.00	32.00	.8	.7018
CRYSTALLINE	81.00	65.00	39.00	.9	.7283
CRYSTALLINE	56.50	37.00	33.00	.6	.7259
CLASTIC	68.00	43.00	14.00	.7	.5068
CLASTIC	75.00	67.00	25.00	.6	.6678
CLASTIC	78.00	47.00	43.00	.6	.6926
CRYSTALLINE	52.00	39.50	29.00	.7	.7510
CLASTIC	74.00	52.00	16.50	.6	.5391
CLASTIC	48.00	45.50	20.00	.6	.7337
CRYSTALLINE	62.00	39.00	37.00	.8	.7214
CLASTIC	53.00	42.50	38.00	.6	.8315
CLASTIC	61.50	46.00	24.00	.6	.6633
CARBONATE	73.00	53.00	34.00	.6	.6967
CLASTIC	49.00	47.00	24.50	.5	.7828
CLASTIC	62.00	51.00	25.60	.6	.6977
CLASTIC	55.00	47.00	13.50	.6	.5942

LOCATION # 7 (continued)

CARBONATE	71.00	55.00	32.00	.6	.7042
CLASTIC	43.00	32.00	22.00	.7	.7248
CLASTIC	60.00	45.00	11.00	.5	.5161
CLASTIC	62.50	59.00	15.00	.6	.6096
CRYSTALLINE	50.00	43.00	24.00	.5	.7446
CLASTIC	50.00	38.00	10.00	.7	.5337
CLASTIC	69.50	39.00	31.00	.6	.6302
CLASTIC	58.00	52.00	30.00	.4	.7740
CLASTIC	47.50	40.50	18.50	.6	.6925
CLASTIC	60.00	58.00	15.00	.6	.6229
CLASTIC	50.00	36.00	22.00	.9	.6817
CARBONATE	57.00	35.00	34.00	.6	.7155
CRYSTALLINE	56.00	42.00	25.00	.5	.6944
CLASTIC	62.00	49.50	19.00	.7	.6254
CLASTIC	50.00	48.00	20.50	.4	.7329
CARBONATE	49.00	37.00	18.00	.7	.6522
CLASTIC	85.00	59.50	19.00	.6	.5389
CLASTIC	61.00	57.00	19.00	.7	.6627
CRYSTALLINE	45.00	40.00	31.00	.5	.8492
CLASTIC	60.00	49.00	10.00	.5	.5144
CARBONATE	70.00	46.00	32.00	.5	.6697
CRYSTALLINE	40.00	33.00	27.00	.6	.8227
CLASTIC	50.00	45.00	25.00	.6	.7663
CRYSTALLINE	54.00	42.00	34.00	.7	.7882
CLASTIC	65.00	41.00	35.00	.8	.6977
CRYSTALLINE	61.00	40.00	34.00	.7	.7150
CRYSTALLINE	64.00	50.00	43.00	.7	.8067
CLASTIC	42.00	32.00	22.00	.7	.7362
CLASTIC	55.00	40.00	14.00	.6	.5699
CLASTIC	62.00	36.00	34.00	.6	.6829
CLASTIC	62.00	49.00	24.00	.6	.6738
CLASTIC	69.00	50.00	12.00	.6	.5014
CRYSTALLINE	46.00	38.00	30.00	.7	.8137
CRYSTALLINE	52.00	32.00	29.00	.7	.7001
CLASTIC	52.00	32.00	21.00	.6	.6287
CRYSTALLINE	65.00	38.00	11.00	.5	.4625
CLASTIC	43.00	34.00	19.00	.6	.7043
CLASTIC	67.00	60.00	14.00	.5	.5720
CLASTIC	62.00	58.00	19.00	.6	.6594

AVERAGE SPHERICITY=.6989

AVERAGE ROUNDNESS=.61

TOTAL CLASTICS= 53

TOTAL CARBONATES= 14

TOTAL CRYSTALLINE= 33

CLASTICS

AVERAGE SPHERICITY=.6597

AVERAGE ROUNDNESS=.62

CARBONATES

AVERAGE SPHERICITY=.7168

AVERAGE ROUNDNESS=.59

CRYSTALLINE

AVERAGE SPHERICITY=.7543

AVERAGE ROUNDNESS=.60

LOCATION # 8

Elev. 790', Fairfield Co. Ohio. Clearport
 Quad, T13N, R19W, Sec 13, 0.7 mile Southeast
 of Clear Creek Bridge (Sec 14), Point Bar
 on north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	79.50	55.00	16.00	.5	.5183
CLASTIC	65.00	59.00	9.50	.4	.5100
CRYSTALLINE	50.00	37.00	20.00	.7	.6664
CLASTIC	86.00	49.50	14.50	.7	.4595
CLASTIC	64.00	38.00	20.00	.7	.5704
CARBONATE	77.00	48.00	42.00	.6	.6980
CLASTIC	67.00	66.00	29.00	.6	.7527
CRYSTALLINE	69.00	57.00	40.00	.4	.7824
CLASTIC	69.00	52.50	37.00	.5	.7417
CLASTIC	63.00	58.50	38.50	.8	.8279
CLASTIC	52.00	49.00	26.50	.5	.7831
CLASTIC	89.00	73.00	36.00	.8	.6923
CRYSTALLINE	74.50	55.50	36.00	.5	.7114
CARBONATE	67.00	54.50	36.00	.5	.7589
CLASTIC	67.00	52.00	30.00	.6	.7031
CRYSTALLINE	69.00	52.00	37.00	.7	.7393
CARBONATE	87.00	47.50	27.50	.5	.5568
CLASTIC	64.00	37.00	25.00	.8	.6090
CARBONATE	83.00	47.00	33.00	.5	.6083
CRYSTALLINE	43.00	30.00	29.00	.7	.7778
CLASTIC	61.00	47.00	14.00	.6	.5613
CLASTIC	95.00	53.00	29.00	.6	.5543
CLASTIC	54.00	50.00	29.00	.7	.7922
CRYSTALLINE	61.00	40.00	35.00	.7	.7219
CLASTIC	53.00	30.00	25.50	.6	.6482
CLASTIC	66.00	50.00	20.00	.5	.6123
CARBONATE	44.00	35.00	30.00	.7	.8155
CRYSTALLINE	48.00	32.00	15.00	.6	.5928
CRYSTALLINE	48.00	43.00	32.50	.6	.8465
CLASTIC	69.00	52.00	27.00	.7	.6656
CLASTIC	88.00	67.00	32.00	.5	.6518
CLASTIC	65.00	54.00	24.50	.5	.6791
CLASTIC	68.00	44.00	25.50	.7	.6237
CRYSTALLINE	81.00	52.50	41.50	.6	.6925
CLASTIC	67.00	50.00	29.00	.6	.6861
CLASTIC	50.50	39.00	11.00	.6	.5520
CLASTIC	74.00	57.00	22.00	.6	.6118
CLASTIC	79.00	59.00	26.00	.8	.6264
CARBONATE	60.00	49.00	18.00	.7	.6257
CARBONATE	57.00	49.00	26.00	.9	.7319
CLASTIC	63.00	44.00	24.00	.6	.6432
CLASTIC	53.00	40.00	18.50	.6	.6411
CLASTIC	62.00	43.00	20.00	.8	.6071
CLASTIC	75.00	37.50	17.00	.5	.4839
CLASTIC	47.00	33.00	24.50	.6	.7153
CLASTIC	83.00	55.00	25.00	.8	.5844
CLASTIC	65.00	57.50	33.00	.3	.7658
CLASTIC	85.00	57.00	38.00	.6	.6693
CLASTIC	78.00	62.00	14.00	.7	.5225
CRYSTALLINE	55.00	50.00	34.00	.8	.8252
CLASTIC	48.50	39.00	19.00	.6	.6804
CRYSTALLINE	45.00	42.00	19.50	.8	.7395
CARBONATE	44.00	35.00	28.00	.7	.7970
CLASTIC	53.00	39.00	24.00	.7	.6933
CARBONATE	69.00	53.00	36.00	.6	.7373
CLASTIC	78.00	62.00	18.00	.7	.5682
CLASTIC	68.00	39.00	29.00	.7	.6254
CRYSTALLINE	71.00	53.00	17.00	.6	.5633
CRYSTALLINE	73.00	48.00	41.00	.6	.7175
CLASTIC	93.00	50.00	14.00	.6	.4326
CLASTIC	67.00	49.00	20.00	.5	.6021

LOCATION # 8 (Continued)

CLASTIC	60.00	36.00	16.00	.5	.5429
CRYSTALLINE	69.00	50.00	39.00	.4	.7426
CLASTIC	68.00	40.00	10.00	.5	.4423
CRYSTALLINE	60.00	54.00	37.00	.5	.8218
CLASTIC	60.00	34.00	30.00	.6	.6568
CARBONATE	80.00	50.00	36.00	.6	.6552
CLASTIC	52.00	41.00	21.00	.6	.6829
CLASTIC	49.00	45.00	21.00	.5	.7328
CLASTIC	70.00	57.00	27.00	.5	.6797
CARBONATE	50.00	45.00	25.00	.6	.7663
CRYSTALLINE	69.00	58.00	40.00	.5	.7869
CLASTIC	46.00	30.00	17.00	.6	.6223
CLASTIC	60.00	31.00	20.00	.6	.5564
CLASTIC	40.00	34.00	23.00	.5	.7877
CARBONATE	50.00	32.00	20.00	.5	.6350
CRYSTALLINE	80.00	71.00	35.00	.6	.7295
CLASTIC	49.00	37.00	22.00	.7	.6973
CRYSTALLINE	34.00	24.00	20.00	.7	.7460
CRYSTALLINE	53.00	49.00	30.00	.7	.8059
CLASTIC	64.00	51.00	15.00	.4	.5716
CRYSTALLINE	53.00	49.00	35.00	.7	.8483
CLASTIC	67.00	58.00	15.00	.4	.5787
CLASTIC	65.00	46.00	29.00	.5	.6809
CLASTIC	52.00	33.00	19.00	.6	.6144
CLASTIC	76.00	35.00	15.00	.4	.4496
CLASTIC	41.00	31.00	20.00	.5	.7171
CARBONATE	55.00	49.00	27.00	.5	.7591
CLASTIC	78.00	53.00	16.00	.4	.5185
CLASTIC	45.00	42.00	3.00	.3	.3963
CRYSTALLINE	55.00	51.00	25.00	.6	.7498
CRYSTALLINE	57.00	51.00	40.00	.7	.8563
CLASTIC	55.00	41.00	16.00	.4	.6008
CLASTIC	50.00	36.00	17.00	.5	.6256
CLASTIC	46.00	28.00	19.00	.5	.6311
CLASTIC	57.00	40.00	20.00	.5	.6268
CLASTIC	71.00	62.00	10.00	.7	.4973
CLASTIC	76.00	40.00	9.00	.4	.3965
CLASTIC	75.00	51.00	18.00	.5	.5465
CRYSTALLINE	53.00	51.00	23.00	.5	.7474

