

Northwestern Observatory

B. C. PARMENTER, DIRECTOR
C. L. BROWN, ASSIST. DIRECTOR

(SOLAR RESEARCH LABORATORY)

Spokane 63, Washington

Office: 6718 EAST SEVENTH

EXPRESS STATION
DISHMAN, WASHINGTON

6 July, 1958.

Walter Orr Roberts
N. Richard T. Hansen

High Altitude Obs.
Boulder, Colorado.

Dear Dr. Roberts;

Wish to make a "special" report on the following material. This may be of considerable value theoretically as to just how elevated material is born in the solar sub-surface, etc, etc,-----.

On 1 July, we had a spot which had come around the limb at approx. S.20-E.80---. On 2 July, a heavy rain-storm forbid making any observation, and no clearing was had until around noon of 3 July. That afternoon I installed my "secondary mirror", to replace the other one, and so give me a smaller working image (32 mm), as a trial on the spectrohelioscope over the long holiday-period. Having gotten it located by 4:30 P.M., I had a few minutes to observe before trees cut off the view. I at once noticed that the single spot had become a large bi-polar, and was in on the disk several degrees. At one carefully positioned place in Ha, to violet,, a dark, spot-type surge was seen, looking much like another simple sun-spot, with surrounding penumbra. By careful manipulation of the line-shifter, I was able to make a closer setting, and saw what appeared as a true spiral, or helical "funnel", much as looking directly down into an earthly cyclone. The individual formations could be seen, and at the center "pit", was a tiny speck of intensely bright material. There was no time for a photograph, or further observation, as the shade from the trees encroched upon the mirrors. On the attached sheet, I have endeavored to draw this, as seen inverted in the spectrohelioscope.

On 4 July, I observed between 1904 UT and 2000 UT. Between 1936 UT and 2000 UT, I took numerous photos. I photographed the area under discussion, because it was interesting---having the bi-polar group--a large dark filament, and a prominence off the limb. It was not until I had made some trial prints of the area, and happened to glance at one, as it lay on the table, in the inverted position as I had seen it in the spectrohelioscope,, that I became aware of any direct connection with the day before. I have therefor purposely inverted the SE view to NW, as clipped to the sheet, and have also sketched the view to show the thing more clearly. If the photo be held at arms length, it show very **clearly** indeed. It is evident, that while the large spot-group progressed inward over the times, the dark funnel which had bred the filament, had not done so,, but had stayed nearly at the same point as I had observed it the day before, when no filament I been in evidence.

On 5 July, ~~nothing~~ unusual was to be observed in this area. Then, today, 6, July, photos were made between 1805 UT and 1825 UT. of this region. The dark funnel surge appeared again, but before I could attach the camera, it had

evidently gone through it's vortical structure (which I observed visually), and all that could be seen in the film was where it had been--with two legs connecting it to the bi-polar spot of the large group. The two smaller prints show the views both off and on Ha,, slightly to violet of centerline. Ordinarily, the dark filaments show more pronounced when the shift is to the other side of the line. (Herein, I might comment that on the 5th, I noticed great changes for the attending long dark filament--that upon shifting from red to violet side of Ha--the filament brightened and darkened for each one-half it's length--as one-half became more pronounced, the other one-half was seen to disappear entirely--and vice-versa). Evidently of great radial motion, but as I at present have the scale detached from the line-shifter,, can only guess at how much difference.

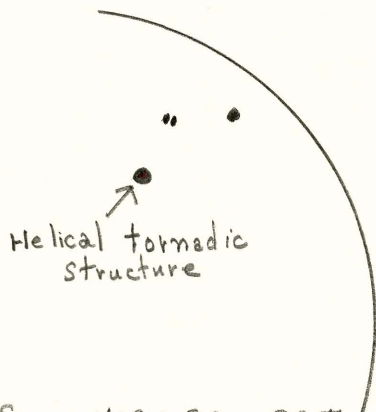
For myself, who having observed this visually instead of motionless photos, the action seems quite clear from a strictly mechanical standpoint.

