complex phenomenon and that the aspect of the flare that is related to the response at 1.5 meters is not certain. The complexity of the flare phenomenon becomes clear when it is realized that in addition to the usually observed sudden brightening in $H\alpha$ there may or may not be (1) an ultraviolet component of sufficient intensity to cause a sudden ionospheric disturbance on the earth, (2) a spreading of a low grade brightening to relatively distant parts of the plage in the later stages of the flare, (3) active dark flocculi or surges in projection on the disk, (4) the actual ejection of material particles.

The 200 Mc/sec response to flares shows a wide range in both magnitude and kind. These responses can be divided into seven descriptive categories or types.

- 1) Major bursts (including the group known as outbursts); (22 cases).
- 2) Minor bursts; (22 cases).
- 3) Micro bursts; (6 cases).
- 4) Series of bursts; (32 cases).
- 5) Small rise in base level; (4 cases).
- 6) Noise storms; (26 cases).
- 7) Nulls; (29 cases).

Eighty per cent of the flares produced some form of energy excess on the 1.5 meter records. For 25 of the 29 flares for which there was no distinctive radio response the associated solar phenomena were relatively unimportant. For at least 4 cases, however, the flares were of importance 2 or more.

The energy excess represented by the flare response at 1.5 meters has been measured for 20 flares. For these cases there appears to be a direct relationship between the importance of the flare and the energy excess associated with it.

Comparisons of the times of onset of the optical flare and the radio response indicate that the major, minor, and micro-bursts tend to occur at the very commencement of the optical rise. The series of bursts begin before the observer detects the start of the flare in $H\alpha$ radiation. On the other hand, many of the noise storms and rises in base level have their onset at or near flare maximum. These delayed responses increase in intensity as the flare fades and often attain their greatest intensity just as the optical flare has faded completely.

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Dodson, Helen W. and Leif Owren.* Observation of active regions on the sun by radio interferometer and spectroheliograph.

On a number of days the solar radio frequency radiation contains a variable component in addition to the basic thermal radiation of the quiet sun. At meter wave lengths the low resolving power of current radio telescopes makes it necessary to use interferometers if one wants to establish whether this enhanced radiation originates in small, localized areas or comes from the entire radio disk.

The Cornell 200 Mc/sec radio interferometer consists of two identical broadside antennas placed 51 wave lengths apart on an East-West line. Two coaxial cables of equal electrical length connect the antennas with a common superheterodyne receiver. The half-power beam widths of the individual lobes in the composite antenna polar diagram are comparable to the sun's angular diameter. The pointing accuracy of the interferometer is 3 to 5 minutes of arc.

The antennas are set to the sun's upper transit altitude and the interference pattern recorded as the sun drifts through the polar diagram around local noon. By comparison between the burst amplitudes recorded simultaneously with a 200 Mc/sec radio telescope and the interferometer, the burst interference pattern can be separated out and its time relationship to the interference pattern of the quiet sun established. The source of the bursts can thus be confined to a strip $1/5$ to $1/3$ solar diameter broad and parallel to the celestial meridian.

The 1950-51 observations with the radio interferometer include two determinations of the positions of outbursts associated with solar flares and 14 determinations of the locations of the burst sources, the latter falling within six well-separated time intervals.

Comparisons are made between the positions of the sources of enhanced radio emission and the locations of solar features observed optically at the McMath-Hulbert Observatory. The regions where such features occur are designated as active or inactive from considerations of the size and magnetic field strength of sun spots, extent and intensity of the bright calcium plages surrounding them, the number and importance of flares and active dark flocculi occurring in these plage regions, as well as prominence or coronal activity during passage over the limbs, or the absence of such transient phenomena.

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