Related images from the Rendlesham Forest UFO event and two crop formations

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Abstract – This article demonstrates that the 1980 Rendlesham Forest UFO event, the 2002 Crabwood crop formation, and the 2010 Wilton Windmill crop formation are all logically connected. Each event yielded a set of binary data which was decoded using a single image decoding algorithm discovered in part of the Wilton Windmill data set. Remarkably, four meaningful images were decoded from that data set by ordering the data bits in different ways. One image shows a bipedal figure with one arm raised. Another shows the same figure in a different pose with the other arm raised. A third image shows a face with large ears as in a drawing of a bunny in a child's book. A fourth image shows what appears to be a child riding a tricycle. The data set from the Crabwood formation was decoded as a bipedal figure extending a three-fingered hand in greeting. Finally, the data set from the UFO encounter in Rendlesham Forest was decoded as the profile of a sitting cat or dog. Evidently, a plan was devised before 1980 to deliver the encoded images, and to allow them to be revealed only in 2010 when the decoding algorithm would be provided.

The anomalous flight technologies reported by witnesses at Rendlesham Forest, the extraordinary methods and technology required to construct the Crabwood formation, and the extremely complicated way that images were encoded in the Wilton Windmill formation, are evidence that an agency with exceptional capabilities orchestrated the events. The symbols of greeting in the images and other benign content convey the message that a meeting is anticipated and that we should not fear it. This further implies that the meeting will be with non-terrestrial entities, else the message would be trivial.

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Introduction

On May 22, 2010, a crop formation appeared at Wilton Windmill, Wiltshire, England. The formation was found to represent binary information that encoded a famous mathematical formula. This article shows that an additional text string as well as four recognizable images were also encoded in the formation. The second text string was interpreted as a high-level algorithm for decoding the images. Unexpectedly, the same algorithm decoded a meaningful image from the 2002 Crabwood crop formation. Even more surprisingly, a recognizable image was also decoded from a bit sequence that originated from the UFO encounter at Rendlesham Forest, England, in 1980.

Each of these events are discussed in separate sections, and a separate discussion section will attempt to make some sense of it all.

The Wilton Windmill Crop Formation

The design of the Wilton Windmill formation in Figure 1 suggested to a number of people that bit sequences interpretable as ASCII characters might be represented there.

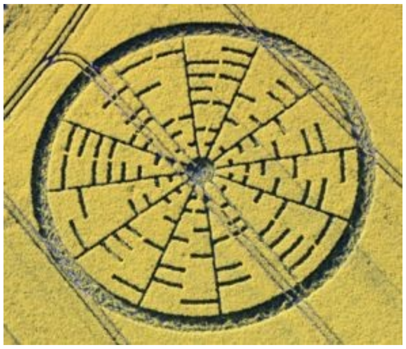

Figure 1. The 2010 Wilton Windmill crop formation.

This was confirmed when a text string was decoded from the flattened vegetation which took the form of Euler's identity, a famous mathematical formula (e.g., Perceval, 2010). Each arc projecting from a radial line in the formation was read as a 1 and the absence of an arc was read as a 0. On one side of each radial line, the bit nearest the center was always 0, and only this side was used. Since the bit nearest the center was constant, it was ignored. The remaining seven bit positions were used to create a 7-bit ASCII character code, starting from the second bit position and moving towards the circumference. Successive characters were read from adjacent radial lines moving in the clockwise direction. The 12 character codes are listed in Appendix A-1. The decoded text string "e^(hi)pi)1=0" was recognized as a close approximation to "e ^ (i pi) + 1 = 0", the correct form of the Euler equation.

A second text string was decoded from the other side of each radial line, with bits read from the circumference towards the center. Again, the bit nearest the center was ignored since it was constant. The 12 character codes are listed in Appendix A-2. The text string ",But45x459!y" decoded from this data is recognized here as a high-level algorithm for transforming 8-bit symbols into a visual format.

