

Analysis of the Miamisburg Crop Circle Formation

A Study To Determine Its Relationship To Musical Notes

By Dee Gragg, P.E.

Executive Summary: This study shows a strong link between the crop circles analyzed by Dr Gerald Hawkins in southern England in 1981-88, and the USA circles of Locust Grove, Ohio, 2003, and Miamisburg, Ohio 2004. This link was established by studying the USA formations using methods identical to those used by Dr. Hawkins in southern England. This report contains the first nondiatonic integer ever discovered in any of the work. After 23 years of finding only the white piano keys, we have now discovered one of the black keys. Specifically, it gives a musical note of G# or Ab at a frequency of 418 Hz.

The Miamisburg crop circle appeared approximately September 1, 2004. It is in corn and is located near the Miamisburg Mound in Miamisburg, Ohio

My objective was to determine if the United States, 2004 Miamisburg crop circle formation contained diatonic ratios which could be related to musical notes. If so, can they be related to the Locust Grove study (Gragg p.6) and the work of Dr. Gerald Hawkins (Hawkins p.6 and Andrews p.6). This study and the Locust Grove study used the same methods as those employed by Dr. Gerald Hawkins in his classic study of 1981-88 crop circles of southern England.

By using the same methods as Dr. Hawkins, any diatonic ratios and their relationship to musical notes will then be comparable to his work and the Locust Grove study. This will strengthen the link between the three studies.

Dr. Hawkins took the diameter of the large circle and divided it by the diameter of the satellite circle and used this result to determine any integers.¹ Using the integers found, he searched for diatonic ratios by raising 2 to the n/12 power where n is the integer just found. For example if:

Large Circle = 10 Satellite Circle = 2

Then: $10/2 = 5$; And the diatonic ratio = $2^{5/12} = 2^{.4166} = 1.335$

This is the diatonic ratio 4/3, which is F just above middle C.

The Miamisburg formation bears an amazing, almost sister-like resemblance to the Locust Grove formation. In fact, Mr. Jeff Wilson has made a most convincing comparison in his Comparison of the Basic Elements of the Miamisburg, OH (8-2004) and the Locust Grove, OH, (8-2003) Crop Circles (Wilson p.6).

I began this analysis with Circle A which had the smallest diameter and was deemed to be the satellite circle (Figure 1). I then divided it into the next larger circle, Circle B. This gave $14.5/11 = 1.318$. There is certainly no integer nor diatonic ratio here. Likewise going to the

next larger Circle C, which gave $14.7/11 = 1.336$. No integer here. Likewise Circle D $20/11 = 1.818$. Not surprisingly this is very similar to the results for its sister circle at Locust Grove.

But beginning with Circle E the ratios again began to look promising i.e. $41/11 = 3.727$. In a perfect world this ratio would have been 4.000. But we are not in a perfect world and I did not want to miss any important data while trying to hold it to perfection.

In the Locust Grove paper (Gragg p.6) I gave the theory and computations as to why it is impossible to have exact dimensions and, for the most part, I will not repeat them here. But in summary, you can have an exact diameter, an exact integer or an exact diatonic ratio. But you cannot have all three. You can have **only one** exact and the other two will be slightly off. This is the general case for any analysis of crop circles.

In my calculations I computed accuracy to the 0.001 of a foot. This accuracy was created, rather artificially, by the calculations. It should not be implied that a crop circle was measured to 0.001 of a foot in the field.

Prior to beginning this study Mr. Ted Robertson advised me that this formation was in corn. The rows were approximately 27 inches apart and the individual stalks were about a foot apart. Mr. Robertson was one of the researchers on the ground that made the measurements.² Because of this, he estimated that the measurement of the 11 foot circle could be closer to 10.5 feet. When I did the diatonic ratio computations, I found this to be amazingly prophetic.

Again, I have chosen to use the exact integer in my calculations. The results will then compare to the Locust Grove results and I believe that this is what Dr. Hawkins would have done. Also, for illustrative purposes I am going to carry the three decimal place accuracy through the calculations.

