State University. I thank my colleagues here for their assistance.

H. C. Ko

Radio Observatory,
Ohio State University,
Columbus 10, Ohio.

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ASTRONOMY

Spectra of Meteor Wakes

With regard to the interesting communication by Rao and Lokanadham[1] I would direct attention to a possible consequence.

Hoffmeister[2] has collected various instances of auroral-like glows connected with meteoric showers, Perseids, Leonids, 1872 Bielids. Such was also noted in Germany and England during the famous Leonid shower of November 13–14[3]. It was indeed remarked it might be possible that "brilliant meteor streams electrify the higher regions of the atmosphere and produce phenomena analogous to the aurora borealis"[4].

The detection of *H* and the red line of *NI* is interesting in view of the observation by von Wrangel in Siberian waters 1820–24[5] that dark areas of aurora traversed by meteors lighted up and continued to glow.

Cicely M. Botley

5 Blatchington Road,
Tunbridge Wells.

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Miss Botley has brought to light some interesting observations of auroral-like glows of meteors during some meteoric shower periods[1–3] and during periods of auroral activity[4]. These observations indicate that this phenomenon is associated with the atmosphere, in which meteors appear, being in an ionized or excited condition. There is evidence for such a general increase of electron density in the *E* region during meteoric shower periods[5]. It is also known that the atmosphere above 80 km is ionized by auroral activity[6]. The predominant constituents of the atmosphere in this region are atomic oxygen and molecular nitrogen[7].

The main contributing feature in the auroral-like glow of meteors appears to be the forbidden line of *OI* (λ5577, known as the auroral green line), which has been observed in as many as 30 meteor spectra[8–10]. A possible explanation for the production of this line by a combination of the oxygen contained within the meteoroid and that in the atmosphere has been outlined by Halliday[11]. From the observations of Halliday, Millman[8] concluded that even moderate solar activity was not necessary for this green line to appear in meteor spectra. This is consistent with the foregoing picture that the increase of atmospheric ionization above normal may also be produced by meteor showers, like auroræ which occur during periods of high solar activity.

The appearance of the weak $H\alpha$ and *NI* lines in meteor spectra[10] may be mainly due to these elements present within the meteoroid particle. The mechanism of production of the former line may be similar to that in auroræ, wherein the same line is produced by protons of the corpuscular radiation from the Sun[12]. It may be noted in this connexion that the nitrogen bands observed in the red and yellow regions of the meteor spectrum by Cook and Millman[13] were connected with the molecular nitrogen in the atmosphere.

The foregoing explanation of auroral-like glow of any meteor is based on the fact that it is caused by the further local excitation of the atmospheric gases, already in a sufficiently excited condition, by the passage of the meteor through them. Such a glow should reveal itself in the wake spectrum of the meteor, as did the oxygen green line[8–10]. On the other hand, the $H\alpha$ and *NI* lines are found only in the primary spectra[10,14] of meteors.

M. Srirama Rao
B. Lokanadham

Meteor Research Laboratory,
Department of Physics,
Andhra University,
Waltair, India.

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PHYSICS

Intensity of Neutral Argon Emission Lines radiated by the Low-voltage – High-amperage Arc compared with Four High-voltage Type Arcs

The intensity of strong neutral argon emission lines radiated by the thermally excited argon shield gas surrounding and within the central d.c. arc plasma of the Heliweld thoriated tungsten electrode welding arc has been measured. This arc was operated at 15 V and 135 amp (d.c.), providing a good source for thermally exciting neutral argon emission lines at a voltage below the ionization voltage (argon = 15·8 V).

The purpose of the investigation was to see how the relative intensities of the strong neutral emission lines of argon varied in reference to each other for this thermally excited arc compared with microwave, glow discharge and hollow cathode type arcs. This information should add to the background of data on observations of spectral sensitivity of elements excited under varied conditions.

As W. F. Meggers[1] points out, the relative intensities of lines in any particular spectrum are fairly independent of conditions; successive spectra will show large differences as functions of excitation conditions. In order to get the best comparison of intensities between arcs, therefore, the intensities are normalized to the strongest line common to all arcs. The intensities for each arc and intensity values are then adjusted by ratio to this normalized intensity value (0·8115μ argon line) as shown in Table 1.

The values recorded for the tungsten arc were recorded by a Perkin–Elmer monochromator with suitable entrance optics and output recorder.

Table 1 shows the normalized intensity values for all these arcs. The low-voltage tungsten arc emission lines appear to differ in intensity to the same degree as the microwave, glow discharge and hollow cathode intensities vary from each other.