The string contains two numbers, 45x459, which are each divisible by nine. So the string may be rewritten as ",But9x9x255!y". The number 255 is the maximum decimal value of an 8-bit (or byte) code that represents the intensity of a pixel in a grayscale image. The 9x9 could specify the size in pixels of an image array. Finally, the '!y' characters could mean that the bits in each 'y' byte are to be negated. The '!' symbol is the logical NOT operator in some computer programming languages. Therefore, a translation of the original text string could be "*, but see the image decoded using a 9x9 array of bytes with bits inverted*". Computer code that implements this algorithm is included in Appendix B.

Sufficient information to encode an image was discovered by Damen (2010). His reconstruction of the formation offered a way to decode 36 bytes of data which would be enough to represent a 9x4 image array. Figure 2 shows his drawing of the formation that includes the relevant construction lines in blue.

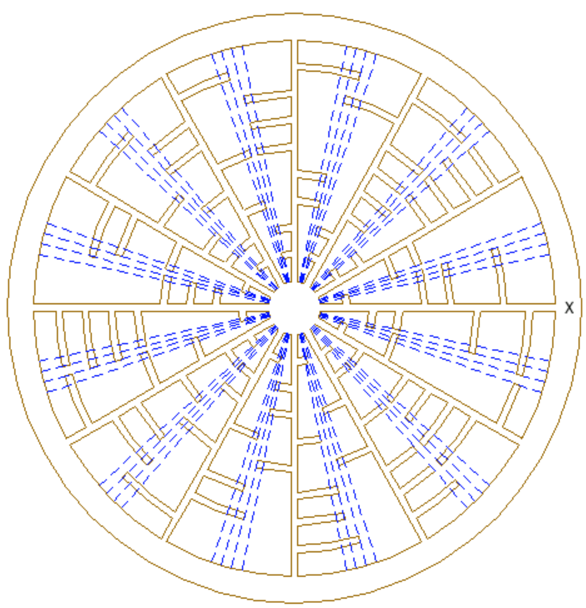

Figure 2. Wilton Windmill formation design with construction lines.

The approach takes advantage of the observation that the arcs projecting from the 12 radii in the formation are not all the same length, so that between each pair of dashed lines left in from the reconstruction process there may be a different number of bits of the arcs.

Each bit encountered represents a 1 for that bit position, else that position is a 0. This basis for bit assignment is shown in the diagram of Figure 2. Eight bits of data are found between each pair of dotted lines, giving a total of 288 bits or 36 bytes of data, sufficient for a 9x4 image array.

How the bits should be read was not obvious since at least four ways were identified. It so happened that a choice was not necessary since each of those four ways yielded a different and apparently meaningful image. The starting point was always the radial line marked by an *x* in Figure 2, since this gave the first symbol of Euler's formula. As in the decoding of the formula, successive bits or bytes were obtained by moving only in the clockwise direction. The meaningfulness of the relatively simple decoded images is subjective, of course, but the proffered interpretations should be acceptable to most viewers.

For the first image, the order of the bits was suggested by the trigonometric form of Euler's formula, which can be expressed in terms of the sine and cosine. The bits in the first byte were read from the center to the circumference between each pair of dotted lines. Moving clockwise to the adjacent pair of dotted lines, the second byte was read from the circumference to the center, the third was read from the center to the circumference, etc. This sinusoidal pattern continued until all 36 bytes were constructed (see Appendix A-3). Then according to the high-level decoding algorithm described above, the bits were inverted and the byte values were assigned to a 9x4 array of image pixels. The result was the image shown on the left in Figure 3. On the right is the image smoothed with a Gaussian filter. The filter removes high frequency components introduced by the edges of the blocks representing individual pixels. The image is easily interpreted as the frontal view of a humanoid figure with head tilted to the side and left arm waving.

Figure 3. Bipedal figure with left arm waving.

If we think of the order of the bits in the previous image as being read in sine phase, we can construct a second image by reading the bits in cosine phase. To do this, the bits in the first byte were read from the circumference to the center, the second was read from center to the circumference, the third was read from circumference to the center, etc. The 36 bytes are listed in Appendix A-4. After inverting the bits, the bytes were again assigned to the 9x4 pixel array. The result is shown in Figure 4. Remarkably, the smoothed version is a similar humanoid figure, this time turned sideways and appearing to be stepping away while waving with the right arm.

