TWILIGHT PHENOMENA

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About 7 p.m. on 10 November, 1955, at Springvale, Melbourne, rays were seen to converge to a point on the eastern horizon. The day had been cold with showers and at sunset (about 7 p.m.) there was a layer of altostratus cloud with some cumulus cloud in the eastern heavens. The observer first noticed several rays narrow and bluish grey in colour seemingly superimposed on the cream grey altostratus and radiating from a common point near the eastern horizon. These were in evidence for several minutes. The observer then noticed the sun lighting up the top of a solitary cumulus cloud approximately east-north-east of the observer. It was a vivid orange and yellow colour like a glowing coal. There was no other redness in any other cloud. Suddenly the observer noticed a broad brilliant band of violet light seemingly superimposed against the blue sky and radiating from a point near the glowing cloud. The band faded after a few minutes. No measurements were taken. A pictorial representation of the phenomena is shown in Figure 1.

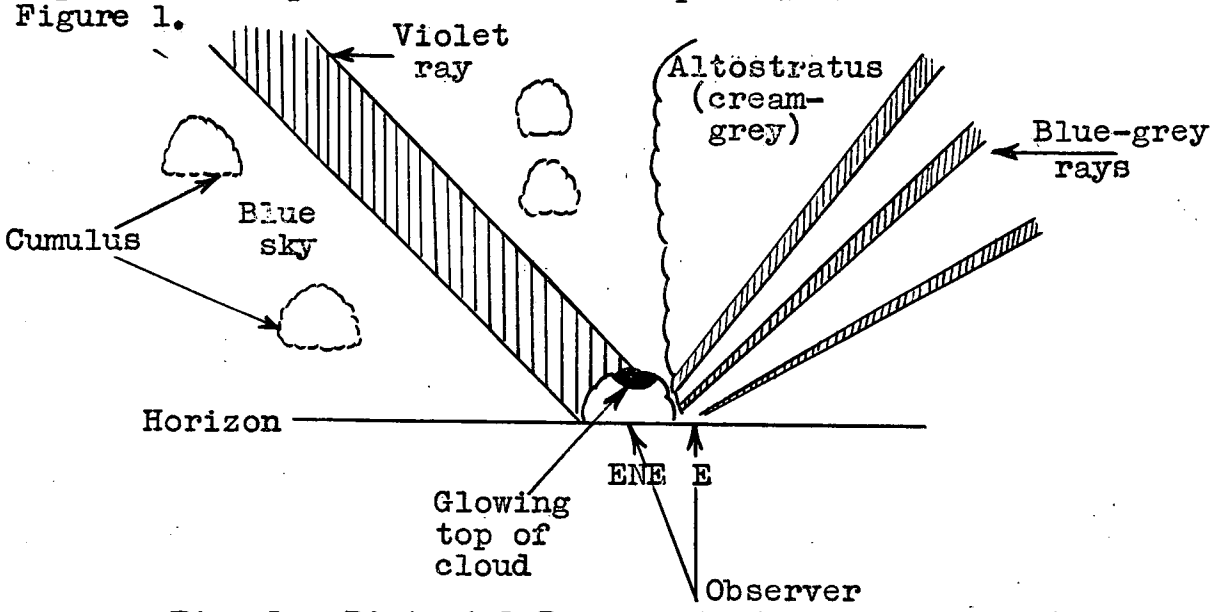

Fig. 1 - Pictorial Representation of Phenomena Observed at Springvale 10 November, 1955

This phenomena of purple anti-crepuscular rays is well known. Neuberger (1951 p.73) states - "At, or shortly after sunset, the anti twilight arch, a purplish band of some 3° or more in width, can be seen to rise above the solar counterpoint on the eastern horizon." (See Fig.2). "When the sun's rays are partially obstructed by clouds or mountain peaks ..... shadow bands (anti-crepuscular rays) on the eastern sky may give the anti-twilight arch a fan like appearance."

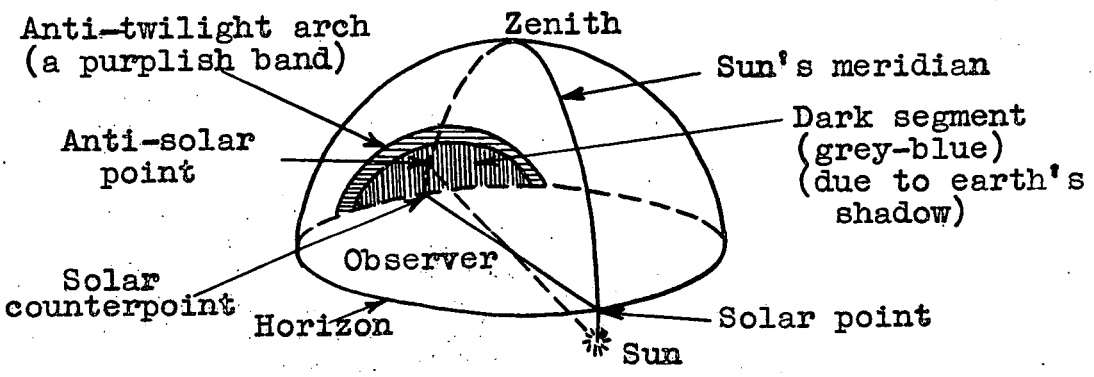

Fig. 2 - Schematic Diagram of Major Twilight Phenomena
(From Neuberger's (1951) Fig. 11)

Direct sunlight in the lower dusty atmosphere to the east must have penetrated long distances through the denser air and thus have become prevailingly red, while that reaching the higher atmosphere is still rich in blue and violet. Hence, the observer sees red light scattered from the first of these layers and blue to violet from the other and, thereby, gets the effect of the superposition of the opposite ends of the visible spectrum, that is purple.

REFERENCES

Neuberger, H. 1951 Compendium of Met., Boston, p.73

Humphreys, N.J. 1929 Physics of the Air (McGraw-Hill)