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## Electromagnetic and Crystalline Properties of Crop Formations April 20, 2002

### Abstract

Crop formations have long been associated with anomalous electrostatic and magnetic phenomena. We suggest that many crop formations have crystalline properties that create nonordinary, resonant-energy properties not usually found in Euclidian-shaped, mechanically-planted farm fields. We specifically examine the crystalline shape of crop formations, the similarity between the lay of plant stalks and liquid crystals, and the piezo-electric effect.

### Introduction

Crop circles have long been associated with anomalous electromagnetic phenomena such as battery failure, camera malfunctions, and strange balls of light which are sometimes experienced in and around the formations. While there has not yet been a satisfactory explanation for these observations we propose a theory based on the similarities between crop formations and crystals. Specifically, we believe that at least three properties of crystals are at work in crop formations and these may explain some of their anomalous effects.

Three distinct properties can be identified here: The shape of a crop formation may affect the crystalline properties of wheat and other grain crops by interacting with the chlorophyll in their cells; the periodic and symmetrical alignment of the individual stalks may create resonance; pushing down on the crop may activate the piezo-electric effect.

Research in liquid crystals shows that these materials are highly sensitive to electric fields and change their orientation in response to relatively low voltage fluctuations. These types of crystals are used in flat-panel displays, calculators, and watches. Other organic substances also have crystalline properties. Chlorophyll and proteins, for example, have crystalline structures.

One of the main characteristics of crop formations is that the positions of the individual crop stems are changed from a vertical position to a flattened, horizontal one. In making crop patterns, pressure is put on the plants to create a particular shape. Crop patterns can often affect areas several acres in size or larger. When uniform pressure is applied to the plants it is possible that the piezo-electric effect is put into action, whereby pressure on a crystal causes it to emit electricity in very specific ways. If this were done on a large-scale, as is often the case with crop formations, it might result in a significant change in the electromagnetic and other properties of the crop. In their recent research, Hein and Russell of Midwest Research and Colin Andrews of CPRI have found large changes in the electrostatic and magnetic fields in many crop formations.

The overall shape of crop formations must also be considered. Generally, crop formations are periodic (ie., internally repetitive) and symmetrical; an important quality of crystals. Formations are set in fields planted by a seed drill that sets up a lattice-array of plants. This lattice-array is

then shaped into a coherent pattern by circle-makers, human or otherwise. These coherent patterns may be responsible for creating some of the subtle energy effects that are sometimes reported in the vicinity of these formations. These effects often defy a conventional, physical explanation.

The effect of all these crystalline components is to create a self-sustaining resonance field capable of conducting various frequencies and subtle energies. We believe this transduction effect is responsible for creating many of the anomalies experienced in and around crop formations.

### **The Lattice-Array**

One aspect of crop fields that is important here is the way the individual stalks are laid out. The fields are generally planted by a seed-drill machine which plants the seeds at regular intervals, about every inch or so. In doing so, the net result is acres of plants planted at evenly spaced intervals. In effect, the lattice-array is created with periodicity similar to a natural crystal. One of the effects of a lattice-array in a natural crystal is a highly periodic, repetitive arrangement of atoms across large distances, atomically speaking. In a desire to maximize crop yields, the farmer has unintentionally created the same arrangement. The crop circle functions as another periodic pattern overlaid on a preexisting one.

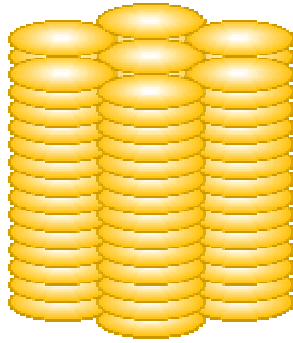
### **Crop Formations as a Large-Scale Phase Change**

Liquid crystals and crop formations share many of the same properties in terms of the orientation of the individual crystals or stalks. Liquid crystals exhibit various types of phases that describe that orientation of the individual crystals. Two phases, the smectic and nematic phases, describe conditions in which the individual crystals have large-scale order with respect to their orientation. In these phases, the crystals begin to point in the same directions creating long-range orientational order. This order is characterized by parallel but not lateral (end-to-end) order. This parallel, orientational coherency, as opposed to random orientation, gives the crystal its properties.