Figure 4. Bipedal figure with right arm waving.

For the third image found in the formation, each byte was built up of bits assigned from the center to the circumference between every pair of adjacent dotted lines progressing clockwise. This data is listed in Appendix A-5. The bits were inverted and the resulting byte values were assigned to pixels of the 9x4 grayscale image. The decoded image is shown in Figure 5. The smoothed version is interpreted as a face with large ears as in a drawing of a bunny in a child's book.

Figure 5. Image of a bunny with ears.

For the fourth image, the bits were organized according to their positions in the eight concentric circles. That is, the bits were read by going around each consecutive circle in the clockwise direction, beginning at the inner circle. The 36 bytes are listed in Appendix A-6. As before, the algorithm inverted the bits and assigned the resulting byte values to pixels of the 9x4 grayscale image. The result was the image in Figure 6. The smoothed version is interpreted as a child riding a tricycle.

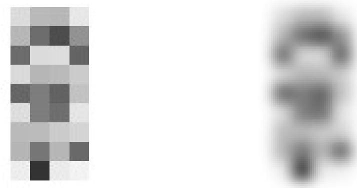

Figure 6. Image of a child on a tricycle.

In retrospect, the appearance of each image is intuitively related to the ordering of the bits yielding that image. In Figures 3 and 4, the two images resulted from the up-and-down ordering of the bit arrays forming each byte as suggested by the trigonometric form of Euler's formula. This sinusoidal pattern corresponds to the implied motion of the waving arm in each image. Also, one bipedal figure appears to be turned 90 degrees to the side relative to the other figure, and opposing arms are raised. These differences correspond to the sine/cosine phase difference. As an aside, the reason for the apparent error in the decoded Euler's identity now seems obvious. The incorrect "hi" substring is telling us that the raised arms in the images are to be interpreted as a greeting.

The image of Figure 5 also appears to be related to the particular bit order used in its construction. The alert, raised ears of the bunny correspond to the diverging construction lines in Figure 2 guiding the strictly inner-to-outer ordering of the bits. Also, the tricycle image of Figure 6 was obtained by going around circles of different radii to form the bytes. Of course, the most prominent features of a tricycle are its circular, different-sized wheels.

Some may object that image interpretation is too subjective, and that the pixel arrays produced by the decoding algorithm are no more meaningful than any other random arrangement of pixels. To examine this possibility, the same arrays were also processed with offsets of 1-7 bits from the beginning. Two examples of the different offsets are given in Appendix C. The patterns in the images with no offset are clearly more meaningful than those in the images with offsets. This would be expected if the images with no offset were intended by the designers of the formation.

That the encoding of these particular images was intentional is strongly supported by the conceptual similarity of the images of Figures 3 and 4 decoded using hints from Euler's formula. Each image shows a humanoid figure with an arm raised perhaps in greeting. The obvious similarity of the two images is persuasive confirmation that the data sampling schemes were correct and the decoding algorithm was applied as intended.

It is amazing that the set of bits in this formation were arranged so that two interpretable text strings and four meaningful images could be decoded simply by choosing different byte construction schemes. Encoding of this information would have been rendered even more difficult by the constraints on the bit assignments. First, it seems that the bit selection scheme for each image was chosen *a priori* to reflect the content of that image. Second, Figure 2 shows that the bit values on each side of a given radial line in the crop formation are always complementary. Third, the bit in the center channel of each set of four construction lines can have a value of 1 only if at least one of the neighboring channels also has that value. Further, if the outer channels both have a value of 0, then the center channel must have that value as well. Successfully encoding this much meaningful text and image information in such a restrictive and co-dependent way is very unlikely to have happened by chance. Perhaps it was done by optimizing an appropriate cost function, if one could even be defined.

The Crabwood Crop Formation

The image decoding algorithm obtained from the Wilton Windmill formation was also applied to an existing binary data set that was part of the Crabwood formation discovered much earlier in 2002. A photograph of the formation in Figure 7 shows a representation of an alien being leaning through a rectangular portal. The being's outstretched hand supports a disk shape already known to contain a binary message. A version of the photograph smoothed with a Gaussian filter is included on the right.