AVERAGE SPHERICITY=.6588

AVERAGE ROUNDNESS=.59

TOTAL CLASTICS= 64

TOTAL CARBONATES= 13

TOTAL CRYSTALLINE= 23

CLASTICS

AVERAGE SPHERICITY=.6175

AVERAGE ROUNDNESS=.57

CARBONATES

AVERAGE SPHERICITY=.7035

AVERAGE ROUNDNESS=.61

CRYSTALLINE

AVERAGE SPHERICITY=.7483

AVERAGE ROUNDNESS=.62

LOCATION # 9

Elev. 796', Fairfield Co. Ohio. Clearport
 Quad, T13N, R19W, Sec 14, 40 yards Northeast
 of Clear Creek Bridge, Point Bar on north
 side of Clear Creek

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	23.00	52.00	29.00	.7	*****
CLASTIC	71.00	63.00	33.00	.6	.7444
CLASTIC	51.00	36.00	16.50	.7	.6112
CARBONATE	38.00	27.00	20.50	.7	.7264
CLASTIC	39.00	33.00	22.50	.7	.7874
CARBONATE	54.00	44.00	37.00	.4	.8234
CLASTIC	60.00	36.00	11.00	.6	.4791
CLASTIC	53.00	45.00	9.00	.4	.5244
CLASTIC	78.50	50.00	24.00	.6	.5796
CARBONATE	51.00	37.00	22.00	.5	.6789
CLASTIC	66.00	47.00	36.00	.6	.7296
CARBONATE	37.00	36.50	23.00	.5	.8496
CARBONATE	57.00	41.00	20.00	.7	.6320
CARBONATE	63.00	36.00	26.00	.5	.6178
CARBONATE	79.00	37.50	26.00	.5	.5386
CLASTIC	55.00	47.00	26.50	.6	.7439
CLASTIC	58.00	43.00	29.00	.6	.7184
CLASTIC	43.00	38.00	15.00	.6	.6755
CARBONATE	51.00	37.00	26.00	.5	.7178
CRYSTALLINE	60.50	34.00	21.00	.7	.5800
CARBONATE	57.00	37.50	20.00	.6	.6134
CARBONATE	67.00	40.00	21.00	.4	.5720
CLASTIC	44.00	38.00	27.00	.8	.8092
CARBONATE	48.00	25.00	23.00	.5	.6296
CLASTIC	50.00	45.00	7.50	.4	.5130
CARBONATE	58.00	44.00	25.00	.6	.6889
CARBONATE	50.50	37.00	15.00	.7	.6015
CLASTIC	41.00	32.00	21.50	.8	.7425
CLASTIC	40.00	32.00	30.00	.7	.8434
CLASTIC	42.00	32.00	16.00	.6	.6621
CLASTIC	75.00	66.00	19.00	.5	.6064
CLASTIC	54.00	34.00	15.00	.6	.5592
CLASTIC	59.00	28.00	23.00	.4	.5698
CLASTIC	48.00	39.00	11.50	.6	.5796
CLASTIC	70.00	38.00	26.50	.6	.5901
CLASTIC	40.00	35.00	20.00	.6	.7591
CLASTIC	56.00	52.00	13.00	.6	.5996
CLASTIC	69.00	45.00	45.00	.6	.7520
CLASTIC	58.00	54.00	12.00	.4	.5775
CLASTIC	76.00	72.50	30.00	.7	.7221
CLASTIC	64.00	49.00	23.00	.5	.6504
CLASTIC	47.00	40.00	23.00	.6	.7468
CRYSTALLINE	51.00	37.50	22.00	.5	.6820
CLASTIC	37.00	27.00	23.00	.8	.7684
CLASTIC	65.00	54.00	12.00	.6	.5353
CARBONATE	60.00	38.00	23.00	.6	.6238
CLASTIC	80.00	50.00	45.00	.7	.7058
CLASTIC	45.00	39.50	31.50	.5	.8501
CLASTIC	44.00	31.00	18.00	.5	.6606
CLASTIC	49.00	47.00	25.00	.5	.7880
CLASTIC	47.00	29.00	27.50	.6	.7121
CLASTIC	45.00	38.00	23.00	.7	.7557
CLASTIC	56.00	34.00	22.00	.5	.6202
CRYSTALLINE	79.00	55.00	10.00	.5	.4450
CLASTIC	73.00	38.00	12.00	.4	.4407
CLASTIC	58.00	43.00	21.00	.5	.6451
CLASTIC	59.00	45.00	22.00	.4	.6576
CLASTIC	60.00	43.00	14.00	.4	.5509
CARBONATE	50.00	40.00	26.00	.5	.7465
CLASTIC	76.00	51.00	42.00	.4	.7185
CARBONATE	98.00	51.00	21.00	.4	.4813

LOCATION # 9 (Continued)

CLASTIC	40.00	30.00	18.00	.5	.6962
CLASTIC	44.00	36.00	11.00	.4	.5892
CLASTIC	72.00	41.00	12.00	.5	.4561
CLASTIC	49.00	40.00	18.00	.6	.6693
CRYSTALLINE	54.00	38.00	17.00	.6	.6051
CLASTIC	30.00	80.00	28.00	.7	*****
CLASTIC	57.00	35.00	22.00	.5	.6188
CLASTIC	56.00	40.00	10.00	.4	.5034
CARBONATE	65.00	43.00	6.00	.4	.3938
CLASTIC	70.00	40.00	29.00	.5	.6186
CLASTIC	50.00	36.00	30.00	.7	.7560
CLASTIC	57.00	51.00	12.00	.4	.5732
CLASTIC	49.00	47.00	20.00	.5	.7316
CRYSTALLINE	60.00	45.00	3.00	.4	.3347
CLASTIC	60.00	38.00	30.00	.5	.6816
CLASTIC	46.00	40.00	3.00	.3	.3842
CLASTIC	68.00	41.00	13.00	.4	.4867
CLASTIC	50.00	48.00	9.00	.4	.5570
CRYSTALLINE	55.00	38.00	5.00	.4	.3975
CARBONATE	55.00	34.00	25.00	.5	.6550
CLASTIC	70.00	40.00	21.00	.5	.5555
CLASTIC	40.00	32.00	26.00	.5	.8041
CLASTIC	60.00	48.00	10.00	.4	.5109
CRYSTALLINE	50.00	35.00	22.00	.4	.6753
CLASTIC	67.00	49.00	31.00	.7	.6968
CLASTIC	78.00	49.00	30.00	.5	.6228
CLASTIC	70.00	58.00	16.00	.5	.5743
CLASTIC	54.00	24.00	7.00	.4	.3862
CLASTIC	51.00	47.00	17.00	.6	.6747
CLASTIC	56.00	40.00	4.00	.4	.3709
CARBONATE	68.00	20.00	16.00	.4	.4106
CLASTIC	60.00	40.00	13.00	.4	.5247
CLASTIC	40.00	39.00	9.00	.5	.6031
CRYSTALLINE	44.00	32.00	20.00	.5	.6914
CLASTIC	49.00	40.00	20.00	.5	.6933
CLASTIC	41.00	37.00	28.00	.5	.8510
CARBONATE	48.00	35.00	21.00	.5	.6833
CLASTIC	59.00	58.00	25.00	.7	.7468
CARBONATE	65.00	32.00	11.00	.5	.4368

