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Chaplain George Greene  
PO Box [REDACTED]  
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Dear Chaplain Greene:

Your inquiry brought back memories of over 30 years ago when we lived out east, at 10121 Mt. Lemmon (or Catalina) Highway. Yes, we saw night-luminous clouds, some before 1963 but with increasing frequency in the years following.

Of particular interest was one reported by Dr. James McDonald, who at that time thought it was a new type of natural cloud that somehow formed at very high altitude. The picture, taken from Flagstaff, was indeed spectacular. A giant 'smoke ring' fringed with small wisps. It wasn't like the explosion later of the Shuttle which had a trail of smoke from the solid strap-on boosters (that led to the disaster). However, the Titan II is liquid fueled and thus has no trail up to the point of the explosion.

Aden was involved with the launch of rockets from Vandenberg AFB, California, and immediately recognized the McDonald cloud as from an explosion of a rocket the afternoon of 28 February 1963. We told McDonald of the event.

Since natural 'noctilucent clouds' are seen at high latitudes during summer months it was a reasonable conclusion by McDonald that his 'ring cloud' was also of natural origin. He was disappointed to learn that it was only a man-made cloud.

We have a short section on such man-made clouds in our popular book *Sunsets, Twilights, and Evening Skies*, Cambridge University Press, 1983, (ISBN0-521-40647-1) Chapter 9, Noctilucent Clouds, p. 88-89, now in paperback. There is a color picture (plate 9-3) of a Vandenberg rocket trail seen after sunset.

We published a number of scientific papers on such rocket clouds. You said you knew of the one with Barbara Middlehurst and Ewen Whitaker (*Science* 141, 1176-1178, 1963). We published another: A. B. Meinel & M. P. Meinel, *Low latitude noctilucent cloud of Nov. 2, 1963*, *Science* 143, p.38-39, 1964.

At that point they became so common we felt it unnecessary to report on them since everyone in the science community now knew whence they came.

We hope this answers your questions. Sincerely,



Aden & Marjorie Meinel