22 hr. sidereal time. The fourth maximum appears to occur at about the same time as that of the maximum of the 24-hourly sidereal variation previously obtained[1].

Ehmert[3], by a totally different method, has also deduced the existence of a 6-hourly sidereal variation, though its amplitude is not given.

It may be noteworthy that in the studies of radio-frequency energy from the stars, several maxima have been recorded which, according to Reber[4], may be associated with projections from the Milky Way analogous to the arms of other spiral nebulæ. If cosmic rays are generated, as previously suggested[1], in the stars, a similar cause might account for the sidereal fourth harmonic.

With regard to the third harmonic, no variation for cosmic rays appears which could be regarded as real.

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[1] Duperier, *Nature*, **158**, 196 (1946).
[2] Duperier, *Proc. Phys. Soc.*, **57**, 464 (1945).
[3] Ehmert, *Z. Phys.*, **101**, 260 (1936).
[4] Reber, *Astrophys. J.*, **100**, 279 (1944).

Solar Radiation at 480 Mc./sec.

For several months past, daily measurements of radio waves from the sun at 480 Mc./sec. have been made here at true noon. The normal observed intensity is about 5×10^{-19} watt/sq. cm. per Mc./sec., corresponding to an apparent solar temperature of about a million degrees. Superimposed on this are slow day-to-day variations of about 15 per cent which are quite closely correlated with the apparent area of sunspots. This variation is no doubt the same phenomenon on a greatly reduced scale which was observed by Pawsey[1]. The apparent solar diameter is about ½°, and no observable variation (less than 0·1°) has been found from day to day.

On November 23 a partial solar eclipse occurred here. On that day the observed solar intensity dropped about 25 per cent compared to the observed intensity on November 22 and 24. This is approximately the amount of the sun's disk obscured by the moon at noon. No change in solar width was observed.

On November 21 a great radio storm was observed similar in type to that described by Hey[2]. It started about 1630 G.M.T., increased in severity to about 1800 G.M.T. and then died down. A second smaller outbreak occurred about 1930 G.M.T. The storm manifested itself as greatly increased apparent radio intensity. The sounds coming from the amplifier were typical hissing or rushing noises quite similar to thermal agitation noise. However, instead of being steady as is the normal solar noise, this storm noise varied from second to second in amplitude. Thus the output meter showed an erratic reading, and the audible effect in headphones was much like wind whistling through the trees when no leaves are on the limbs. Occasionally great swishes occurred above the rapidly varying background. No snaps or crackling sounds could be heard which might be interpreted as lightning or sparking discharges of any kind.

At the peak of the disturbance the antenna was turned to declination 57° N., which is practically at right angles to the sun. All the solar background disappeared, but the occasional swishes could still be heard, quite weakly now. Since this storm was not expected, adequate arrangement had not been made to record its peak intensity. Observation of the output meters showed the background intensity to be more than four hundred times normal for a period of several minutes. The great swishes probably rose to several thousand times normal, judging from listening.

Exchange of telegrams with G. C. Southworth of the Bell Telephone Laboratories produced the information that solar intensity measurements had been made at a wave-length of 1¼ cm., but nothing unusual had been observed at this wave-length on November 21.

On the following night the apparatus was operated again to measure radiation from the galaxy. Since motor-car ignition noise is much less at night, the sensitivity was increased to about thirty times that used during the day. All night long there were quite faint noises similar to those heard at the preceding noon, but perhaps 10^5 times fainter. Due to faintness only individual swishes could be heard. These occurred at irregular intervals of from a second to a couple of minutes between swishes. Each individual swish lasted only about one quarter second. Often the swish was accompanied by faint grinding sounds with noise components near 300 cycles. The phenomenon weakened and died out toward dawn. The next day the sun appeared normal, and no more night-time swishes have since been encountered.

It seems likely the above night-time effect is directly associated with the previous noon-day effect, and that perhaps the whole phenomenon originated in the earth's atmosphere and not in the sun at all. The individual swishes might be due to noises set up in the upper atmosphere when some charged particle passed through it. Such a particle might easily originate in the sun.

The apparatus used here is automatically recording and usually operates unattended. Upon looking over my charts, I find that a similar phenomenon may have occurred on October 17 in a much attenuated form. No one was present when this chart was made. The background rose to only about twenty times normal on this day, and then only for a minute or so at a time. Several sharp spikes, most likely caused by swishes, are present on the trace.

Due to unsteadiness of the background, it was impossible to measure accurately the solar width on November 21. However, estimates show it to be not more than a few degrees and probably less at the half-intensity points.

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212 W. Seminary Ave.,
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Nov. 24.

[1] Pawsey, *Nature*, **157**, 158 (1946).
[2] Hey, *Nature*, **157**, 47 (1946).

Demodulation by Superconductivity

We have examined further the anomalous fluctuations in the superconducting bolometers previously reported by Andrews, Milton and Desorbo[1], and find that, in part, such fluctuations are due to the absorption by the superconductor of modulated broadcast radio waves and the conversion of the modulation wave, by the superconductor, to simple audio-frequency. Our experiments were carried out