Figure 7. The 2002 Crabwood crop formation.

The binary code on the disk was interpreted as a sequence of ASCII characters soon after the formation appeared. Collie (2007) offers a description of the analysis that led to the following message.

"*Beware the bearers of FALSE gifts & their BROKEN PROMISES. Much PAIN but still time. BELIEVE. There is GOOD out there. We oPpose DECEPTION. Conduit CLOSING*"

The existence of a second message in the data set is suggested by the odd mixture of upper and lower case letters. Perhaps capital letters were substituted for lower case letters in order to improve the encoding of an image in the same sequence of bits. An image was decoded from the initial 81 bytes of the sequence provided by Collie (2007), and the resulting 9x9 image is shown in Figure 8. The data is listed in Appendix A-7.

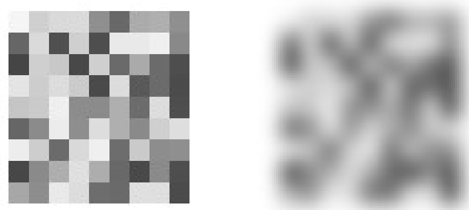

Figure 8. Bipedal figure extending a hand.

The right half of the smoothed image appears to show a bipedal figure in motion. The strategic placements of lighter and darker areas give the body a 3-dimensional appearance with one leg projected towards the viewer. The left half of the image may be interpreted as a three-fingered right hand. The hand appears to extend towards the viewer as well because of its disproportionately large size. The image may be interpreted as a representation of a bipedal figure extending a three-fingered hand in greeting.

The Rendlesham Forest UFO Incident

A well-known encounter with UFOs occurred during several nights just after Christmas, 1980, in southern England. Mysterious lights seen in Rendlesham Forest were investigated by personnel from the nearby American military base at Bentwaters. A brief description of the incident may be found in Dolan (2009).

During the first night of the event, Sgt. James Penniston was among a group of people who investigated moving lights spotted in the forest near the military base. During the investigation, Penniston approached a strange glowing object on the ground. When he touched it with his hand, the object increased in brightness. Almost 30 years later, he revealed on the Earthfiles web site that he then experienced telepathic communication with the object. He learned that the object was from our future and was involved in a project to save future humanity from genetic degradation. He also received a download of uninterpretable binary data into his mind. The data persisted in his mind until he wrote it down in his notebook after returning home.

In the fall of 2010, Penniston released the first five pages of the notebook to the public. The data on the pages consist of the long sequence of 1's and 0's listed in Appendix A-8. When the sequence is treated as a continuous stream of 8-bit ASCII character codes, the following text is obtained.

EXPLORATIONOGHUMANITY6lÙÁ‰��©‘�É¡‘©™’q‰™‰™‰‘±Êºzr¢INUOUSQ“Ô”S‘UT–PQ§�S‡"BŒ�URTHCOODINATECONTINUOTUQS�Øª HH¨ÉêH²

Some embedded words are interpretable, but the text as a whole does not make much sense. Perhaps it should be decoded as an image instead. Communicating an image might have been the primary purpose of the download to Penniston’s mind.

Figure 9 shows the image decoded from Penniston's binary code using the algorithm given by the Wilton Windmill crop formation. The image was again smoothed with a Gaussian filter.

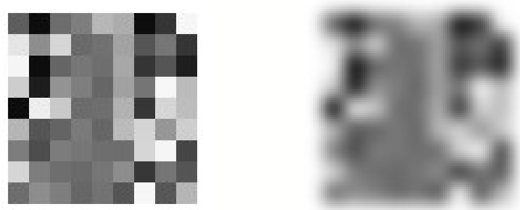

Figure 9. Image of a sitting dog or cat.

This image appears to show the profile of a being like a sitting cat or dog, facing left, with its tail curled up over its back on the right. Some recognizable body parts are labeled in Figure 10 for the benefit of those having difficulty seeing this interpretation.

