THE FOCAL POINT

Vol. II, No.VI | *The Newsletter of the Atlanta Astronomy Club* | February 1990

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by Lee Keith
courtesy of the Northern Lights Newsletter

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According to Noyes (1982), "All sunspots begin their lives as tiny pores no larger than a single solar-granule. They are created when a cluster of sub-surface gas carrying a strong magnetic field breaks the surface..." A pore may last only an hour or so, or may go on to become a huge group of spots many times the size of the Earth.

Invariably a new group first appears as one or more tiny spots without penumbra (the filamented structures which surround the dark, or umbral, portions of the spots). Such a group is classified "A". An "A" group is a unipolar, rather than bipolar cluster.

Visually bipolar groups consist of two or more spots which are oriented in an East to West direction. If a small group does show a bipolar structure, it is classified as a "B" group. Many clusters never develop beyond the "A" or "B" stage, and consequently their lifetimes are a few days at most. In spite of their insignificant appearance, these small activity centers are often quite numerous, and can make up a substantial portion of the daily sunspot count. Sometimes, and especially during the minimum of a sunspot cycle, these are the only groups which are present on the Sun's disk.

A few of the "A" or "B" type clusters develop rapidly into larger and more complicated systems. One of the first signs of impending greatness is a very rapid surge in growth shortly after the spot's initial emergence. Within a few hours, the group may have grown to become a "C" or "D" group. The most distinguishing feature of the "C" group is the appearance of a single penumbra. The penumbra can appear around the preceding (most westerly) or following spot; however, more often than not the penumbra appears around the leader.

On the other hand, the "D" group is characterized by penumbra around both preceding and following spots. Most "D" groups pass through the "C" stage, but often their growth is so rapid that they appear as "A" or "B" types on one day, and as class "D" on the next. Professor Waldmeier specifies a maximum length of up to ten heliographic (solar) degrees for this stage of group development.

A small fraction of the "D" clusters continue to grow and

become "E" groups. Length (and to some extent, structure) is the difference between "D" and "E" groups. The "E" types must demonstrate a longitudinal spread between ten and fifteen degrees. Spread in latitude, which can show considerable variation, is not considered.

Although "E" groups represent only a small percentage of the total number of clusters, a few of them continue to grow into the largest group of all, the type "F". Again length is the determining factor: their longitudinal spread must exceed fifteen degrees. Such groups can be spectacular! The spot count in one "F" type cluster alone can exceed one-hundred, and they can spread over areas of billions of square-miles. The lifetime of the "F" group is usually long; they often rotate back onto the visible disk for additional appearances.

All groups have one thing in common: their growth is far more rapid than their decay. Maximum growth can usually be recognized by a lack of further spread in longitude. And, when the numerous tiny spots that are characteristically associated with developing clusters start to disappear, it is most often a sign that the group has started to decay.

The decay process is similar for all groups. The smaller "C" and "D" types usually desolve into a rather long-lasting single spot with penumbra. If decay ends in a single spot it is deemed to be class "J" if less than two and one-half degrees in diameter, and "H" if its size exceeds this. The "H" group which remains from the decay of an "F" group is particularly long-lasting and may reappear for several solar rotations. Small spots may come and go around the edges of these groups.

The larger "D," and the "E" and "F" type complexes often desolve into two such spots. This stage of decay is classified "G." These clusters generally decay further into a single spot which is frequently the preceding member of the group. These in turn are classed as either "J" or "H" type groups, depending on their diameter.

The groups which we have described (except for types "A," "J" and "H") have visually bipolar structures. Occasionally a great group develops that lacks this structure. These clusters are also classed "H" even though they do not represent a decayed group. Usually they grow to be quite large, and may become great flare producers. More rarely, a small, unimpressive group which lacks a bipolar structure will occur, and it should be classified "J" even though it too did not come about through a decay process.

Note: In the "Modified Zurich Classification", "G" groups are included in the definition of classes "E" and "F," while "J" types are assigned to class "H."

THE TEXAS STAR PARTY

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For more information about this exciting event ask any officer for further details at the meeting.

WHERE DO YOU GET THOSE SHOWS?

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A planetarium show can be a lot of different things, depending on where you see it, who's putting it on, and who created it. Current planetarium show philosophy at any one facility is affected by a number of factors: educational and entertainment needs, current events in astronomy, the financial status of the facility (i.e. does it need to bring in dough before the budget axe hits?), what the local audience interests are; the interests of the planetarium staff, and the abilities of the staff.

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Physically, the show may consist of anywhere from 25-300 or more slides, a soundtrack tape, a set of special effects projectors, and the star projector. In some facilities, these materials are created in-house. Other facilities buy their show materials, either from planetarium materials producers, NASA (slides and films only), or they adapt standard AV presentations to their needs. In a facility which creates its own shows, the creation of a show might follow this scenario:

4-6 months before the show opens, the scriptwriter sits down and comes up with an idea for the show. He/she/it meets with the artist and soundtrack person (or him/her/itself if the staff is small), to brainstorm the idea for visual and sound possibilities. Then the scriptwriter writes the script. (That's what I do -- it looks easier than it is...)

2-3 months before the show opens, the finished script is handed to the technical staff, which then gets to work creating visuals for the show. If the facility is especially lucky, an on-staff artist will paint scenes for the show, which are then photographed and mounted for projection onto a curved surface. If the facility is exceedingly lucky, the staff soundtrack artist will compose original music and set the narration to it. However, usually someone just uses library music (there are special "space-music" libraries available for this purpose) to create the soundtrack, records the narrator(s), and puts together a full track to go along with the visuals.

1-2 weeks before the show opens, the old show is torn out, new projectors are installed, the slides are put in and synchronized to the soundtrack, and the show is rehearsed (if there's time).

This scenario varies from facility to facility. If a planetarium space/theater buys a show from another facility, then the creative time is shorter, but the installation time remains about the same. Obviously this scenario fits the better-equipped facilities -- but the creative thought behind the shows given in any facility isn't limited to the "big boys". I have created a show from 30 slides and a limited soundtrack, which ran in a small school facility here in Colorado. The students who saw the show came away with a new appreciation for the subject (Voyager 2 at Uranus). It was a case of creative presentation -- something which distinguishes planetarians from the general run of teachers and audio-visual materials creators. It's a lot like creating science fiction -- planetarians have the whole universe from which to glean ideas to present in Earth-bound facilities. In most cases, they do a pretty good job.

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First Class Delivery

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