

Single and double inflexions on the F -trace

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Abstract—An attempt is made to explain the single and double inflexions on the daylight F -trace in terms of the Appleton–Lyon theory of the “height-lag.” Two hypothetical constructs are presented. A procedure for empirically verifying and evaluating either hypothesis is indicated.

INTRODUCTION

IN a symposium on ionospheric results of solar eclipses under the chairmanship of RATCLIFFE (1956), the phenomenon of the $F1\frac{1}{2}$ -layer was mentioned and recommended for further study. With this end in view, the related and more regular phenomenon of inflexions on the F -trace is undertaken in the present study. It seems that the conditions that normally produce an F -trace with a double inflexion on ordinary days are essentially the same as those that produce the $F1\frac{1}{2}$ -layer during an eclipse, with the difference that the eclipse intensifies those conditions. At any rate, the subject of F -inflexions is sufficiently important by itself to merit a close study.

APPLETON and LYON (1955) have shown that some departures from the Chapman analysis may be accounted for by taking the “height-lag” into account. The present study seeks a connexion between this height-lag and the inflexions on the F -trace.

SURVEY OF DATA

Selected for this pilot study are 936 ionograms taken at Baguio from 0500 to 1400 hours of each day for 26 successive days of 1956, 26 April to 22 May. This period of the year is selected for convenience and because its solar conditions simulate the summer-equatorial conditions closely enough. The year 1956 is selected because it is about half-way up on the rising slope of the sunspot cycle.

Attention is focused on *first* appearances of single and of double inflexions on the F -trace for each day, as well as the general location of the inflexions (low, middle, high) when they first appear. The results are graphically tabulated in Fig. 1.

The general trend shows that between 7 and 9 o'clock, there is only one inflexion, and this is found in the lower part of the F -trace; between 9 and 11 o'clock, a second inflexion

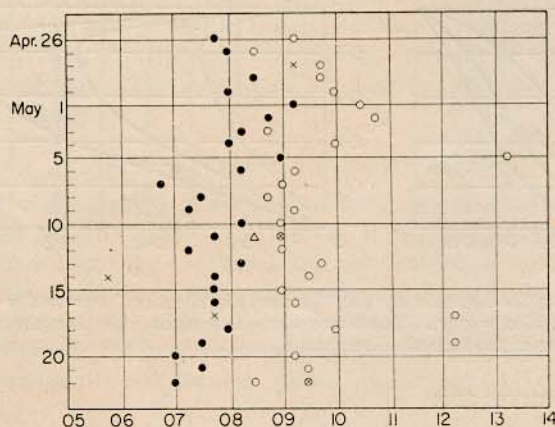


Fig. 1. Time and location of first appearances of inflexions on the F -trace: ● single: low; × single: middle; ○ double: high, low; △ double: both low; ⊗ triple: high, middle, low.