distances of several solar diameters. In the first, the shape was considered to be simply the shape of the net magnetic field resulting from the combination high in the corona of the individual magnetic fields above two active solar regions separated by angles of the order of 60° or more of the solar surface. In this hypothesis, the fields were taken as being similar to isolated magnetic poles, with the field smoothly dropping off with increasing distances from the region, and recognizable to distances of the order of 200,000 km. The fields responsible for a ray or streamer must, on this hypothesis, be of same sign. The ray then results from illumination of electrons constrained by the field to move parallel to it. The electrons, in this picture, are swept up from chromospheric jets or spicules over the entire quiet surface between the focussing field centers.

The hypothesis, though it gave suitable streamer shapes, ran into serious troubles in explaining other aspects of the electron corona. However, a new hypothesis, closely related to the first, seems to explain the principal observed features of the electron corona in qualitative fashion, at least. In this, the isolated poles responsible for the focussing are of opposite polarity, and the steady-state streamer shape results from the distorting effect of the particle energies which, in this view, carry the magnetic field lines far out into the solar atmosphere.

The hypothesis explains general coronal shape variations, with sunspot activity, the quiet sun coronal form, and the relationship of coronal rays to M-region magnetic storms described by Allen in 1944.¹ Some support for the concept is provided by solar radio noise observations by Payne-Scott and Little.² The qualitative success of the hypothesis suggests the importance of a concerted theoretical attack on the problem.

1. *M. N.* **104**, 13, 1944.

2. *Aust. J. Sci. Res.* **5A**, 32, 1952.

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Robinson, L. V. On the origin of comets.

The slow disintegration of comets, shown by the loss of tails and the emergence of meteor swarms, apparently justifies a conclusion that they have not always been members of the solar system and that they may have some time been picked up by the sun as aggregates of cosmic debris. Then, the fact that the B stars in Orion

are moving almost directly away from the sun affords good evidence that the solar system must have passed through some of the nebulosity which pervades those regions. The mean radial velocity, about 23.2 km/sec, and distance, 560 light-years, of these stars suggest that the sun passed through these realms some 7,500,000 years ago and picked up masses of material since then represented by comets.

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Rush, J. H. and W. O. Roberts. Recent studies of chromospheric spicules.

Two film sequences of spicules at the south polar zone of the sun, taken in 1949 with the Climax coronagraph in $H\alpha$, were analyzed. These films were run at 6 frames/min. for a combined duration of 92 min. Both films agreed on an upper limit of 22,000 spicules having lifetimes of 0.3 min. or greater on the entire sun at a given time, assuming uniform distribution.

The lifetimes of 400 spicules were determined, but could not be corrected for the effects of spatial distribution in the line of sight. The number of spicules having a given lifetime was inversely proportional to the lifetime. The mean lifetime was about 4 min., confirming an earlier result.¹ Nearly all spicules were radial to the sun. Upward speeds of 64 spicules ranged widely about a mean of 32 km/sec. Apparent downward displacements were observed in many cases, at speeds loosely correlated with upward speeds. Whether apparent descent represented return of material or progressive fading of intensity is not known. The coefficient of correlation between maximum heights and upward speeds was 0.7. Neither heights nor upward speeds were significantly correlated with lifetimes. The spicules occurred randomly in time. The data suggested correlation of some characteristics with latitude; but any such relations were so intermingled with observational and other selection factors that they could not be verified.

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1. W. O. Roberts, *Ap. J.* **101**, 136, 1945.

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