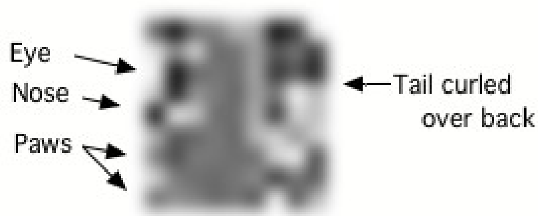

Figure 10. Labeled image.

Two nights after Penniston’s experience, Larry Warren, a member of the USAF Security Police at Bentwaters, also encountered a UFO in Rendlesham Forest. He reported that non-human entities accompanied the UFO. Does the decoded image correspond to his account? The entities he described had large heads and catlike black eyes (Warren and Robbins, 2005, p.47). This description, as far as it goes, matches the representation in the decoded image. The image shows an entity with a relatively large head that is about half the height of the whole figure. The prominent dark eye in the image could correspond to Warren’s description of 'catlike black eyes'.

Years after the event, in 1987 and again in 1988, Warren drew the entities from memory for his coauthor, Peter Robbins. Robbins kindly made the drawings available and they are reproduced in Figure 11 with his permission. Clearly, these drawings are not at all like the representation in the decoded image. Rather, the drawings show the likeness of what is commonly known as the *gray* alien. Note that a similar being also appeared in the 2002 Crabwood crop formation where it is shown holding the disk of information (Figure 7).

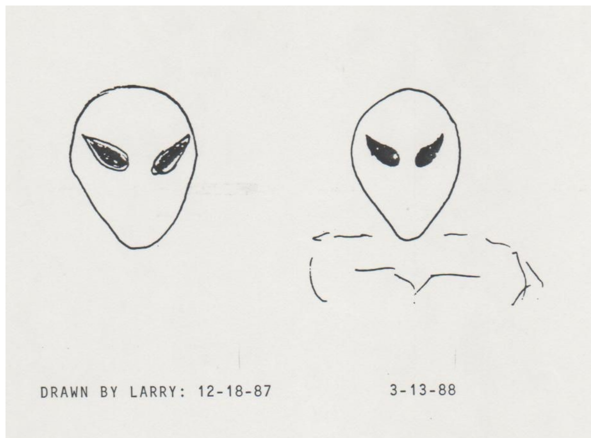

Figure 11. *Warren's drawings of the entities (reproduced with permission).*

Since Warren's drawings in Figure 11 are not at all like the decoded image, we can conclude that Penniston did not receive an encoded likeness of the being seen later by Warren.

General Discussion

The image decoding algorithm is a common thread connecting the Wilton Windmill and Crabwood crop formation designs and the Rendlesham Forest UFO sightings. The same algorithm decoded recognizable images from data obtained from the three different events. A striking feature is the temporal relations among the events. The algorithm appeared about eight years after the 2002 Crabwood formation appeared, and even longer after the data from Rendlesham Forest was said to have been received in 1980. This means that the decoding algorithm must have been part of a long-term plan initiated before 1980 by an unknown agency. This plan would allow us to see the images, but only after 2010.

Was this agency human, alien or both. By his own account, Penniston's mind in Rendlesham Forest was manipulated by the download of the data. Was the agency responsible from beyond our space and time as he was told? Did it have the ability to maintain the data in his mind for a period of time as he says? Or was it a human agency with sufficient expertise in mind control to modify his perception of reality? A human agency might have made Penniston believe it was an alien download, and then placed pages of encoded image data in his notebook. Whether human or alien, the agency involved must have defined the decoding algorithm revealed in the crop formation as well as all the binary data from the three events.

Like Penniston, Warren may have experienced a real encounter with an alien entity, or his perceptions may also have been manipulated by the same human agency. In any case, his drawings of the entities resemble the entity drawn in the field at Crabwood twelve years later. This similarity reinforces the connection between the two events already established by the shared decoding algorithm.