AVERAGE SPHERICITY=.6453

AVERAGE ROUNDNESS=.53

TOTAL CLASTICS= 71

TOTAL CARBONATES= 21

TOTAL CRYSTALLINE= 8

CLASTICS

AVERAGE SPHERICITY=.6619

AVERAGE ROUNDNESS=.54

CARBONATES

AVERAGE SPHERICITY=.6248

AVERAGE ROUNDNESS=.52

CRYSTALLINE

AVERAGE SPHERICITY=.5514

AVERAGE ROUNDNESS=.50

LOCATION # 10

Elev. 802', Fairfield Co. Ohio. Clearport
 Quad, T13N, R19W, Sec 14, 20 yards Northeast
 Clear Creek Bridge, northeast corner Sec 14,
 Point Bar on north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CLASTIC	58.00	46.00	22.00	.6	.6701
CLASTIC	60.00	39.00	26.50	.4	.6597
CLASTIC	66.00	51.00	41.00	.6	.7830
CLASTIC	57.00	38.50	29.00	.4	.7004
CARBONATE	52.50	32.00	22.00	.7	.6345
CLASTIC	59.00	33.50	20.00	.6	.5774
CLASTIC	53.50	40.00	18.50	.6	.6371
CLASTIC	46.50	46.00	30.00	.6	.8610
CLASTIC	54.00	38.00	9.00	.6	.4895
CARBONATE	64.00	39.00	22.00	.6	.5939
CLASTIC	42.00	41.00	10.00	.6	.6148
CLASTIC	74.00	45.50	11.00	.5	.4505
CLASTIC	74.00	51.00	19.00	.6	.5614
CARBONATE	60.00	41.00	15.00	.7	.5549
CLASTIC	65.00	49.00	12.00	.6	.5182
CRYSTALLINE	46.00	35.50	16.50	.4	.6517
CLASTIC	75.00	61.00	30.00	.6	.6878
CRYSTALLINE	47.00	32.00	25.00	.5	.7128
CARBONATE	46.00	43.00	20.50	.8	.7469
CLASTIC	44.50	33.00	18.00	.5	.6694
CARBONATE	56.00	54.00	20.00	.5	.7009
CRYSTALLINE	55.00	39.00	33.00	.5	.7521
CLASTIC	101.00	58.00	54.00	.8	.6746
CLASTIC	83.00	66.00	34.00	.5	.6881
CARBONATE	79.00	69.00	40.00	.6	.7619
CLASTIC	78.00	69.00	25.00	.5	.6570
CLASTIC	65.00	35.00	30.00	.4	.6287
CARBONATE	61.00	44.00	35.00	.5	.7452
CRYSTALLINE	40.00	30.00	23.00	.5	.7555
CRYSTALLINE	47.00	42.00	35.00	.6	.8731
CLASTIC	46.00	32.00	20.00	.5	.6713
CARBONATE	47.00	35.00	30.00	.7	.7804
CLASTIC	64.00	49.00	15.00	.5	.5640
CARBONATE	54.00	36.00	26.00	.6	.6847
CRYSTALLINE	60.00	54.00	47.00	.7	.8900
CRYSTALLINE	55.00	44.00	32.00	.7	.7750
CLASTIC	64.00	61.00	30.00	.4	.7645
CLASTIC	50.00	32.00	27.00	.5	.7018
CLASTIC	89.00	60.00	25.00	.6	.5743
CRYSTALLINE	73.00	55.00	15.00	.4	.5370
CLASTIC	58.00	50.00	10.00	.5	.5297
CARBONATE	32.00	31.00	21.00	.7	.8599
CARBONATE	51.00	37.00	23.00	.5	.6891
CLASTIC	56.00	38.00	19.00	.5	.6129
CLASTIC	50.00	44.00	21.00	.5	.7176
CLASTIC	75.00	70.00	11.00	.5	.5154
CLASTIC	60.00	41.00	15.00	.5	.5549
CLASTIC	50.00	45.00	14.00	.4	.6316
CLASTIC	84.00	41.00	18.00	.5	.4712
CARBONATE	50.00	41.00	17.00	.5	.6533
CRYSTALLINE	38.00	30.00	26.00	.5	.8144
CARBONATE	38.00	35.00	26.00	.6	.8573
CLASTIC	33.00	26.00	19.00	.6	.7684
CLASTIC	50.00	48.00	8.00	.5	.5355
CLASTIC	52.00	40.00	11.00	.5	.5459
CLASTIC	46.00	31.00	22.00	.6	.6856
CLASTIC	66.00	26.00	18.00	.5	.4754
CARBONATE	36.00	29.00	20.00	.6	.7649
CRYSTALLINE	51.00	37.00	21.00	.5	.6685
CARBONATE	60.00	38.00	10.00	.4	.4726
CRYSTALLINE	41.00	35.00	25.00	.6	.8044

LOCATION # 10 (Continued)

CLASTIC	42.00	38.00	18.00	.7	.7292
CLASTIC	62.00	50.00	15.00	.5	.5800
CLASTIC	63.00	46.00	9.00	.5	.4707
CLASTIC	66.00	48.00	19.00	.5	.5938
CLASTIC	70.00	47.00	35.00	.5	.6950
CLASTIC	37.00	30.00	20.00	.6	.7596
CLASTIC	70.00	40.00	13.00	.5	.4734
CLASTIC	56.00	45.00	34.50	.4	.7911
CARBONATE	59.00	44.00	27.00	.6	.6988
CLASTIC	63.00	59.00	16.00	.6	.6196
CRYSTALLINE	58.00	42.00	35.00	.5	.7588
CLASTIC	59.00	55.00	31.00	.6	.7883
CLASTIC	53.00	44.50	25.00	.8	.7344
CLASTIC	54.00	48.00	34.00	.6	.8241
CRYSTALLINE	63.00	49.00	43.00	.7	.8097
CARBONATE	43.00	34.00	26.50	.6	.7869
CLASTIC	82.50	41.50	29.00	.6	.5613
CLASTIC	55.00	48.00	17.50	.7	.6524
CLASTIC	62.00	48.00	23.50	.6	.6645
CLASTIC	45.00	41.00	12.50	.5	.6325
CRYSTALLINE	97.00	64.00	39.50	.7	.6453
CARBONATE	59.00	49.00	30.00	.6	.7502
CLASTIC	112.00	66.00	40.50	.7	.5973
CARBONATE	55.00	41.00	35.00	.6	.7799
CARBONATE	67.00	52.00	31.50	.6	.7146
CLASTIC	62.00	53.50	29.00	.5	.7390
CRYSTALLINE	59.00	53.00	28.00	.5	.7526
CLASTIC	68.00	64.00	19.50	.6	.6462
CLASTIC	69.00	55.00	31.00	.7	.7101
CRYSTALLINE	64.00	45.50	39.00	.5	.7567
CLASTIC	58.00	37.00	25.00	.6	.6503
CARBONATE	72.00	42.00	19.00	.6	.5359
CRYSTALLINE	49.50	36.00	20.00	.7	.6648
CLASTIC	76.00	68.50	27.50	.6	.6883
CRYSTALLINE	58.00	45.00	36.00	.6	.7838
CRYSTALLINE	65.50	37.50	21.00	.7	.5683
CLASTIC	57.00	50.00	27.00	.6	.7462
CLASTIC	62.00	35.50	31.00	.5	.6591
CLASTIC	56.50	34.00	33.00	.8	.7057

AVERAGE SPHERICITY=.6730

AVERAGE ROUNDNESS=.57

TOTAL CLASTICS= 60

TOTAL CARBONATES= 21

TOTAL CRYSTALLINE= 19

CLASTICS

AVERAGE SPHERICITY=.6427

AVERAGE ROUNDNESS=.56

CARBONATES

AVERAGE SPHERICITY=.7032

AVERAGE ROUNDNESS=.60

CRYSTALLINE

AVERAGE SPHERICITY=.7355

AVERAGE ROUNDNESS=.57

LOCATION # 11

Elev. 805', Fairfield Co. Ohio, Clearport
 Quad. T13N, R19W, Sec 14, 0.4 mile Northeast
 of Clear Creek Bridge, Point Bar on east
 side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CRYSTALLINE	68.00	62.00	32.00	.5	.7542
CRYSTALLINE	100.00	65.00	21.00	.5	.5149
CARBONATE	70.00	42.00	40.00	.6	.6999
CRYSTALLINE	74.00	66.00	39.00	.5	.7775
CRYSTALLINE	75.00	70.00	40.00	.7	.7925
CLASTIC	93.00	58.00	27.00	.5	.5657
CARBONATE	62.00	50.00	15.00	.5	.5800
CLASTIC	62.00	56.00	41.00	.5	.8422
CRYSTALLINE	43.00	33.00	17.00	.7	.6720
CRYSTALLINE	40.00	31.00	21.00	.5	.7410
CRYSTALLINE	90.00	66.00	42.00	.7	.6995
CRYSTALLINE	80.00	57.00	48.00	.6	.7533
CARBONATE	56.00	36.00	23.00	.6	.6415
CRYSTALLINE	63.00	47.00	39.00	.5	.7730
CLASTIC	79.00	52.00	30.00	.5	.6299
CLASTIC	41.00	28.00	23.00	.5	.7263
CLASTIC	85.00	56.00	16.00	.4	.4987
CARBONATE	47.00	39.00	33.00	.5	.8352
CRYSTALLINE	41.00	31.00	20.00	.6	.7171
CRYSTALLINE	74.00	46.00	31.00	.5	.6386
CRYSTALLINE	49.00	40.00	29.00	.5	.7847
CARBONATE	75.00	51.00	40.00	.6	.7131
CRYSTALLINE	59.00	42.00	33.00	.5	.7357
CARBONATE	58.00	49.00	28.00	.5	.7416
CRYSTALLINE	66.00	59.00	41.00	.6	.8220
CLASTIC	53.00	43.00	20.00	.5	.6740
CARBONATE	60.00	51.00	29.00	.5	.7434
CRYSTALLINE	46.00	34.00	26.00	.5	.7476
CLASTIC	84.00	46.00	17.00	.4	.4803
CRYSTALLINE	82.00	58.00	16.00	.5	.5168
CRYSTALLINE	50.00	31.00	30.00	.6	.7192
CRYSTALLINE	83.00	53.00	43.00	.5	.6916
CRYSTALLINE	78.00	60.00	35.00	.5	.7015
CRYSTALLINE	39.00	30.00	24.00	.7	.7794
CLASTIC	37.00	30.00	23.00	.5	.7958
CRYSTALLINE	52.00	38.00	21.00	.5	.6658
CARBONATE	75.00	59.00	28.00	.5	.6647
CLASTIC	64.00	57.00	35.00	.7	.7868
CRYSTALLINE	60.00	45.00	20.00	.5	.6300
CRYSTALLINE	41.00	30.00	25.00	.5	.7641
CRYSTALLINE	50.00	41.00	25.00	.5	.7429
CRYSTALLINE	37.00	36.00	16.00	.6	.7493
CARBONATE	45.00	35.00	24.00	.5	.7458
CRYSTALLINE	41.00	36.00	29.00	.5	.8532
CLASTIC	59.00	51.00	17.00	.5	.6292
CLASTIC	47.00	27.00	16.00	.5	.5804
CARBONATE	88.00	67.00	38.00	.6	.6902
CARBONATE	56.00	36.00	28.00	.5	.6850
CARBONATE	51.00	42.00	11.00	.6	.5621
CLASTIC	64.50	53.00	12.00	.5	.5347
CRYSTALLINE	78.00	41.00	22.00	.5	.5293
CARBONATE	50.00	30.00	20.00	.5	.6214
CRYSTALLINE	64.00	48.00	32.00	.6	.7211
CRYSTALLINE	62.00	41.00	12.00	.6	.5040
CRYSTALLINE	53.00	52.00	35.00	.7	.8653
CRYSTALLINE	63.00	48.00	32.50	.5	.7325
CLASTIC	81.50	40.00	10.00	.6	.3920
CARBONATE	38.00	37.00	22.00	.6	.8261
CARBONATE	80.00	51.00	29.00	.6	.6137
CARBONATE	47.00	32.00	24.00	.7	.7032
CARBONATE	74.50	60.00	66.00	.6	.8936