So for the 41 foot diameter of Circle E the satellite circle diameter is 10.25 feet, the integer 4 and the diatonic ratio 1.259 (Table 1). This corresponds to a Middle C fraction of $5/4$ and a musical note of E at a frequency of 330 Hz..

The next larger circle is the “eye”, Circle F, whose top and bottom are each 72 feet. For the exact integer of 7 the satellite circle diameter is 10.29 and the diatonic ratio is 1.499 (Table 1). This corresponds to a Middle C fraction of $3/2$ and a musical note of G at a frequency of 396 Hz.

The next two larger circles are G which have diameters of 84 feet. For the exact integer of 8 the satellite circle diameter is 10.50 and the **nondiatonic** ratio is 1.587. This is a first! In all of Dr. Hawkins’ work and mine, neither of us found integers which were not diatonic up to now. Frankly, I had been naively assuming that I never would. Wrong! For a complete discussion of this phenomenon see the *Analysis and Conclusions* Section of this report.

The final and largest circle, H, is 123 feet. For the exact integer of 12 the satellite circle diameter is 10.25 and the diatonic ratio is 2.000 (Table 1). This corresponds to a Middle C fraction of $2/1$ and a musical note of C at a frequency of 528 Hz.

Table 1

Circle	Diameter (Feet)	Satellite Diameter (Feet)	Integer	Diatonic Ratio	Fraction of Middle C	Musical Note	Frequency (Hz)
B	14.5	No Integer					
C	14.7	No Integer					
D	20	No Integer					
E	41	10.25	4	1.259	5/4	E	330
F	72	10.29	7	1.499	3/2	G	396
G	84	10.50	8	1.587	Not Diatonic		
H	123	10.25	12	2.000	2/1	C	528

As mentioned before there are two sets of concentric circles to consider for diatonic ratios. Circle E is concentric with Circle H and Circle F is concentric with Circle G. As just shown Circles E, F, and H are diatonic and although Circle G contains a ratio integer of 8 it is not diatonic.

Remember that with concentric circles we must look at the ratio of diameters squared to find diatonic ratios. Dr. Hawkins and I have both verified this (Gragg p.6).

So, dividing the diameter of Circle H by the diameter of Circle E, I got $123/41 = 3.0$. Squaring gives $(3.0)^2 = 9.0$ and $2^{9/12} = 1.682$. This corresponds to a Middle C fraction of 5/3 and a musical note of A at a frequency of 440 Hz (Table 2).

Dividing the diameter of Circle G by the diameter of Circle F gives $84/72 = 1.167$. Squaring gives $(1.167)^2 = 1.361$ which is far from an integer and is therefore not diatonic (Table 2). Certainly not surprising since Circle G is in its self not diatonic.

Table 2

Circle	Diameter (Feet)	Satellite Diameter (Feet)	Integer	Diatonic Ratio	Fraction of Middle C	Musical Note	Frequency (Hz)
H/E	N/A	N/A	9	1.682	5/3	A	440
G/F	N/A	Not Diatonic					

Appendix A is a modified version of the Appendix B from my Locust Grove paper (Gragg p.6). To the previous Appendix B I have added these four notes. Again, this brings together all of the work using Dr. Hawkins methods.

All four of these musical notes have been found previously by Dr. Hawkins in his classic 1981-88 study. Two of them (E and G) had also been found in the Locust Grove study. What is new is the finding of a note (A) by the use of concentric circles rather than the use of a satellite circle. This continues to confirm and strengthen the bond between this work and that of Dr. Hawkins.

Analysis and Conclusions

In the Locust Grove paper I made much of the Note F appearing in all four of the previous works: Dr. Hawkins's theorems, my theorems, Dr. Hawkins's crop circle work and the Locust Grove formation.

Well, this time there was no Note F. Perhaps its appearance was only coincidental in the first four studies or perhaps we simply need more time and data to evaluate its significance (if any).

Previously I noted that Mr. Robertson thought that the 11 foot circle might be a bit smaller. This was most prophetic when the computations were made. When exact integers are used the variation in the Satellite Diameter for all four circles was only 3 inches! And that includes Circle G which has a nondiatonic integer (Table 1).