The bi-polar spots were evidently attracted to the cyclonic center of attraction, due to it's intense make-up. Over the ensuing times, as the spots were encroaching upon the center, the abundance of material were forced to shift elsewhere, and so thrown out upon the solar visible surface. As the other large spot of the group was nearby, in solar standards, there may have been some attraction to it also (magnetic, etc), and so it took the "trail" shown, only to be finally ejected entirely to higher elevations, as the dark filament, or surface prominence. If this highly active material were of extreme temperature,, the meeting with the cooler spots, would no doubt have caused an absorptive-effect, or cooling--in which the whole might have then reversed, and so become cool and dark enough to have been observed in this manner.

It all sounds too "pat",, but at least its a theory, into which one might incorporate temperatures, collisions, Coriolis forces, shock, etc, etc. At the same time, one might prove that where there is an over-abundance of highly-active material, and there are displacements among bodies of varying sizes, temperatures, and the like--then such material is not entirely dis-
apated, but must shift about. What better place--than the paths of least resistance--and so to the upper levels.

Observing this only once of course means little,, but perhaps like observations which you have either made there,, or has been made of this at other stations,, may give some indication of what actually transpires at times such as this. In any event, this filament will bear watching, if it maintains some of the radial aspects across the disk and onto the western limb.

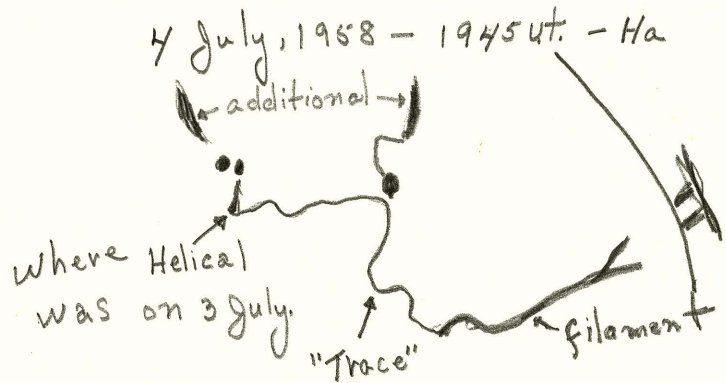
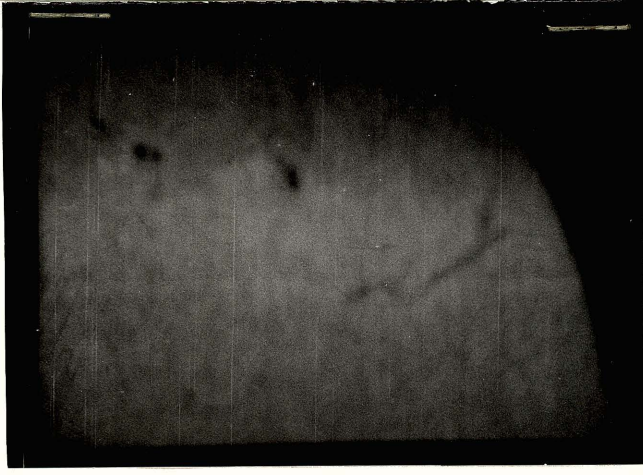
Sincerely
BC. Parmeter



3 July, 1958 - 4:30 P.M. P.S.T.
Spectroheliograph - H α - Visual.



appearance of Helical structure on 3 July.

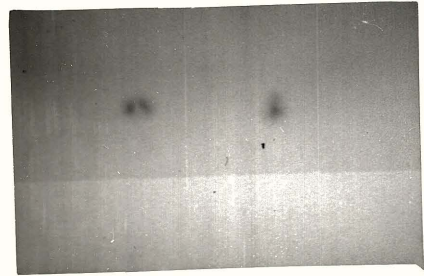


4 July, 1958 - 1945 UT. - H α

H α
Continuum

6 July, 1958.

"stroke"
"mark" →



Trouble with Anderson's Prism rotation caused "stroke-marks" this day.

H α
line

6 July, 1958

where surge had been just before photo
"stroke"
"mark" →

