of "first seens" recorded averaged 120, but these were so bunched that 61 of them were recorded on 9 days. Three-fifths of all the arrivals came in the last 30 days of the season. The lack of uniformity in distribution became still clearer when only the arrivals of the last 30 days were considered. Indeed, in the years 1909-1916, half of all these arrivals were recorded on 2 days. One-half of all the arrivals of the last 30 days of the 14 seasons together were recorded on 63 days. A study of the weather maps for these 63 days showed that on 54 of these days there were approaching areas of low pressure, with south winds during the preceding night. On 5 other days there had been southerly winds either at Urbana or further south in the state. On 1 only of the 63 days was there a rather light northerly wind.

It seems fair to conclude that the near approach of a low from the west with the accompanying rise in temperature and southerly winds favors the northward migration of birds.—*Eleanor S. Brooks.*

WEATHER AND THE FADING RADIO SIGNALS *

The first report of the Bureau of Standards on its work with the American Radio Relay League was published in *QST*, the official organ of that body. The ARRL, the naval radio station at Anacostia, D. C., 17 transmitting stations and 243 receiving stations co-operated with the Bureau to determine if possible the cause for the fading of radio signals.

One theory takes into account the presence of the "Heaviside" surface in the atmosphere above the earth.

The boundary of the Heaviside surface is not considered as absolutely horizontal, but as changing from time to time. The permanently ionized region above the Heaviside surface is the region of permanent aurora, and is so good a conductor that waves cannot penetrate it. Any waves reaching it can only slide along it, just as waves slide along the even less perfectly conducting surface of the earth.

In daylight transmission, the waves cannot reach the Heaviside surface because of the intervening ionized stratosphere, and hence only those waves which travel along the earth's surface are useful during the daytime. In traveling along the earth's surface the waves are diminished in intensity by absorption of their energy in the earth. At night, on the other hand, the waves may reach the Heaviside surface, and slide along it without appreciable absorption.

Because of the variable absorption which may be introduced by the irregularities of the Heaviside surface and the adjoining regions the waves may vary rapidly in intensity. Small irregularities would affect short waves more than long waves.—*A. W. P.*

THE MEASUREMENT OF TIME

Time and Timekeepers, including the History, Construction, Care, and Accuracy of Clocks and Watches. By Willis I. Milham. New York, The Macmillan Company, 1923. Pp. xix, 609; 339 illustrations. Price $6.00.

The author of this volume is well known to students of Meteorology by virtue of his excellent textbook on the subject. While the interest of the meteorologist *as such* in Professor Milham's latest book will perhaps be largely indirect, he will find it none the less absorbing on this account: For probably nothing so profoundly controls the activities of

* Extract from "QST" for August and September, 1923.

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