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DISCUSSION AND CORRESPONDENCE THE AURORA BOREALIS

THE most extensive and brilliant aurora witnessed in central Illinois within the memory of living men attracted unusual attention on the evening of March 7, 1918, at Urbana, Illinois, in lat. $40^{\circ} 6' N.$, long. $88^{\circ} 13' W.$ Although the aurora is only rarely visible here at all, this one reached beyond the zenith.

The aurora first attracted my attention at 9:25 P.M., central time, in the form of a band of white light about 2° wide, extending in an arc from a point on the horizon at about $N. 45^{\circ} W.$ across the north sky, reaching a maximum altitude of about 20° , approximately due north, and descending at about $N. 45^{\circ} E.$ Through and beyond this, radiating white bands extending upward, and two rosy areas of about the color of the strontium flame appeared, one about $N. 45^{\circ} E.$ and 20° above the horizon, the other about $N. 10^{\circ} W.$ and 25° or 30° above the horizon.

The illuminated area extended rapidly, reaching a maximum at about 9:45 P.M., when it included the entire north half of the sky and overlapped into the south half from horizon to zenith. The main framework consisted of streamers of white light converging toward a point 30° or more south of and below the zenith. These streamers rose vertically from the north point of the horizon and its vicinity, but those rising from the east and west points of the horizon were inclined about 20° from the vertical (toward the south).

The streamers were fairly steady, in large part, extending, multiplying, and fading gradually; but in many parts of the sky there was a nearly continual play of light, in pulsations proceeding swiftly upward along the rays. Occasionally a streamer or a group of streamers brightened suddenly, giving an effect like that of the throwing on of a great searchlight.

Against the background of white streamers

the red color expanded in glowing patches, increasing in brilliance as in area. During the maximum brilliance and extent of the aurora, the red was bright from the due east to the due west vertical circles and beyond them, and especially near the zenith (just below it to the north). It was never a continuous sheet of uniform brightness, but appeared brightest in roundish patches, locally streaking out parallel to the white streamers. The red lights pulsed and played up and down over the sky like the white.

About 9:50 P.M., after the aurora had faded slowly for a few minutes, the white streamers shortening to an altitude of 45° or less, the red light concentrated again in two patches, one about $N. 45^{\circ} E.$ and 20° above the horizon, the other $N. 5^{\circ}-10^{\circ} W.$ and $25^{\circ}-30^{\circ}$ high. They varied from 3 to 10 degrees or more in diameter. About 9:55 a third bright red area appeared, about $N. 40^{\circ} W.$ and $20^{\circ}-25^{\circ}$ above the horizon. It was less perfectly circular than the other two, having a tendency to show brightest and to expand along lines parallel to the white streamers.

About 10:05 P.M. the $N. 40^{\circ} W.$ and $N. 45^{\circ} E.$ red areas faded out, leaving a single glowing patch $N.-N. 10^{\circ} W.$ and $20^{\circ}-25^{\circ}$ above the horizon, which continued to pulsate faintly and grow weaker. The white light had now subsided to a rather uniform sector of the north sky reaching from about $N. 50^{\circ} W.$ to about $N. 50^{\circ} E.$ and from the horizon to an arc whose maximum altitude lay in the site of the red patch in the north. At 10:45 P.M. there was still a glow in the north sky, apparent to an altitude of over 5° .

The angles here given were estimated, as I unfortunately had no instruments available at the time.

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On the evening of Thursday, March 7, a remarkable auroral display was visible here. Some observers report a faint red glow in the eastern sky as early as seven o'clock, and it would appear from the testimony of several observers that the phenomena increased in brilliancy until about 9:45, at which time it

was particularly striking. From the extreme northwest a broad band of deep red, like a cloud reflection of a conflagration, spread upward to a point in the constellation Cancer, just south of the zenith, where it terminated within a horseshoe-shaped mass of white having the convex side toward the north. A similar but less brilliant red cloud extended from this point toward the east. Culminating at the same point within the horseshoe were greenish white streamers extending in all directions to the horizon. At this time also there was another red patch covering somewhat more than the area of the Great Bear in the northeast. Athwart this ran the zenith streamers from the north horizon.

At 10:45 the overhead display was fading and a broad red patch in the northwest covered Cassiopeia. This rapidly divided into two parts, drifting west and south.

By 10:30 the effect had practically disappeared except for a greenish glow toward the north.

Although the deep red color was massed in the streamers and patches mentioned, the entire sky was tinged with red, shading gradually outward from these dense masses.

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SCIENTIFIC BOOKS

Catalogue of the Hemiptera of America North of Mexico, excepting the Alphididae, Coccidae and Aleurodidae. By EDWARD P. VAN DUZEE. University of California Press 1917. Pp. i-xiv, 1-902.

The completion of this great paper marks another distinct advance in the study of North American insects. The large order Hemiptera has had comparatively few devotees, though select, as the names of Fieber, Stål, Reuter, Bergrot, Horváth, and Uhler will indicate, and until recently its study has been somewhat backward as regards quantity if not quality. During the last few years, however, a great many of the younger students of entomology have elected to become hemipterists, and in consequence there has been a sudden

increase in scattered contributions with a general rise of interest in the order. The present is, therefore, a peculiarly fortunate time for the appearance of a full bibliographical catalogue which brings together in orderly and properly conservative form a report of what has so far been accomplished and furnishes an adequate basis for further advance. Hemipterists, if few in number, have been unusually prolific, as is attested by the more than 900 large pages of the volume under consideration.

Careful examination of the work reveals a well-planned and faithfully executed enterprise. The author exhibits a masterly grasp of his subject, as a whole and in detail, and his production merits the warmest praise in every respect. In the introduction Mr. Van Duzee gives a clear and convincing statement of the nomenclatorial principles which have guided him. These are his well known and by no means ultra-conservative views, grounded firmly on the International Code, eminently logical in theory and successful in practise. For the first time the principle of priority is applied and fully worked out in connection with the names of all taxonomic groups, with such happy results that to me the general adoption of this plan seems sure. Original spellings are retained, but the author expressly disclaims any intention of restraining those who refuse to assist in perpetuating philological and grammatical errors. In addition to these general matters, a number of special points deserve particular attention.

In recording the distribution of the species, the author has done well to abandon the method of his recent check list, simply giving under each species a list of the states in which it is known to occur. As he remarks in the introduction, "our knowledge of the distribution of our species is still too fragmentary to allow the satisfactory naming of a habitat,"—a procedure too frequent in hemipterological writings. In this way the student is forcibly reminded of the extensive lacunæ existing in this branch of the study, and he can go about the business of filling them with some confidence. The scarcity of