The 2004 Miamisburg formation marks the first occurrence of a nondiatonic integer. Neither Dr. Hawkins nor I found any integers which were not diatonic in all of our combined work until now.

So, does this nondiatonic integer have some musical significance? Yes, happily it does. The computed nondiatonic ratio of 1.587 corresponds to a Middle C fraction of 19/12 with an exact nondiatonic ratio of 1.583. This gives a musical note of G# or Ab at a frequency of 418 Hz. **We have now found one of the black keys!!**

For all the computed diatonic and nondiatonic ratios and the exact diatonic ratios (Integer=0 to 24) see Appendix B. I have added this exact nondiatonic ratio and note in blue to emphasize that it is not a diatonic ratio.

So what does this mean? Is there a message here or could this just be a random statistical event? For an answer we need to consider the statistical inference of data which is restricted to yes/no, on/off, good/bad, or in our case diatonic/nondiatonic. This is sometimes called One Shot Reliability.

Using Dr. Hawkins 25 diatonic data points, plus our 4 from Locust Grove and these 4 from Miamisburg we have a total of 33 diatonic data points. Statistically after 33 consecutive diatonics we have demonstrated that the next point will also be diatonic with a minimum reliability of 93.2% at the 90% confidence level. For an explanation of this statistic with a sample calculation see my Web Page at SwimOutsideThePool (Gragg, p.6)

But the next point was not diatonic. So, where does that leave us now? Actually we are not much worse off statistically than before. With 33 diatonic and 1 nondiatonic we have now demonstrated that the next point will now be diatonic with a minimum reliability of 89.0% at the 90% confidence level.

This does not appear to be a random statistical event. In fact perhaps the nonhumans³ have decided to now show us the black keys. Maybe there will now be a mix of diatonic and

nondiatonic ratios. I am certainly not foolish enough to begin predicting anything except possibly that the 2005 circles will continue to be interesting and fun.

From this analysis I conclude that we have added the following to the understanding of crop circles.:

- This study strengthens the already existing link between crop circles and musical notes.
- The Miamisburg formation is a sister formation to the Locust Grove formation.
- For the first time in USA crop circles we found a musical note using concentric circles.
- This is the first occurrence in any of the works of a nondiatonic integer. This gives a musical note of G# or Ab at a frequency of 418 Hz. We have now found one of the **black keys**.

Footnotes:

1. This method is used for circles that are not concentric. If they are concentric the ratio must be squared to look for the integer. We have two sets of concentric circles which I will deal with later in the paper.
2. Mr. Robertson was a part of the team which made the original ground measurements. He also did the complete construction line drawing showing the relationship of all the circles. I used this to construct Figure 1 which represents the formation as seen in the field. Mr. Robertson supplied this information to me and encouraged me in this research. Again without his help none of this would have happened.
3. In various books, the Internet and other literature of the field there are a number of different names in use to describe the makers of the authentic circles. Some of them are the Force, Intelligence, Higher Intelligence, and Circle Makers. I have a bit of a problem with these. Perhaps neither force nor intelligence is even applicable if we really knew how the circles were created. When I read Circle Makers I sometimes become uncertain if the author is talking about the making of the authentic circles or something that the hoaxers have created. I like the term **nonhuman** because it assumes nothing about the authentic makers and it is specific that it is not the hoaxers at work.