Because of the shared algorithm, the same agency that staged the Rendlesham experience must also have designed the Crabwood and Wilton Windmill crop formations. Some formations have been made using relatively simple equipment to mechanically flatten the crop, but others have clearly been made with more sophisticated methods. For example, Haselhoff (2001) found in his analysis of a simple crop circle that the elongation of the flattened plant nodes varied monotonically from the center of the circle to the edge. A witness had observed a ball of light floating above the field where this particular circle appeared. Haselhoff assumed that the ball of light emitted electromagnetic radiation which caused the plant nodes to stretch because of local heating. The pattern of node elongations was fit very well by a model of a source of electromagnetic radiation suspended 4.1 m above the center of the circle. A similar conclusion was reported earlier by Levingood and Talbot (1999).

No suitable human technology yet exists in the public domain that can create and manipulate such balls of light. However, it is a given that the results of covert military research typically remain secret. In particular, we know that the UK Ministry of Defence (2000) expressed a strong interest in developing technology to create plasma balls high in the sky. If this research has been successful, such technology might be used today to create crop formations as well. But would it have progressed far enough by 2002 to create the Crabwood formation?

We should distinguish between the design and the actual making of crop formations. The Crabwood formation could have been designed by a good graphic artist, but its creation in the field would have been very difficult. Construction of the complex formation in a short time would have required extraordinary methods and technology. The Wilton Windmill formation, on the other hand, would have been relatively easy to make using mechanical methods, but very difficult to design. Recall that the same set of bits in the formation represented multiple text strings and images. Determining the required organization of the bits would have required sophisticated resources.

Carrying out the implied plan over the decades would have required a number of extraordinary capabilities: the ability to manipulate human perceptions, to display completely novel flight technologies, to create very complex crop formations, and to solve sophisticated optimization problems. If there is no human agency that can do all this, then we may have seen the results of alien technology at work.

It is also possible that there was collaboration between alien and covert human agencies. Alien technologies might have done the really difficult things, such as manipulating Penniston's memory, designing the Wilton Windmill formation, and implementing the Crabwood formation design. Human collaborators might have helped things along by, for example, tampering with Penniston's notebook and enlisting crop artists to implement the Wilton Windmill design.

So who was behind the strategy to present the images to the world? Thanks to the Rendlesham image, we know that the plan was initiated more than 30 years ago. Why would someone plan that long ago to make the images available to us now? Too much time and effort was expended for it all to be a mere practical joke.

The rather benign contents of the images suggest answers to these questions. There are friendly waves and a proffered handshake from humanoid figures, the face of a fuzzy animal, a child riding a tricycle, and a seated cat or dog. The images of greetings suggest that we should expect to meet the authors of the images. The image contents are also particularly non-threatening, perhaps telling us that we need not fear the authors when we meet. This message further implies that the authors do not look like us and may even have a non-terrestrial origin. Otherwise, the message would be trivial.

Conclusions

Six meaningful images were decoded from the three sets of data using the same decoding algorithm. Because the decoding algorithm was specified only in the latest data set, all of the data sets must have been designed by the same agency. Further, we were not meant to see the images until 2010 when the decoding algorithm was provided. Three of the images offer greetings, suggesting that we should expect some kind of meeting with the authors of the images. The remaining three depictions of harmless furry animals and a child imply that we should not fear them when we eventually meet. Since this message would be trivial if the source were a human agency, the authors probably have a non-terrestrial origin.

References

Dolan, R.M., 2009, *UFOs & the National Security State: The Cover-up Exposed, 1973-1991*. Keyhole Publishing Co., Rochester, NY.

Haselhoff, E.H., 2001, *The Deepening Complexity of Crop Circles*, Frog Ltd.

Levingood, W.C. and Talbot, N.P., 1999, *Dispersion of energies in worldwide crop formations*, Physiologia Plantarum, 105, 615-624.

Warren, L. and Robbins, P., 2005, *Left at East Gate*. Cosimo, New York, NY.