Similarly, in a crop formation, the process of patterning the crop gives the stalks an overall orientational coherency. Crop formations act as a perturbation or disturbance from equilibrium conditions of the grain field. Figure 1 shows a sketch of a three-dimensional columnar liquid crystal. It appears very similar to the Adam's Grave "CD Formation (2001)" (Figures 2a and 2b). This latter formation was constructed entirely of 2107 compact discs turned upside down to reflect the sunlight. The formation closely resembles the Milk Hill formation of 1997 (Figure 3).

Figures 4 and 5 shows how the coherent orientation of individual crystals changes in a group of liquid crystals. In a liquid crystal, all of the crystals can align in one direction or another. Figure 6 shows a liquid crystal in which layered crystals are superimposed on each other. This is very similar to the layering effect often found in the lay of crop formations. Figures 7a and 7b show crop layering, similar in appearance to layered liquid crystals, in the Danebury Triad and Koch Snowflake formations (1997). Notice how the lay is similar to the arrangement of the liquid crystal in Figure 6.

These photos and illustrations show that crop formations are often very similar in appearance to liquid crystals. As the individual plant stalks are arranged as a whole in crystal-like patterns, the whole formation may resonate like a crystal.



**Figure 1:** Columnar liquid crystal.



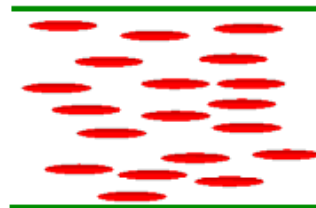
**Figure 2a:** Columnar structure used in Adam's Grave "CD Formation," July, 2001



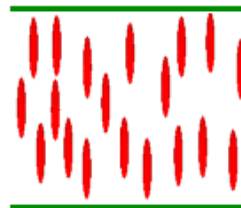
**Figure 2b:** CD Formation



**Figure 3:** Milk Hill Formation, 1997

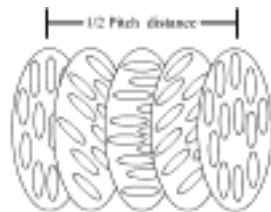


Planar Texture

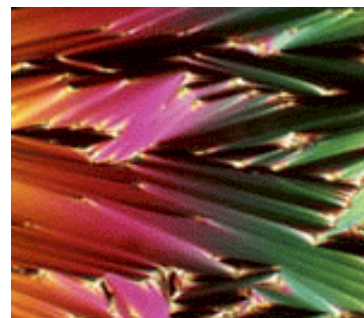


Homeotropic Texture

**Figure 4:** Liquid crystals shift their orientation



**Figure 5:** Rotational symmetry



*Photo courtesy of Dr. Mary Neubert LCI-KSU*

**Figure 6:** Smectic or layered phase crystal



**Figure 7a:** Layered crop in Danebury Triad Formation, 1997

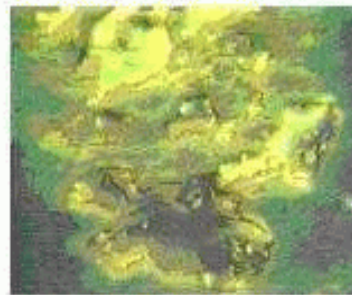
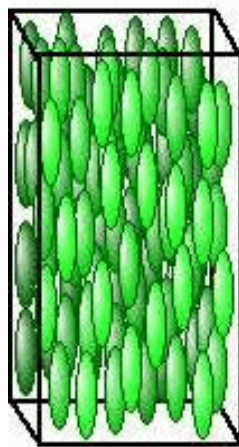


**Figure 7b:** Large-scale crop layering in Silbury Hill Formation, 1997

### Orientation

In a liquid crystal lattice-array, such as a computer display, the crystals are in a semi-liquid state that allows them to move in response to electrical fields that are turned on and off very quickly. The crystals are evenly spaced across the lattice. As electrical current is precisely applied to the array, the crystals twist and untwist very rapidly allowing precise points in the light screen behind the crystal lattice to show through. This is called a “chiral nematic” phase whereby the liquid crystals all point in a coherent direction and certain crystals twist as groups. The direction in which a group of crystals points is called the “director.” Figure 8 shows crystals in a nematic state.