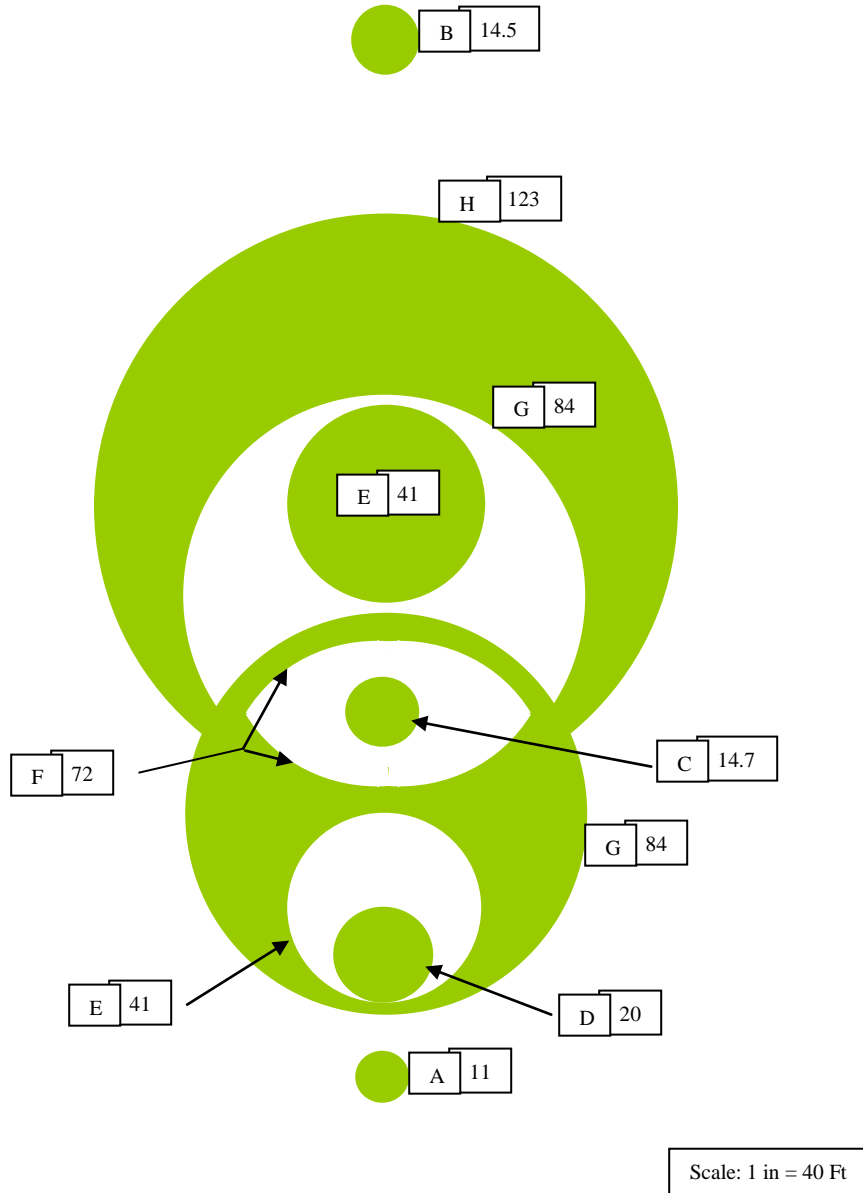
References:

1. **Gragg**, Dee, “Analysis of The Locust Grove Crop Circle Formation - A Study To Determine Its Relationship To Musical Notes”, Crop Circle News, August 19, 2004.
2. **Hawkins**, Gerald, Phd., D.Sc. “The Diatonic Ratios in Crop Circles”, Circles Phenomenon Research International Newsletter, Volume 5, No. 2, Fall/Winter 1996/97. This work has been reprinted in full in the following book.
3. **Andrews**, Colin with Stephen J. Spignesi, “Crop Circles: Signs of Contact”, Chapter 12, The Career Press, Inc., Franklin Lakes, NJ, 2003.
4. **Wilson**, Jeffery, “All elements of Locust Grove formation present at Miamisburg formation, E-mail Mon, 20 Sep 2004.
5. **Gragg**, Dee, “SwimOutsideThePool”, <http://www.netmdc.com/~ngragg/>, How To Determine The Winner of a Basketball Game, Statistics, 2000.