LOCATION # 11 (Continued)

CLASTIC	49.00	35.00	25.00	.6	.7143
CRYSTALLINE	47.00	34.50	23.50	.7	.7160
CARBONATE	71.00	54.00	25.00	.6	.6446
CLASTIC	71.50	49.00	30.00	.6	.6600
CLASTIC	74.00	45.00	15.00	.5	.4977
CLASTIC	72.00	50.00	23.50	.6	.6097
CARBONATE	53.00	43.50	31.00	.6	.7830
CRYSTALLINE	63.00	46.00	33.00	.6	.7259
CRYSTALLINE	70.00	54.00	46.00	.6	.7974
CLASTIC	91.50	69.00	19.00	.5	.5390
CARBONATE	65.00	48.00	29.00	.6	.6907
CARBONATE	44.00	35.00	22.00	.6	.7354
CRYSTALLINE	48.00	29.00	25.00	.5	.6802
CLASTIC	55.00	49.00	29.00	.5	.7774
CLASTIC	48.00	41.50	13.00	.5	.6164
CRYSTALLINE	65.00	53.00	29.00	.6	.7139
CARBONATE	36.00	27.00	22.00	.7	.7710
CRYSTALLINE	57.00	43.00	30.50	.7	.7390
CRYSTALLINE	48.00	37.00	9.00	.5	.5248
CLASTIC	60.00	43.50	12.00	.5	.5254
CLASTIC	65.00	47.00	24.50	.6	.6484
CARBONATE	85.50	45.00	22.50	.7	.5174
CLASTIC	53.00	38.00	12.50	.5	.5530
CARBONATE	69.00	43.00	34.00	.5	.6747
CARBONATE	43.50	41.00	19.00	.6	.7439
CRYSTALLINE	50.00	40.00	25.00	.6	.7368
CARBONATE	65.00	34.00	32.00	.6	.6362
CRYSTALLINE	56.00	39.50	21.00	.7	.6419
CRYSTALLINE	70.00	59.50	49.00	.6	.8411
CRYSTALLINE	85.00	39.00	28.00	.6	.5327
CRYSTALLINE	55.00	37.00	34.00	.6	.7464
CARBONATE	69.00	37.00	30.00	.6	.6155
CARBONATE	54.00	45.00	31.50	.6	.7863
CARBONATE	59.00	49.00	40.00	.5	.8258
CRYSTALLINE	49.00	39.50	29.50	.7	.7859
CRYSTALLINE	62.50	57.00	31.00	.5	.7676
CRYSTALLINE	66.00	53.00	36.00	.6	.7594
CARBONATE	70.00	54.00	22.50	.6	.6282
CRYSTALLINE	48.00	37.50	23.00	.6	.7207

AVERAGE SPHERICITY=.6881

AVERAGE ROUNDNESS=.56

TOTAL CLASTICS= 23

TOTAL CARBONATES= 30

TOTAL CRYSTALLINE= 47

CLASTICS

AVERAGE SPHERICITY=.6207

AVERAGE ROUNDNESS=.52

CARBONATES

AVERAGE SPHERICITY=.7004

AVERAGE ROUNDNESS=.58

CRYSTALLINE

AVERAGE SPHERICITY=.7132

AVERAGE ROUNDNESS=.57

LOCATION # 12

Elev.

Elev. 810', Fairfield Co. Ohio, Clearport
 Quad, T13N, R19W, Sec 10, 0.2 mile Southwest
 of Clear Creek Bridge (Sec 10), Point Bar on
 north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CARBONATE	73.00	48.00	19.50	.5	.5600
CLASTIC	70.00	60.00	26.00	.5	.6828
CRYSTALLINE	62.00	61.00	33.00	.6	.8060
CLASTIC	43.00	37.00	25.00	.7	.7938
CARBONATE	80.00	70.00	30.00	.6	.6897
CLASTIC	77.50	38.00	19.00	.7	.4935
CLASTIC	63.00	48.00	23.00	.7	.6528
CRYSTALLINE	62.00	55.00	36.00	.6	.8016
CRYSTALLINE	46.50	41.00	26.50	.7	.7950
CRYSTALLINE	60.00	57.00	29.00	.7	.7715
CLASTIC	65.00	49.50	10.00	.6	.4893
CRYSTALLINE	64.00	37.00	33.50	.5	.6714
CARBONATE	50.00	45.00	21.50	.7	.7287
CRYSTALLINE	46.00	37.50	28.50	.5	.7964
CRYSTALLINE	51.00	38.00	22.00	.7	.6850
CARBONATE	63.00	39.00	27.00	.6	.6426
CARBONATE	51.00	46.00	25.00	.6	.7618
CLASTIC	64.00	47.50	10.00	.6	.4877
CARBONATE	88.00	57.00	23.00	.4	.5532
CARBONATE	78.00	48.00	26.00	.6	.5898
CRYSTALLINE	41.50	34.00	22.00	.5	.7573
CARBONATE	69.50	53.00	25.00	.6	.6498
CLASTIC	53.00	44.50	21.00	.5	.6929
CLASTIC	67.00	44.00	20.00	.4	.5809
CRYSTALLINE	50.00	41.00	31.00	.5	.7981
CARBONATE	68.00	61.00	49.00	.6	.8646
CLASTIC	41.00	40.50	23.50	.6	.8273
CRYSTALLINE	78.50	51.00	41.00	.6	.6975
CRYSTALLINE	38.00	42.50	27.50	.7	.9319
CRYSTALLINE	44.50	37.00	27.00	.5	.7961
CRYSTALLINE	46.00	43.00	27.00	.5	.8187
CARBONATE	38.00	35.00	17.00	.6	.7441
CRYSTALLINE	57.00	52.00	32.00	.5	.8001
CARBONATE	47.00	27.50	22.00	.6	.6494
CLASTIC	60.00	55.00	16.00	.6	.6253
CARBONATE	64.00	37.00	30.00	.6	.6471
CLASTIC	69.00	39.00	6.50	.4	.3762
CLASTIC	46.00	39.00	28.00	.6	.8021
CLASTIC	44.50	44.00	10.00	.6	.6057
CRYSTALLINE	44.00	38.00	29.00	.5	.8288
CARBONATE	60.00	45.00	25.00	.6	.6786
CARBONATE	69.00	41.50	28.50	.6	.6286
CRYSTALLINE	60.00	40.00	26.00	.6	.6611
CARBONATE	56.00	36.00	23.00	.6	.6415
CARBONATE	79.00	42.00	17.00	.7	.4855
CARBONATE	44.50	38.00	32.00	.5	.8500
CLASTIC	64.00	46.00	31.00	.6	.7035
CRYSTALLINE	47.00	38.00	27.50	.6	.7792
CLASTIC	53.00	40.00	15.00	.6	.5978
CLASTIC	52.00	40.00	16.00	.4	.6186
CARBONATE	65.00	30.00	17.00	.6	.4942
CRYSTALLINE	44.00	31.00	22.00	.5	.7063
CRYSTALLINE	63.00	53.50	37.50	.8	.7966
CRYSTALLINE	40.00	33.00	24.00	.6	.7910
CLASTIC	48.00	42.00	19.00	.5	.7023
CLASTIC	45.00	34.00	23.00	.5	.7282
CARBONATE	36.00	26.00	25.00	.6	.7945
CLASTIC	39.00	26.00	24.00	.4	.7431
CLASTIC	42.00	41.00	11.00	.5	.6347
CARBONATE	46.00	25.00	16.00	.6	.5739
CRYSTALLINE	54.00	52.00	41.00	.5	.9009

LOCATION # 12 (Continued)