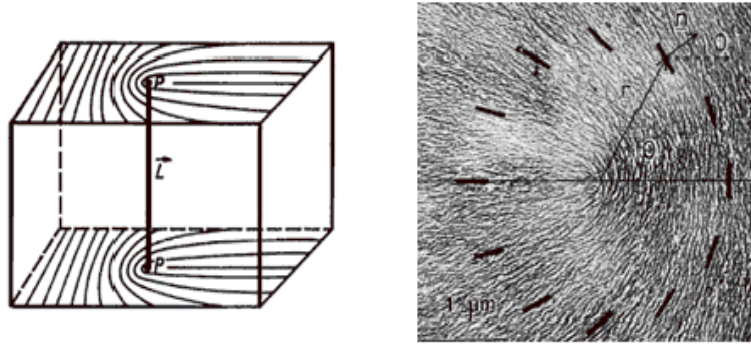
However, while the same principle is in operation in both liquid crystals and crop formations, in the latter it is reversed. In a liquid crystal, an electric current is applied to change the orientation of the crystals. In a crop formation, the circle-makers change the orientation of groups of individual stalks. If each stalk is seen as an individual crystal, then it follows that modifying the orientation of the stalks generates or changes the flow of energy in the field.



A schematic representation of the nematic phase (left) and a photo of a nematic liquid crystal (above).

*Photo courtesy Dr. Mary Neubert ICI-KSU*

**Figure 8:** Nematic-phase crystal



Director topology around a line disclination in a liquid crystal (left), and an electron micrograph of the same type of disclination. Crystalline lamellae are seen edge on and appear dark. The director field lines lie normal to the lamellae as illustrated by the vector  $n$  for a highlighted lamellae.

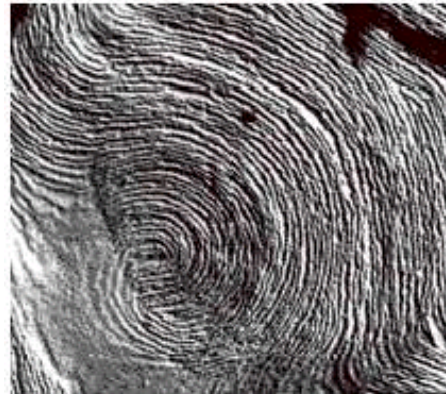
**Figure 9:** Director field lines

### Director Topology

Liquid crystals are orientated in the central direction of the director, described above. The director field lines provide the orientation for the entire crystal. Similarly, in a crop circle, the lines of flow in grain crops may also follow a flow or flux pattern oriented around a coherent topology. Figures 9 and 10b show the topology of two different liquid crystals. These seem very similar to the lay patterns seen in crop formations (Milk Hill, 1997) as shown in Figure 10a. Many crop formations are often oriented around large-scale spiral patterns such the Hackpen and Cherhill constructions of 1999. The memorable Moire patterns of 2000 and Chilbolton “Arecibo” and “Face” formations of 2001 are exceptions to this design pattern.



**Figure 10a:** Spiral lay in crop circle



**Figure 10b:** Spiral liquid crystal

### The Piezo-Electric Effect

Crystal radios, which use no batteries, are an example of the piezo-electric effect. In a crystal radio, the crystal acts to transform the energy of the radio signal into an audible sound that is perceivable through an earpiece. The piezo-electro effect allows the crystal to convert radio signals into electricity.

Similarly, in the theory presented here, pushing down on the grain crop “activates” its latent crystal properties. The energy intrinsic to the plants may be converted into another type of energy that resonates with people and objects. Thus, the way in which the crop formation is created could directly affect its subsequent energetic properties. From this perspective, formations made by mechanical means could have the same energetic effects as so-called “authentic” formations.

## Summary

The similarity between crystals—particularly liquid crystals—and crop formations provides an intriguing model with which to understand some of the anomalous objects and phenomena present near crop formations. As crystals act to transduce energy through the piezo-electric effect, this may explain how crop formations act to disrupt electronic equipment and interact with the consciousness of human researchers and other visitors. In effect, crop circles may simultaneously serve as a form of natural magic and as an elemental resonant technology.

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