Appendix A-1

Wilton Windmill data for Euler's Identity

```
1100101
1011110
0101000
1101000
1101001
0101001
1110000
1101001
0101001
0110001
0111101
0110000
```

Appendix A-2

Wilton Windmill data for the decoding algorithm specification

```
0101100
1000010
1110101
1110100
0110100
0110101
1111000
0110100
0110101
0111001
0100001
1111001
```

Appendix A-3

Wilton Windmill data for the image with left hand waving

```
starting at "e" sector of Euler's formula

01000101 1a in -> out
10000100 1b out -> in
10100000 1c in -> out
01111010 2a out -> in
00000110 2b in -> out
10001011 2c out -> in
00101000 3a in -> out
10000000 3b out -> in
10000111 3c in -> out
00010110 4a out -> in
00000010 4a in -> out
01101001 4c out -> in
01101001 5a in -> out
11010000 5a out -> in
11010110 5c in -> out
10010100 6a out -> in
10000110 6b in -> out
11110001 6c out -> in
01110000 7a in -> out
01000000 7b out -> in
10010110 7c in -> out
10010110 8a out -> in
00000001 8a in -> out
01101011 8c out -> in
00101001 9a in -> out
00000001 9b out -> in
11001110 9c in -> out
10001100 10a out -> in
00000011 10b in -> out
01000011 10c out -> in
00111101 11a in -> out
10001000 11b out -> in
11001110 11c in -> out
00000100 12a out -> in
00011010 12a in -> out
01011001 12c out -> in
```

Appendix A-4

Wilton Windmill data for the image with right hand waving

```
starting at "e" sector of Euler's formula

10100010 1a out -> in
00100001
00000101
01011110 2a in -> out
01100000
11010001
00010100 3a out -> in
00000001
11100001
01101000 4a in -> out
01000000
10010110
10010110 5a out -> in
00001011
01101011
00101001 6a in -> out
01100001
10001111
00001110 7a out -> in
00000010
01101001
01101001 8a in -> out
10000000
11010110
10010100 9a out -> in
10000000
01110011
00110001 10a in -> out
11000000
11000010
10111100 11a out -> in
00010001
01110011
00100000 12a in -> out
01011000
10011010
```

Appendix A-5

Wilton Windmill data for the bunny image

```
starting        at      e       sector  of      Euler's formula

01000101        1a      in      ->      out
00100001        1b      in      ->      out
10100000        1c      in      ->      out
01011110        2a      in      ->      out
00000110        2b      in      ->      out
11010001        2b      in      ->      out
00101000        3a      in      ->      out
00000001
10000111
01101000        4a      in      ->      out
00000010
10010110
01101001        5a      in      ->      out
00001011
11010110
00101001        6a      in      ->      out
10000110
10001111
01110000        7a      in      ->      out
00000010
10010110
01101001        8a      in      ->      out
00000001
11010110
00101001        9a      in      ->      out
10000000
11001110
00110001        10a     in      ->      out
00000011
11000010
00111101        11a     in      ->      out
00010001
11001110
00100000        12a     in      ->      out
00011010
10011010
```

Appendix A-6

Wilton Windmill data for the tricycle image

```
Start at the inner ring (a) of "e" sector of Euler's formula.
Go clockwise around that ring, then jump to next outer ring (b)
and repeat until outermost ring (h) is reached.

a 001001001001001011001001011001001001
b 100101000100101000100101001001001000
c 011000100100100100100100100100100100
d 000101000001001000101001000100110011
e 000100100100110101000100101000101011
f 100110001001001011001001001000101000
g 000110001011011011011001001011001011
h 110001011000110101000110100110110000
```

Appendix A-7

Crabwood data for handshake image

```
01
01000010
01100101
01110111
01100001
01110010
01100101
00100000
01110100
011010000
01100101
00100000
01100010
01100101
01100001
01110010
01100101
01110010
01110011
00100000
01101111
01100110
00100000
01000110
01000001
01001100
01010011
01000101
00100000
01100111
01101001
01100110
01110100
01110011
00100000
00100110
00100000
01110100
01101000
01100101
01101001
01110010
00100000
01000010
01010010
01001111
01001011
```

01000101
01001110
00100000
01010000
01010010
01001111
01001101
01001001
01010011
01000101
01010011
00101110
01001101
01110101
01100011
01101000
00100000
01010000
01000001
01001001
01001110
00100000
01100010
01110101
01110100
00100000
01110011
01110100
01101001
01101100
01101100
00100000
01110100
01101001
01101101