CRYSTALLINE	60.00	57.00	37.00	.6	.8367
CARBONATE	77.00	54.00	30.00	.5	.6489
CRYSTALLINE	47.00	39.00	31.00	.5	.8180
CRYSTALLINE	63.00	38.00	31.00	.5	.6670
CARBONATE	46.00	36.00	30.00	.5	.7992
CARBONATE	50.00	43.00	20.00	.6	.7007
CRYSTALLINE	59.00	54.00	38.00	.5	.8385
CRYSTALLINE	36.00	31.00	20.00	.5	.7821
CARBONATE	50.00	40.00	20.00	.6	.6840
CLASTIC	68.00	32.00	25.00	.5	.5572
CARBONATE	52.00	35.00	24.00	.4	.6773
CRYSTALLINE	43.00	40.00	15.00	.6	.6872
CLASTIC	46.00	31.00	20.00	.5	.6642
CARBONATE	60.00	53.00	29.00	.7	.7530
CLASTIC	62.00	48.00	26.00	.5	.6873
CARBONATE	48.00	41.00	31.00	.5	.8201
CARBONATE	50.00	50.00	32.00	.5	.8618
CRYSTALLINE	43.00	27.00	19.00	.5	.6522
CARBONATE	40.00	36.00	20.00	.5	.7663
CRYSTALLINE	60.00	50.00	22.00	.6	.6735
CRYSTALLINE	59.00	52.00	27.00	.5	.7388
CARBONATE	49.00	45.00	30.00	.5	.8254
CLASTIC	68.00	58.00	30.00	.6	.7220
CLASTIC	74.00	50.00	14.00	.4	.5037
CLASTIC	47.00	41.00	26.00	.5	.7844
CRYSTALLINE	63.00	39.00	20.00	.6	.5814
CARBONATE	58.00	53.00	40.00	.5	.8574
CLASTIC	43.00	38.00	24.00	.6	.7901
CRYSTALLINE	58.00	46.00	29.00	.7	.7347
CARBONATE	72.00	60.00	41.00	.5	.7800
CRYSTALLINE	74.00	58.00	45.00	.6	.7811
CRYSTALLINE	62.00	44.00	30.00	.5	.7003
CARBONATE	60.00	50.00	35.00	.5	.7863
CRYSTALLINE	76.00	55.00	36.00	.6	.6999
CARBONATE	50.00	44.00	35.00	.5	.8509
CRYSTALLINE	59.00	50.00	35.00	.5	.7951
CRYSTALLINE	59.00	51.00	30.00	.6	.7603
CRYSTALLINE	50.00	40.00	36.00	.5	.8320
CLASTIC	61.00	51.00	17.00	.5	.6153

AVERAGE SPHERICITY=.7117

AVERAGE ROUNDNESS=.56

TOTAL CLASTICS= 28

TOTAL CARBONATES= 34

TOTAL CRYSTALLINE= 38

CLASTICS

AVERAGE SPHERICITY=.6487

AVERAGE ROUNDNESS=.54

CARBONATES

AVERAGE SPHERICITY=.7070

AVERAGE ROUNDNESS=.56

CRYSTALLINE

AVERAGE SPHERICITY=.7623

AVERAGE ROUNDNESS=.57

LOCATION # 13

Elev. 812', Fairfield Co. Ohio, Clearport
 Quad, T13N, R19W, Sec 10, 0.1 mile West
 of Clear Creek Bridge (Sec 10), Point Bar
 on north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CRYSTALLINE	79.00	69.00	62.00	.6	.8817
CLASTIC	92.00	63.00	14.00	.5	.4706
CARBONATE	58.00	43.00	31.50	.5	.7384
CLASTIC	70.00	55.00	24.00	.5	.6458
CLASTIC	55.00	48.00	15.00	.5	.6197
CLASTIC	106.50	58.50	12.00	.5	.3956
CRYSTALLINE	51.00	43.00	32.00	.4	.8088
CLASTIC	70.00	43.50	29.00	.6	.6362
CLASTIC	70.50	48.50	24.00	.6	.6164
CLASTIC	79.00	63.00	35.00	.6	.7069
CARBONATE	46.00	42.00	27.00	.5	.8123
CLASTIC	61.00	46.00	33.00	.5	.7417
CRYSTALLINE	53.00	37.00	31.00	.4	.7419
CLASTIC	55.00	39.50	38.00	.6	.7917
CRYSTALLINE	105.00	89.00	65.00	.4	.8066
CARBONATE	48.00	39.00	24.50	.6	.7457
CRYSTALLINE	50.00	46.00	40.00	.6	.9029
CRYSTALLINE	49.00	41.00	38.00	.7	.8657
CLASTIC	62.50	50.50	30.00	.7	.7293
CLASTIC	48.00	42.00	28.00	.8	.7992
CRYSTALLINE	51.00	43.00	30.00	.5	.7916
CARBONATE	97.50	76.50	40.00	.6	.6853
CARBONATE	48.00	46.00	38.00	.6	.9121
CRYSTALLINE	62.00	53.00	30.00	.6	.7451
CRYSTALLINE	51.00	44.00	42.00	.7	.8923
CARBONATE	40.50	35.00	27.50	.6	.8372
CARBONATE	42.00	35.50	24.50	.6	.7900
CARBONATE	49.00	40.50	13.00	.8	.6030
CLASTIC	42.50	40.00	26.00	.7	.8319
CARBONATE	55.00	41.00	39.00	.5	.8086
CRYSTALLINE	45.00	42.00	25.00	.6	.8034
CLASTIC	76.00	37.00	15.00	.5	.4580
CLASTIC	67.00	62.00	42.50	.5	.8373
CARBONATE	86.00	57.50	27.00	.6	.5943
CLASTIC	85.00	68.00	63.00	.7	.8401
CLASTIC	80.00	59.00	27.00	.6	.6290
CRYSTALLINE	60.00	48.00	40.00	.6	.8110
CLASTIC	75.00	49.00	44.00	.6	.7264
CRYSTALLINE	40.00	35.00	32.00	.5	.8879
CARBONATE	62.00	36.00	27.00	.7	.6324
CLASTIC	70.00	43.50	23.00	.6	.5889
CLASTIC	80.00	76.00	37.00	.6	.7602
CRYSTALLINE	42.00	37.50	25.00	.5	.8100
CARBONATE	43.00	38.00	24.50	.6	.7956
CLASTIC	48.00	47.00	21.00	.5	.7538
CLASTIC	57.00	50.00	14.00	.6	.5995
CARBONATE	41.00	37.00	22.00	.7	.7853
CARBONATE	47.50	41.00	21.00	.6	.7253
CLASTIC	50.50	39.00	13.00	.5	.5836
CARBONATE	43.00	32.50	22.00	.6	.7285
CLASTIC	103.50	50.00	19.00	.5	.4459
CLASTIC	100.00	68.00	31.00	.5	.5951
CRYSTALLINE	60.00	51.00	39.50	.4	.8241
CARBONATE	76.50	45.00	29.00	.6	.6064
CLASTIC	42.00	41.00	29.00	.6	.8768
CARBONATE	44.00	31.00	28.00	.6	.7654
CLASTIC	74.00	52.00	12.00	.6	.4848
CLASTIC	66.00	49.50	29.00	.6	.6907
CLASTIC	50.50	44.00	24.00	.5	.7454
CARBONATE	50.50	40.00	34.00	.6	.8109
CARBONATE	66.00	45.50	31.00	.6	.6867

LOCATION # 13 (Continued)

CARBONATE	50.00	46.00	17.00	.6	.6788
CLASTIC	57.50	45.00	40.00	.6	.8165
CLASTIC	60.50	25.00	23.00	.6	.5396
CRYSTALLINE	49.00	39.00	25.00	.6	.7405
CARBONATE	44.50	29.50	23.50	.5	.7048
CLASTIC	65.00	56.50	30.00	.6	.7375
CLASTIC	53.00	40.50	28.50	.6	.7434
CLASTIC	55.00	53.00	25.00	.7	.7594
CRYSTALLINE	51.00	35.00	25.50	.6	.7001
CLASTIC	90.00	44.50	27.50	.5	.5326
CARBONATE	85.00	72.50	50.00	.5	.7946
CARBONATE	43.50	30.00	22.00	.5	.7039
CLASTIC	73.50	68.00	14.50	.5	.5672
CRYSTALLINE	42.50	37.00	28.00	.5	.8309
CARBONATE	62.00	43.00	34.00	.6	.7245
CARBONATE	67.50	48.50	34.50	.6	.7161
CLASTIC	67.00	50.50	11.50	.7	.5058
CRYSTALLINE	49.00	40.00	33.50	.6	.8233
CRYSTALLINE	62.00	40.50	23.50	.5	.6279
CRYSTALLINE	60.00	59.00	55.00	.4	.9660
CLASTIC	73.00	43.00	11.00	.4	.4461
CRYSTALLINE	47.50	40.00	30.50	.7	.8147
CLASTIC	59.00	51.50	13.50	.7	.5845
CLASTIC	62.00	48.50	26.00	.4	.6897
CARBONATE	61.00	42.00	36.00	.6	.7407
CLASTIC	46.00	37.50	21.00	.5	.7193
CLASTIC	49.00	32.00	26.00	.7	.7024
CARBONATE	59.00	55.00	39.00	.6	.8510
CARBONATE	39.50	33.00	22.00	.6	.7749
CARBONATE	49.50	37.50	29.00	.6	.7628
CARBONATE	59.00	36.50	35.00	.6	.7160
CARBONATE	62.50	46.50	30.00	.6	.7095
CARBONATE	48.00	43.50	30.00	.6	.8274
CLASTIC	59.00	27.00	17.50	.6	.5139
CARBONATE	56.50	54.00	17.50	.6	.6665
CARBONATE	40.00	28.00	27.00	.6	.7789
CLASTIC	64.50	40.00	7.00	.5	.4068
CRYSTALLINE	51.00	30.50	28.50	.6	.6940
CARBONATE	53.50	48.50	17.00	.6	.6604

