Crop Formation: Sussex, England, 1994

Laboratory Code: KS-02-128

Material: Wheat heads, *Triticum aestivum*.

Formation: Three circles of approx. 90, 28 and 14 ft., with their centers located precisely on a N - S line. Formed July 29, 1994, with all three circles laid counterclockwise. Location- Sompting, West Sussex. U.K.

Sampled: by Mr. Barry Reynolds et al., on July 31, 1994.

Laboratory Results:

At the time these samples were collected, one of us (WCL) had previously given instructions to the field workers that at late maturity, only seed heads were important (not thinking too clearly that day). In any event the lack of stem nodes made it necessary to examine the bract tissue for cell wall pit changes, a more labor intensive, eye straining examination. Needless to say the above instructions to field workers, are null and void - node length measurements are easier on old eyes (also important to examine for possible Beer's law effect, node expulsions etc.).

The bract pit field measurements were made in the usual manner with 30, randomly selected pits per sample. Rather than present a table of data, we have superimposed the cell wall pit data over a diagram prepared by Mr. Reynolds (Fig.1 attached). The overall control mean was taken from three North and three South sample sets at 55', 110' and 220' from the formation (average 2.10 microns with an sd of 0.36, N=180). Values shown in Fig.1 are percent change relative to this control level, with those on the left side from within the formations and those on the right the samples outside the formation.

From these data it is quite apparent that the cell wall pits in the formation samples were significantly expanded ($P<0.05$) relative to the six control sample sets. All the outside formation samples show very low variations (from +5% to -4%) from the control level. There is no indication of a "spill over" effect in these formations. In the seed germination and seedling growth data, no significant differences were observed. These samples were apparently taken at the growth stage where the influence on the seed development was at a minimum.

Conclusions:

On pages 30-36 of the Nov.1, 1994, Sussex Branch report of the CCCS, Mr Barry Reynolds details a very important and significant mathematical analysis of these three circular formations. By applying an Analytic Geometry approach he was able to show that the diameters and spacing of the three circles relate very precisely to the Fibonacci number sequence. Our purpose here is to point out that this is not a trivial finding!

These precise relationships cannot be dismissed as a mere coincidence. The Fibonacci series describes geometric patterns and forms observed within the natural world. In fact the occurrence is so frequent that the series constant has been termed the "Golden Number". Many species of plants have leaf swirls and seed patterns which can be defined by this series. In Fig.2 is an example of Fibonacci defined pattern development in a sunflower head. We would hope that the reader is struck by the similarity between the swirls in the sunflower and the swirled crop lay seen in the majority of crop formations.

It is to be expected that there are those who would question drawing any analogy between the swirls in a sunflower and those in a crop formation. What must be kept in mind is that these dynamic processes are scale invariant, that is, size is not a factor. Very similar, time-force relationships are involved, whether within a spiral galaxy, a crop formation or a seed head on a sunflower. If these are multiple energies occurring in an iterating, chaotic system far from equilibrium (such as an ion plasma) then very complex, non repeating, geometric forms are to be expected.

This is a very complex situation and Mr. Reynolds is to be congratulated in making a significant step toward a better understanding of crop formation dynamics. It would seem that most observers choose to take a non empirical approach and simply blame the formation on the so called "circle makers". It is to be hoped that others will be stimulated by the Reynolds analyses and objectively examine other formations for similar mathematical relationships. Later in the season when the sample arrivals slow down, we intend to look more deeply into the relationship between geometrical constants found in crop formations and those with a similar pattern which are prevalent in natural, chaotic systems.