Appendix A-8

Data for the Rendlesham Forest image

```
0100010101011000
0101000001001100
0100111101010010
01000001010101000
1001001010011110100
11100100111101000
11101001000010101
010100110101000001
0100111001001001
0101010001011001
00110110011011
001101100111000
0011000100110000
00110000

0011010100110010
00110000001110010011
0100001100100011
0101001100110011
001001001110
00110001001100 1100
11000100110011
00110001001100100011
0110001110010101
0111010000110100
111101001110
010101000100
100100101001110

0101010101001111 0101
01010101001101
0100011001001111
01010010010100000100
1100010000010100
111001000101010101
00010000010101
001001011001
0100000101000
10001010110010
0000101001110
000111001000
100100001

01000110010011101 01010
10101010010010101
000100100001000011
01001111010011110100
```

01000100100101001
1100100000101010100
0100010101000011010
011110100111001010
1000100100101001110
010101010100111101010
100010101010101000
10101001110
01000011011000101
010100000101001
00100001001000
10101000110010011
1101010010

010001011

Appendix B

// Wilton Windmill decoding algorithm implemented in C++ in MS Visual Studio

```
void CCrabDlg::OnPaint()
{
  CPaintDC dc(this); // device context for painting
  COLORREF white= RGB(255,255,255);

  if(m_bDisplayData) {
    int x,y;
    for(int i=0,ii=0;i < m_nbytes && ii < m_nBlocks;i += 81,ii++){
       for(int j=0,m=0;j < 9*m_iBlocksize;j += m_iBlocksize,m++) {
         for(int k=0,n=0;k < 9*m_iBlocksize;k += m_iBlocksize,n++){
            x= m_cp.x+ii*9*m_iBlocksize+j;
            y= m_cp.y+k;
            unsigned char ch= m_bdata[i+m*9+n];
            COLORREF color= RGB(ch,ch,ch);  // block gray level
            DrawBlock(&dc,x,y,m_iBlocksize,color);
         }
       }
     }
     m_bDisplayData= FALSE;
   }
   CDialog::OnPaint();
}

void CCrabDlg::DrawBlock(CDC* pdc,int bx,int by,int size,COLORREF color)
{
  for(int i=0;i < size;i++)
    for(int j=0;j < size;j++)
      pdc->SetPixel(bx+i,by+j,color);
}

BOOL CCrabDlg::ReadData(void)
{
   FILE * fi= fopen((LPCSTR)m_strInputFile,"rt");
   m_ndata=0;
   for(i=0;i < 2000;i++){
      if(fscanf(fi,"%1d",&num) < 1)
         break;
      m_indata[i]= num;
      m_ndata++;
   }
   fclose(fi);
}
```

```
unsigned char CCrabDlg::bits2byte(int *bits,int len)
 {
    unsigned char bdata= 0;
    unsigned char ch;
    for(int i=0;i < len;i++){
       if(bits[i]==1){
         ch= 1;
         ch= ch << i;
         bdata |= ch;
       }
    }
    return(bdata);
 }


void CCrabDlg::OnButtonDisplay()
{
   int i,j;
   // flip the bits
   for(i=0;i < m_ndata;i++){
     if(m_indata[i] == 0)
        m_dispdata[i]= 1;
     else
        m_dispdata[i]= 0;
   }

   //encode the bits into bytes
   m_nbytes= 0;
   for(i=0,j=0;i < m_ndata;i += 8,j++){
      m_bdata[j]= bits2byte(&m_dispdata[i],8);
      m_nbytes++;
   }
   m_bDisplayData= TRUE;
   Invalidate();    // draw the bytes
}
```

Appendix C

The following images were decoded beginning at the indicated number of bits from the beginning of the data set. The results demonstrate that the offset of zero gives the most recognizable image.

Offset 0 is described in the text as a biped with left hand waving ...

0 1 2 3 4 5 6 7

Offset 0 is described in the text as a bunny ...

0 1 2 3 4 5 6 7