AVERAGE SPHERICITY=.7151

AVERAGE ROUNDNESS=.57

TOTAL CLASTICS= 43

TOTAL CARBONATES= 35

TOTAL CRYSTALLINE= 22

CLASTICS

AVERAGE SPHERICITY=.6480

AVERAGE ROUNDNESS=.57

CARBONATES

AVERAGE SPHERICITY=.7393

AVERAGE ROUNDNESS=.59

CRYSTALLINE

AVERAGE SPHERICITY=.8077

AVERAGE ROUNDNESS=.55

LOCATION # 14

Elev. 817', Fairfield Co. Ohio, Clearport
 Quad, T13N, R19W, Sec 9, 0.6 mile South
 Clear Creek Bridge (Sec 9), Point Bar on
 north side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CARBONATE	52.50	48.00	30.00	.6	.8054
CARBONATE	67.50	58.50	41.00	.6	.8074
CARBONATE	66.50	45.00	35.00	.6	.7088
CLASTIC	86.50	86.50	19.00	.6	.6034
CARBONATE	45.50	40.00	19.50	.7	.7223
CLASTIC	49.00	42.00	24.00	.6	.7488
CARBONATE	55.00	54.00	41.00	.6	.9012
CARBONATE	76.50	60.00	50.00	.6	.8003
CLASTIC	71.50	69.00	15.00	.6	.5872
CARBONATE	51.50	38.00	27.00	.5	.7286
CRYSTALLINE	67.00	36.00	35.00	.6	.6547
CRYSTALLINE	75.00	57.00	38.00	.7	.7275
CRYSTALLINE	67.00	57.50	37.00	.5	.7797
CARBONATE	51.00	41.00	15.50	.7	.6252
CLASTIC	84.00	70.00	12.00	.4	.4919
CRYSTALLINE	82.00	62.00	32.00	.4	.6657
CRYSTALLINE	74.00	59.00	33.00	.5	.7084
CARBONATE	42.00	37.00	32.00	.5	.8756
CRYSTALLINE	52.50	30.50	22.00	.6	.6244
CLASTIC	48.00	40.00	37.00	.5	.8628
CRYSTALLINE	90.00	57.50	29.50	.6	.5938
CLASTIC	57.00	48.50	13.00	.6	.5790
CARBONATE	52.50	34.00	13.00	.7	.5433
CARBONATE	83.00	40.00	33.00	.6	.5765
CRYSTALLINE	67.50	53.00	36.00	.5	.7482
CARBONATE	63.00	48.00	29.00	.6	.7052
CARBONATE	64.00	46.00	28.50	.6	.6840
CARBONATE	72.50	43.00	40.00	.6	.6891
CRYSTALLINE	80.00	61.00	40.00	.6	.7251
CARBONATE	73.00	61.00	40.50	.6	.7740
CRYSTALLINE	49.00	41.00	29.00	.6	.7912
CLASTIC	48.00	40.00	25.00	.7	.7571
CARBONATE	68.00	48.00	40.00	.7	.7460
CARBONATE	57.00	41.00	37.00	.7	.7758
CARBONATE	62.50	51.00	26.00	.6	.6976
CARBONATE	46.00	36.00	27.50	.5	.7763
CRYSTALLINE	55.00	41.00	24.00	.5	.6877
CARBONATE	67.00	56.50	55.00	.6	.8846
CLASTIC	56.00	36.00	33.00	.6	.7236
CARBONATE	48.00	36.50	25.00	.5	.7344
CARBONATE	44.00	40.50	25.50	.7	.8110
CLASTIC	62.00	57.00	35.00	.6	.8036
CARBONATE	45.00	42.00	29.00	.7	.8441
CARBONATE	50.00	39.00	30.00	.7	.7764
CARBONATE	47.00	41.50	20.00	.6	.7216
CRYSTALLINE	42.00	35.50	20.00	.6	.7383
CLASTIC	41.00	36.00	17.00	.7	.7140
CARBONATE	50.00	44.00	32.00	.6	.8258
CLASTIC	46.00	32.00	19.50	.8	.6656
CLASTIC	45.00	33.00	16.00	.7	.6389
CRYSTALLINE	68.00	56.00	43.00	.5	.8045
CARBONATE	51.00	45.00	33.50	.7	.8338
CARBONATE	67.00	56.00	43.50	.5	.8157
CLASTIC	51.00	43.00	29.00	.6	.7827
CARBONATE	52.00	50.00	35.00	.6	.8650
CRYSTALLINE	88.00	81.00	61.00	.6	.8609
CARBONATE	70.00	66.50	50.00	.7	.8787
CARBONATE	65.00	35.00	29.00	.8	.6217
CARBONATE	58.00	52.00	33.00	.6	.7990
CLASTIC	58.00	48.00	25.00	.5	.7092
CRYSTALLINE	61.50	46.00	28.00	.6	.6983

LOCATION # 14 (Continued)

CARBONATE	55.00	52.00	37.00	.6	.8600
CARBONATE	69.00	49.00	36.00	.6	.7182
CLASTIC	62.00	37.00	26.00	.7	.6302
CRYSTALLINE	62.50	48.50	32.50	.5	.7390
CARBONATE	87.00	62.00	37.00	.6	.6717
CARBONATE	48.00	29.50	29.00	.7	.7188
CARBONATE	80.00	48.50	29.00	.6	.6035
CARBONATE	86.00	56.00	28.50	.6	.5998
CARBONATE	92.00	61.00	26.50	.6	.5759
CARBONATE	49.00	46.00	43.00	.6	.9374
CLASTIC	42.00	37.00	25.00	.7	.8064
CARBONATE	60.00	53.00	33.00	.5	.7861
CARBONATE	52.00	38.50	22.00	.6	.6791
CARBONATE	72.50	49.00	35.00	.6	.6884
CARBONATE	53.00	38.00	31.00	.7	.7485
CRYSTALLINE	59.00	47.00	37.50	.6	.7970
CARBONATE	56.00	41.00	35.00	.6	.7706
CARBONATE	46.50	41.00	31.00	.6	.8377
CARBONATE	74.00	60.00	38.00	.4	.7467
CLASTIC	51.00	40.00	30.00	.7	.7727
CRYSTALLINE	42.00	32.00	28.00	.6	.7979
CARBONATE	50.00	34.00	26.00	.6	.7071
CARBONATE	50.00	33.00	22.00	.6	.6622
CRYSTALLINE	63.00	38.50	34.00	.5	.6909
CARBONATE	52.00	38.00	32.50	.6	.7701
CRYSTALLINE	62.00	46.00	30.00	.6	.7107
CARBONATE	53.00	42.00	30.00	.6	.7655
CRYSTALLINE	51.50	44.00	23.00	.5	.7253
CRYSTALLINE	45.00	41.00	27.00	.8	.8177
CARBONATE	40.00	32.00	22.00	.7	.7606
CARBONATE	37.00	31.00	23.00	.6	.8046
CLASTIC	33.50	30.00	22.00	.7	.8378
CARBONATE	40.00	35.00	20.00	.5	.7591
CARBONATE	54.00	50.00	38.00	.5	.8669
CARBONATE	48.00	25.00	15.00	.9	.5460
CARBONATE	33.00	26.00	19.00	.7	.7684
CARBONATE	40.00	27.50	27.00	.6	.7742
CARBONATE	45.00	32.00	23.00	.6	.7136
CRYSTALLINE	55.50	35.00	22.50	.6	.6347

AVERAGE SPHERICITY=.7363

AVERAGE ROUNDNESS=.61

TOTAL CLASTICS= 18

TOTAL CARBONATES= 59

TOTAL CRYSTALLINE= 23

CLASTICS

AVERAGE SPHERICITY=.7064

AVERAGE ROUNDNESS=.63

CARBONATES

AVERAGE SPHERICITY=.7491

AVERAGE ROUNDNESS=.62

CRYSTALLINE

AVERAGE SPHERICITY=.7270

AVERAGE ROUNDNESS=.57

LOCATION # 15

Elev. 823', Fairfield Co. Ohio. Clearport
 Quad, T13N, R19W, Sec 9, 20 yards West of
 Clear Creek Bridge, Point Bar on south
 side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CRYSTALLINE	75.00	65.00	44.00	.5	.7981
CARBONATE	49.00	42.00	28.00	.5	.7883
CRYSTALLINE	57.00	40.00	23.00	.6	.6567
CRYSTALLINE	51.00	43.00	26.00	.6	.7547
CRYSTALLINE	65.00	41.00	25.00	.5	.6237
CRYSTALLINE	78.00	39.00	28.00	.5	.5641
CLASTIC	61.00	49.00	45.00	.5	.8399
CARBONATE	62.00	40.00	31.00	.6	.6858
CRYSTALLINE	59.00	46.00	25.00	.5	.6913
CARBONATE	71.00	36.00	28.00	.4	.5848
CARBONATE	52.00	39.00	24.00	.5	.7021
CLASTIC	78.00	49.00	16.00	.4	.5051
CRYSTALLINE	75.00	44.00	41.00	.5	.6845
CRYSTALLINE	54.00	46.00	27.00	.5	.7524
CLASTIC	51.00	41.00	39.00	.5	.8503
CARBONATE	59.00	53.00	41.00	.5	.8546
CLASTIC	52.00	45.00	21.00	.6	.7044
CARBONATE	60.00	49.00	40.00	.5	.8166
CARBONATE	52.00	45.00	29.00	.5	.7844
CRYSTALLINE	52.00	45.00	18.00	.5	.6691
CRYSTALLINE	59.00	51.00	29.00	.5	.7518
CLASTIC	64.00	46.00	22.00	.4	.6275
CARBONATE	50.00	43.00	26.00	.5	.7647
CARBONATE	47.00	31.00	26.00	.5	.7146
CLASTIC	60.00	44.00	39.00	.4	.7812
CRYSTALLINE	52.00	37.00	36.00	.5	.7898
CRYSTALLINE	52.00	36.00	31.00	.5	.7445
CRYSTALLINE	48.00	40.00	22.00	.5	.7255
CARBONATE	81.00	61.00	52.00	.5	.7849
CRYSTALLINE	39.00	32.00	31.00	.5	.8672
CARBONATE	52.00	48.00	29.00	.5	.8015
CLASTIC	59.00	48.00	35.00	.4	.7844
CLASTIC	55.00	40.00	25.00	.4	.6914
CRYSTALLINE	46.00	30.00	26.00	.5	.7170
CLASTIC	55.00	44.00	37.00	.5	.8134
CARBONATE	66.00	45.00	30.00	.6	.6767
CLASTIC	43.00	39.00	26.00	.6	.8185
CARBONATE	52.00	34.00	26.00	.5	.6889
CARBONATE	48.00	37.00	14.00	.5	.6081
CARBONATE	40.00	31.00	20.00	.6	.7290
CRYSTALLINE	40.00	38.00	25.00	.5	.8405
CRYSTALLINE	35.00	24.00	18.00	.5	.7065
CRYSTALLINE	38.00	32.00	18.00	.5	.7361
CRYSTALLINE	65.00	63.00	45.00	.5	.8755
CLASTIC	88.00	44.00	21.00	.5	.4923
CARBONATE	57.00	51.00	30.00	.5	.7780
CRYSTALLINE	55.00	35.00	21.00	.5	.6240
CARBONATE	50.00	35.00	22.00	.6	.6753
CARBONATE	52.00	35.00	31.00	.5	.7376
CLASTIC	36.00	28.00	18.00	.5	.7299
CARBONATE	69.00	53.00	45.50	.5	.7971
CARBONATE	70.00	39.50	28.50	.5	.6125
CARBONATE	60.00	44.00	33.00	.6	.7388
CARBONATE	93.00	46.00	24.50	.5	.5070
CARBONATE	58.50	38.00	26.00	.5	.6609
CARBONATE	67.00	47.00	30.00	.6	.6798
CARBONATE	43.00	40.00	15.00	.6	.6872
CLASTIC	55.00	50.00	19.50	.8	.6856
CRYSTALLINE	64.00	62.50	47.50	.6	.8983
CARBONATE	64.50	46.00	32.00	.6	.7073
CARBONATE	82.00	54.00	40.00	.6	.6849