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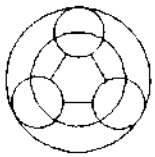
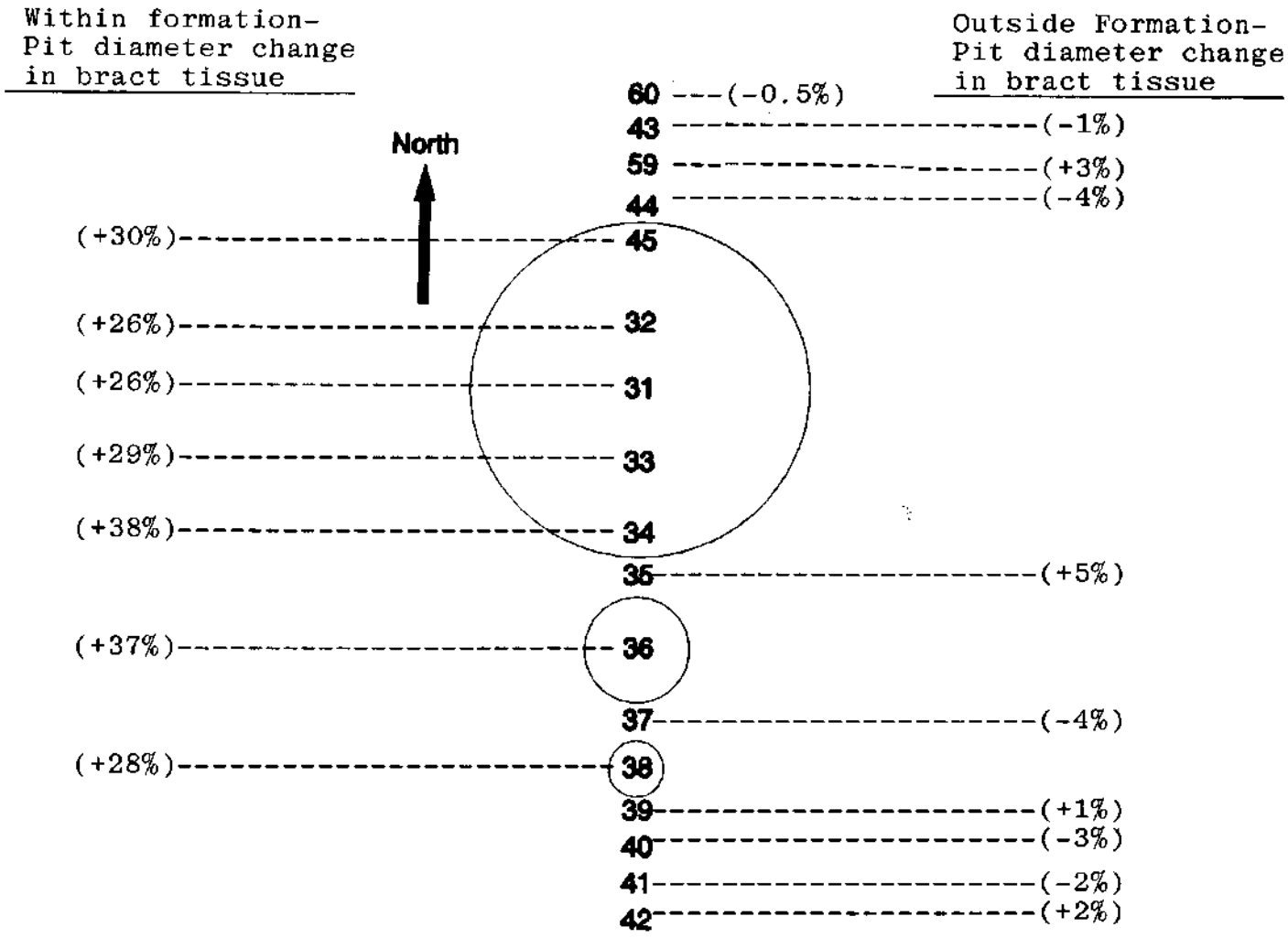
Fig.1

Centre For Crop Circle Studies
Sussex Branch
Prepared by Barry Reynolds



Cell wall pit data superimposed on original diagram. The overall control mean was taken from the three North and three South sets at 55', 110' & 220' from the formation (N=6 sets total or 180 pit measurements). Values shown are percent change relative to these six control sets.



Sampling taken on a North/South line

July 1994

NOTE: All the "outside formation" samples show very low variations (normal plus and minus) from the overall control level.

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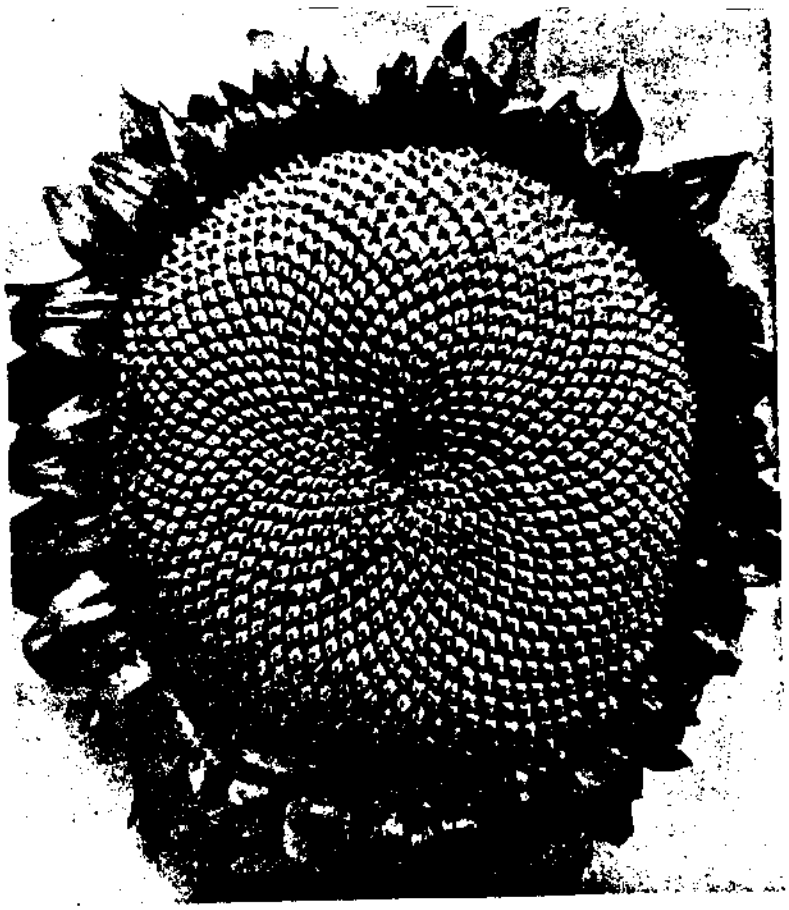
Fig.2 Seed head on sunflower plant (Helianthus maximus) showing oppositely coiled logarithmic spirals arranged as members of a "Fibronacci sequence". (ref: J.R. Newman; "The World of Mathematics", Simon & Schuster, Inc., N.Y., 1956, pp716-718)



Note-similarity between "lay" of seed pattern and lay of plants in crop formations (see comments in Report No.42 text)