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Miamisburg, Ohio

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Notes:

1. Originally drawn by Ted Robertson.
2. Computer WORD drawn by Dee Gragg with help from Ted Robertson
3. Measurements by:
Ted Robertson
Jeffery Wilson

Figure 1

Appendix A

Frequencies In The Fields

Note Name	C	D	E	F	G	A	B	C
Diatonic Ratio	1/4	9/32	5/16	1/3	3/8	5/12	15/32	1/2
Frequency (Hz)	66	74.25	82.5	88	99	110	123.75	132
Note Name	C	D	E	F	G	A	B	C*
Diatonic Ratio	1/2	9/16	5/8	2/3	3/4	5/6	15/16	1
Frequency (Hz)	132	148.5	165	176	198	220	247.5	264
Note Name	C*	D	E	F	G	A	B	C
Diatonic Ratio	1	9/8	5/4	4/3	3/2	5/3	15/8	2
Frequency (Hz)	264	297	330	352	396	440	495	528
Note Name	C	D	E	F	G	A	B	C
Diatonic Ratio	2	9/4	5/2	8/3	3	10/3	15/4	4
Frequency (Hz)	528	594	660	704	792	880	990	1056

* Middle C

Denotes found in the fields

Theorem/Crop Circle Summary

Frequency (Hz)	Musical Note	Theorem/Crop Circle Used For Discovery
88	F	Theorem IVB, Gragg
176	F	Theorem IB, Gragg
264 to 528	C, D, E, F, G, A, B, C	1981-88 Southern England Study, Hawkins
330	E	Locust Grove, 2003, Miamisburg, 2004
352	F	Theorem IA, Theorem IVA, Hawkins
396	G	Locust Grove, 2003, Miamisburg, 2004
440	A	Miamisburg, 2004
528	C	Theorem III, Hawkins, Miamisburg, 2004
594	D	Locust Grove, 2003
704	F	Locust Grove, 2003
1056	C	Theorem II, Hawkins

Appendix B

Integer (n)	Computed Diatonic and Nondiatonic Ratios	Exact Diatonic Ratio	Note
0	$2^{0/12} = 2^0 = 1.000$	$1/1 = 1.000$	C*
1	$2^{1/12} = 2^{.0833} = 1.060$		
2	$2^{2/12} = 2^{.1666} = 1.122$	$9/8 = 1.125$	D
3	$2^{3/12} = 2^{.250} = 1.188$		
4	$2^{4/12} = 2^{.333} = 1.259$	$5/4 = 1.250$	E
5	$2^{5/12} = 2^{.416} = 1.335$	$4/3 = 1.333$	F
6	$2^{6/12} = 2^{.500} = 1.414$		
7	$2^{7/12} = 2^{.583} = 1.498$	$3/2 = 1.500$	G
8	$2^{8/12} = 2^{.667} = 1.587$	$19/12 = 1.583$	G#/Ab
9	$2^{9/12} = 2^{.750} = 1.682$	$5/3 = 1.666$	A
10	$2^{10/12} = 2^{.833} = 1.782$		
11	$2^{11/12} = 2^{.917} = 1.888$	$15/8 = 1.875$	B
12	$2^{12/12} = 2^{1.000} = 2.000$	$2/1 = 2.000$	C
13	$2^{13/12} = 2^{1.083} = 2.119$		
14	$2^{14/12} = 2^{1.167} = 2.245$	$9/4 = 2.250$	D
15	$2^{15/12} = 2^{1.250} = 2.378$		
16	$2^{16/12} = 2^{1.333} = 2.519$	$5/2 = 2.500$	E
17	$2^{17/12} = 2^{1.416} = 2.668$	$8/3 = 2.666$	F
18	$2^{18/12} = 2^{1.500} = 2.828$		
19	$2^{19/12} = 2^{1.583} = 2.996$	$3/1 = 3.000$	G
20	$2^{20/12} = 2^{1.666} = 3.175$		
21	$2^{21/12} = 2^{1.750} = 3.364$	$10/3 = 3.333$	A
22	$2^{22/12} = 2^{1.833} = 3.563$		
23	$2^{23/12} = 2^{1.916} = 3.775$	$15/4 = 3.750$	B
24	$2^{24/12} = 2^{2.000} = 4.000$	$4/1 = 4.000$	C

* Middle C