LOCATION # 15 (Continued)

CARBONATE	51.00	38.00	30.00	.5	.7596
CARBONATE	79.50	66.00	46.00	.6	.7832
CRYSTALLINE	65.50	46.00	25.00	.5	.6448
CLASTIC	68.50	51.00	27.50	.6	.6686
CARBONATE	43.50	35.50	25.50	.5	.7821
CLASTIC	47.00	47.00	11.00	.5	.6163
CARBONATE	46.00	35.00	29.00	.5	.7828
CARBONATE	59.00	52.00	22.00	.7	.6901
CARBONATE	88.50	60.00	47.00	.6	.7114
CARBONATE	35.00	32.50	31.00	.6	.9369
CLASTIC	61.00	42.00	21.00	.5	.6189
CARBONATE	71.00	43.50	24.00	.6	.5916
CARBONATE	59.00	58.00	31.00	.5	.8023
CARBONATE	53.50	52.00	36.00	.6	.8680
CARBONATE	76.00	45.50	39.00	.6	.6748
CARBONATE	59.00	56.00	25.00	.6	.7381
CLASTIC	65.00	40.00	16.50	.5	.5386
CARBONATE	61.00	48.50	42.00	.5	.8180
CRYSTALLINE	45.00	29.00	20.00	.7	.6592
CARBONATE	73.00	47.00	38.50	.5	.6977
CARBONATE	75.00	40.00	17.00	.6	.4945
CARBONATE	55.00	54.00	34.50	.5	.8508
CARBONATE	41.00	38.00	21.00	.7	.7801
CARBONATE	45.00	36.00	30.00	.5	.8110
CARBONATE	48.00	46.00	29.00	.6	.8335
CARBONATE	45.00	41.00	29.50	.6	.8422
CRYSTALLINE	69.00	42.00	24.00	.5	.5960
CARBONATE	84.00	58.00	29.00	.6	.6200
CLASTIC	65.00	45.00	44.00	.5	.7767
CLASTIC	65.00	37.50	10.00	.5	.4461
CARBONATE	60.00	37.50	37.00	.7	.7277
CRYSTALLINE	55.00	48.00	26.50	.6	.7492
CRYSTALLINE	58.00	53.00	33.00	.5	.8041
CARBONATE	41.00	38.00	16.00	.7	.7125
CLASTIC	69.00	51.00	33.50	.5	.7106
CARBONATE	42.00	37.00	29.00	.6	.8473
CARBONATE	59.00	42.00	24.00	.5	.6616
CRYSTALLINE	37.00	36.00	25.00	.5	.8695
CARBONATE	78.00	58.00	33.00	.4	.6801

AVERAGE SPHERICITY=.7224

AVERAGE ROUNDNESS=.53

TOTAL CLASTICS= 20

TOTAL CARBONATES= 53

TOTAL CRYSTALLINE= 27

CLASTICS

AVERAGE SPHERICITY=.6850

AVERAGE ROUNDNESS=.50

CARBONATES

AVERAGE SPHERICITY=.7311

AVERAGE ROUNDNESS=.55

CRYSTALLINE

AVERAGE SPHERICITY=.7331

AVERAGE ROUNDNESS=.52

LOCATION # 16

Elev. 830', Fairfield Co. Ohio. Clearport
 Quad, T13N, R19W, Sec 8, 0.1 mile East of
 Clear Creek Bridge (Br 851), Point Bar on
 south side of Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CRYSTALLINE	47.00	37.00	27.00	.4	.7676
CLASTIC	45.00	36.50	28.00	.6	.7962
CRYSTALLINE	71.00	53.00	43.00	.4	.7675
CLASTIC	66.50	39.00	36.00	.6	.6822
CLASTIC	46.00	30.00	16.50	.5	.6162
CRYSTALLINE	35.00	32.00	32.00	.5	.9420
CARBONATE	55.00	28.00	25.00	.4	.6139
CRYSTALLINE	35.00	32.00	28.00	.7	.9010
CARBONATE	43.00	34.00	24.00	.4	.7614
CARBONATE	45.00	41.00	16.00	.5	.6868
CLASTIC	44.50	32.00	14.00	.5	.6093
CRYSTALLINE	50.00	47.00	37.00	.6	.8860
CARBONATE	72.00	34.00	24.00	.3	.5399
CRYSTALLINE	63.00	29.00	19.00	.4	.5178
CARBONATE	59.00	40.00	33.00	.5	.7238
CLASTIC	50.00	29.50	22.00	.5	.6379
CLASTIC	37.00	31.50	25.00	.4	.8317
CRYSTALLINE	43.50	25.00	23.00	.5	.6723
CLASTIC	64.00	43.00	10.00	.6	.4717
CARBONATE	37.00	29.00	27.00	.5	.8301
CLASTIC	51.00	38.50	29.00	.6	.7543
CARBONATE	40.00	32.00	23.00	.6	.7719
CARBONATE	43.50	28.00	28.00	.5	.7455
CLASTIC	63.00	54.00	20.00	.3	.6480
CLASTIC	60.00	35.00	15.00	.5	.5264
CLASTIC	46.00	40.00	30.00	.6	.8277
CLASTIC	64.00	42.00	28.00	.6	.6597
CARBONATE	43.00	34.00	29.00	.5	.8109
CARBONATE	45.50	31.00	17.50	.6	.6399
CRYSTALLINE	51.00	40.00	33.00	.5	.7976
CLASTIC	47.00	41.00	18.50	.6	.7003
CARBONATE	52.50	40.00	22.00	.6	.6835
CLASTIC	58.50	44.00	25.00	.6	.6850
CARBONATE	49.00	23.00	22.00	.6	.5951
CLASTIC	48.50	27.00	25.00	.5	.6596
CLASTIC	41.00	34.50	22.00	.7	.7672
CARBONATE	49.00	40.00	27.00	.6	.7662
CLASTIC	39.00	29.00	28.00	.5	.8112
CARBONATE	44.00	29.00	24.00	.6	.7111
CLASTIC	46.00	35.00	26.00	.5	.7548
CARBONATE	41.50	28.00	27.00	.5	.7600
CLASTIC	49.00	36.00	31.00	.6	.7746
CLASTIC	88.00	63.00	27.50	.5	.6071
CLASTIC	74.00	41.00	21.00	.6	.5397
CARBONATE	43.00	33.00	26.00	.7	.7742
CARBONATE	50.50	46.50	38.00	.5	.8849
CLASTIC	48.00	39.00	26.00	.6	.7607
CLASTIC	48.00	48.00	35.00	.6	.9001
CRYSTALLINE	46.00	39.00	20.00	.5	.7170
CRYSTALLINE	48.00	31.00	22.00	.5	.6664
CLASTIC	69.00	57.50	52.50	.5	.8591
CLASTIC	46.00	35.00	27.00	.7	.7644
CARBONATE	62.00	47.00	27.00	.5	.6911
CARBONATE	38.00	37.00	25.00	.6	.8620
CARBONATE	46.00	36.00	30.00	.4	.7992
CRYSTALLINE	50.00	38.00	28.00	.5	.7522
CARBONATE	69.00	56.00	30.00	.3	.7066
CARBONATE	49.00	39.00	28.00	.5	.7690
CRYSTALLINE	47.00	36.00	26.00	.4	.7511
CARBONATE	54.00	37.00	25.00	.4	.6820
CLASTIC	44.00	31.00	20.00	.4	.6842

LOCATION # 16 (Continued)

CARBONATE	48.00	35.00	19.00	.3	.6609
CRYSTALLINE	63.00	43.00	42.00	.3	.7692
CLASTIC	65.00	42.00	10.00	.4	.4632
CARBONATE	60.00	39.00	26.00	.4	.6555
CARBONATE	54.00	38.00	20.00	.3	.6388
CARBONATE	53.00	38.00	28.00	.5	.7235
CRYSTALLINE	49.00	31.00	23.00	.5	.6672
CLASTIC	48.00	30.00	22.00	.4	.6592
CRYSTALLINE	52.00	45.00	25.00	.5	.7465
CLASTIC	42.00	38.00	36.00	.5	.9187
CLASTIC	35.00	30.00	27.00	.5	.8712
CLASTIC	64.00	44.00	40.00	.5	.7546
CRYSTALLINE	69.00	40.00	39.00	.4	.6894
CARBONATE	39.00	34.00	20.00	.5	.7646
CLASTIC	54.00	34.00	20.00	.5	.6155
CARBONATE	70.00	35.00	26.00	.4	.5705
CLASTIC	44.00	37.00	25.00	.5	.7818
CRYSTALLINE	80.00	52.00	39.00	.4	.6818
CARBONATE	54.00	32.00	24.00	.4	.6410
CLASTIC	68.00	42.00	40.00	.5	.7136
CRYSTALLINE	56.00	48.00	40.00	.5	.8491
CARBONATE	60.00	30.00	27.00	.4	.6082
CLASTIC	84.00	58.00	43.00	.5	.7070
CARBONATE	48.00	30.00	28.00	.5	.7144
CRYSTALLINE	42.00	30.00	25.00	.4	.7519
CARBONATE	50.00	41.00	39.00	.6	.8616
CARBONATE	43.00	35.00	26.00	.5	.7895
CRYSTALLINE	48.00	40.00	40.00	.4	.8855
CARBONATE	50.00	38.00	24.00	.4	.7145
CARBONATE	59.00	49.00	36.00	.4	.7973
CARBONATE	42.00	35.00	30.00	.5	.8412
CRYSTALLINE	57.00	44.00	33.00	.5	.7645
CRYSTALLINE	54.00	36.00	29.00	.4	.7101
CARBONATE	49.00	30.00	24.00	.4	.6693
CARBONATE	39.00	31.00	24.00	.4	.7879
CARBONATE	45.00	37.00	34.00	.5	.8533
CRYSTALLINE	44.00	41.00	31.00	.4	.8691
CLASTIC	48.00	41.00	25.00	.5	.7634
CARBONATE	49.00	31.00	29.00	.5	.7208

AVERAGE SPHERICITY=.7292

AVERAGE ROUNDNESS=.49

TOTAL CLASTICS= 36

TOTAL CARBONATES= 41

TOTAL CRYSTALLINE= 23

CLASTICS

AVERAGE SPHERICITY=.7105

AVERAGE ROUNDNESS=.53

CARBONATES

AVERAGE SPHERICITY=.7274

AVERAGE ROUNDNESS=.48

CRYSTALLINE

AVERAGE SPHERICITY=.7619

AVERAGE ROUNDNESS=.46

LOCATION # 17

Elev. 836', Fairfield Co. Ohio. Clearport
 Quad, T13N, R19W, Sec 7, 0.6 mile West of
 Bridge 851, Point Bar on south side of
 Clear Creek.

LITHOLOGY	A	B	C	ROUNDNESS	SPHERICITY
CRYSTALLINE	45.00	32.50	24.00	.5	.7276
CRYSTALLINE	47.50	34.00	28.00	.7	.7500
CRYSTALLINE	78.00	66.00	36.00	.5	.7309
CARBONATE	77.00	37.00	22.00	.4	.5159
CARBONATE	58.00	38.00	26.00	.5	.6647
CRYSTALLINE	54.00	36.00	33.00	.6	.7413
CARBONATE	83.00	52.00	32.50	.6	.6260
CARBONATE	50.00	30.50	20.00	.6	.6249
CLASTIC	53.00	36.00	26.00	.6	.6933
CLASTIC	40.00	35.00	29.50	.6	.8642
CLASTIC	43.00	32.00	15.00	.6	.6379
CARBONATE	54.00	36.00	32.00	.6	.7338
CRYSTALLINE	53.00	49.00	31.00	.4	.8147
CLASTIC	43.00	35.00	23.00	.6	.7579
CARBONATE	45.00	40.00	13.00	.7	.6356
CLASTIC	65.00	38.00	23.50	.5	.5957
CARBONATE	48.00	36.00	25.00	.6	.7310
CARBONATE	50.50	37.00	18.50	.5	.6451
CARBONATE	59.00	48.00	33.00	.5	.7692
CARBONATE	49.00	43.00	24.00	.5	.7547
CARBONATE	51.00	37.00	26.00	.5	.7178
CLASTIC	51.00	49.00	23.00	.7	.7567
CRYSTALLINE	46.00	28.00	26.00	.5	.7007
CRYSTALLINE	49.00	35.00	30.00	.6	.7590
CRYSTALLINE	42.00	32.50	24.00	.5	.7618
CARBONATE	72.00	55.50	12.50	.6	.5115
CLASTIC	47.00	38.50	15.00	.6	.6394
CARBONATE	47.00	33.50	32.00	.6	.7858
CLASTIC	36.00	34.00	24.00	.7	.8571
CLASTIC	71.00	52.00	25.00	.3	.6365
CLASTIC	45.00	44.00	17.00	.5	.7175
CRYSTALLINE	63.00	44.00	36.50	.4	.7396
CLASTIC	37.00	36.00	23.00	.8	.8457
CARBONATE	38.00	33.00	25.00	.6	.8298
CARBONATE	45.50	37.50	23.00	.6	.7469
CLASTIC	61.00	47.50	36.00	.6	.7717
CARBONATE	53.00	45.00	26.00	.4	.7468
CLASTIC	69.00	57.00	27.00	.5	.6863
CARBONATE	51.00	43.00	29.50	.6	.7871
CLASTIC	37.00	34.50	27.00	.6	.8795
CLASTIC	52.00	40.00	26.00	.6	.7272
CARBONATE	49.00	33.50	32.00	.5	.7643
CARBONATE	56.00	53.00	45.00	.5	.9128
CRYSTALLINE	55.00	49.50	43.00	.5	.8894
CLASTIC	51.00	51.00	9.00	.7	.5609
CLASTIC	56.00	34.00	33.50	.6	.7135
CARBONATE	61.00	44.00	38.00	.5	.7659
CARBONATE	66.00	42.00	26.00	.6	.6305
CLASTIC	90.00	63.00	36.00	.6	.6542
CRYSTALLINE	54.00	44.00	40.00	.5	.8451
CRYSTALLINE	57.00	45.00	18.00	.6	.6294
CLASTIC	50.50	40.00	17.00	.7	.6436
CLASTIC	50.00	45.50	20.00	.7	.7140
CARBONATE	55.00	45.00	30.00	.3	.7642
CLASTIC	45.00	33.00	25.00	.7	.7413
CLASTIC	58.00	35.00	14.00	.4	.5262
CARBONATE	44.00	38.00	25.00	.4	.7888
CARBONATE	45.00	40.00	21.00	.4	.7458
CLASTIC	47.00	39.00	33.00	.4	.8352
CARBONATE	71.00	57.50	24.00	.5	.6493
CRYSTALLINE	46.00	30.00	27.00	.5	.7261

LOCATION # 17 (Continued)

CRYSTALLINE	61.00	41.00	34.00	.4	.7209
CARBONATE	40.00	35.00	19.00	.5	.7463
CRYSTALLINE	48.00	30.00	23.00	.3	.6690
CARBONATE	70.00	36.00	22.00	.4	.5447
CLASTIC	61.00	34.00	14.00	.4	.5039
CARBONATE	43.00	34.00	22.00	.5	.7396
CARBONATE	56.00	38.00	26.00	.4	.6804
CARBONATE	68.00	44.00	31.00	.4	.6657
CARBONATE	65.00	48.00	46.00	.4	.8055
CRYSTALLINE	43.00	36.00	29.00	.4	.8265
CRYSTALLINE	55.00	31.00	21.00	.4	.5993
CARBONATE	43.00	39.00	38.00	.4	.9289
CLASTIC	54.00	45.00	34.00	.5	.8066
CLASTIC	63.00	55.00	26.00	.6	.7116
CARBONATE	70.00	48.00	16.00	.4	.5392
CLASTIC	48.00	47.00	4.00	.3	.4337
CRYSTALLINE	65.00	48.00	13.00	.3	.5286
CRYSTALLINE	64.00	38.00	30.00	.5	.6529
CARBONATE	52.00	48.00	25.00	.5	.7628
CRYSTALLINE	54.00	37.00	18.00	.5	.6113
CARBONATE	44.00	27.00	21.00	.4	.6641
CLASTIC	50.00	44.50	12.00	.4	.5978
CARBONATE	66.00	37.00	16.00	.3	.5141
CARBONATE	45.00	30.00	31.00	.6	.7715
CARBONATE	45.00	39.00	31.00	.5	.8420
CLASTIC	42.00	40.00	30.00	.5	.8795
CRYSTALLINE	42.00	32.00	30.00	.5	.8164
CLASTIC	52.00	41.00	37.00	.5	.8248
CARBONATE	50.00	43.00	29.00	.5	.7931
CLASTIC	58.00	39.00	19.00	.4	.6039
CLASTIC	57.00	32.00	24.00	.3	.6183
CARBONATE	53.00	39.00	17.00	.4	.6180
CARBONATE	45.00	31.00	22.00	.4	.6957
CARBONATE	66.00	39.00	19.00	.4	.5541
CRYSTALLINE	51.00	32.00	19.00	.4	.6160
CLASTIC	63.00	44.00	35.00	.4	.7294
CLASTIC	61.00	46.00	31.50	.5	.7302
CLASTIC	54.00	46.00	29.00	.5	.7705
CLASTIC	101.00	78.00	15.00	.4	.4859

AVERAGE SPHERICITY=.7072

AVERAGE ROUNDNESS=.50

TOTAL CLASTICS= 36

TOTAL CARBONATES= 42

TOTAL CRYSTALLINE= 22

CLASTICS

AVERAGE SPHERICITY=.6987

AVERAGE ROUNDNESS=.54

CARBONATES

AVERAGE SPHERICITY=.7075

AVERAGE ROUNDNESS=.49

CRYSTALLINE

AVERAGE SPHERICITY=.7208

AVERAGE ROUNDNESS=.48

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