Sky and TELESCOPE

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Jupiter Occultation Over Colorado

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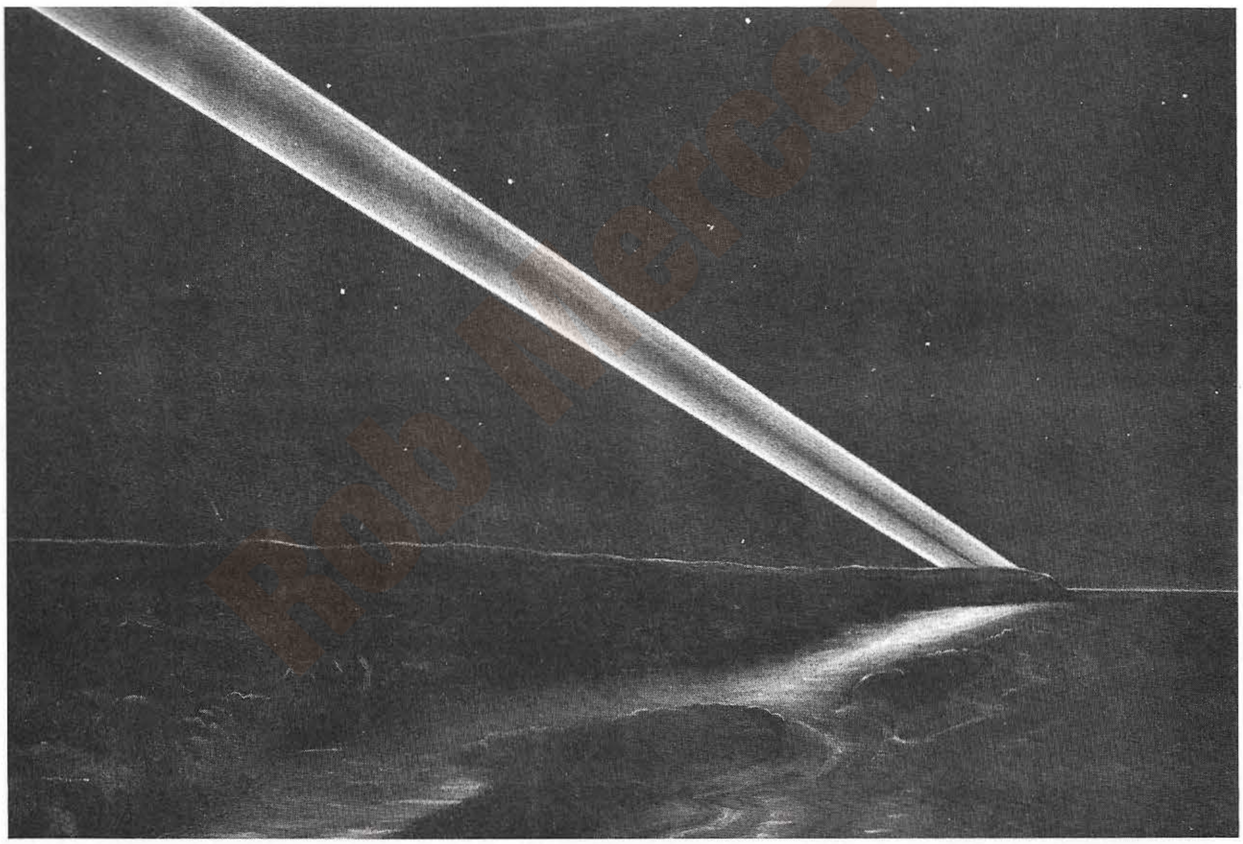
Studies of Interplanetary Dust and Gas PN 2 - 1 - 65

A NEW THEORY ON THE NATURE AND ORIGIN OF COMETS

Donald H. Robey
Engineering Staff Specialist
Advanced Studies Department



General Dynamics/Convair
28 June 1965

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PN 2 - 2 - 65

A SCIENTIFIC EXPLANATION FOR FLYING SAUCERS

Donald H. Robey
Engineering Staff Specialist
Advanced Studies Department

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AURORA BOREALIS EFFECTS ON RADAR

The study of auroras is of great importance in the investigation of the upper atmosphere. Spectroscopic observations of the auroral light in particular, yield valuable information regarding the composition and temperature of the upper atmosphere. The study of the form and the geographical distribution of the auroras is again very helpful in investigating the nature and origin of the charged particles, the entry of which into the high atmosphere is the cause of the magnetic storms and also of the auroral displays. It is satisfactory to note that to the visual, photographic and spectroscopic methods of studying the auroras, has now been added the new and powerful radar method. Radar echoes from auroras, due to the intense ionization produced by the bombarding solar corpuscles, have been recorded by more than one observer.

Photographs of some typical auroral forms.

The aurora borealis, or northern lights, produces conditions and phenomena which have been associated with mistakenly-conceived flying objects. Auroral activity is associated with the earth's magnetic fields, explosions on the surface of the sun, and other solar activity. The auroral zone in the northern hemisphere follows roughly a circle around, and about 23 degrees away from the magnetic pole. In Europe, auroras are seen only infrequently below 50 degrees.

The aurora borealis cannot be seen in daylight, and during moonlit periods it is inconspicious. It is sometimes bright enough to read by, and on rare occasions, its surface brightness surpasses even that of the moon. The most distinctive form of the aurora is that of a curtain or long wavy band, often with folds and flutings in it. Although the lower edge of the aurora is nearly horizontal, the band as seen from Europe would appear as an arc, due to its great distance from the observer. Auroras may consist of more than one curtain and may appear and disappear rapidly, remain constant for long periods, or move slowly across the sky. Some may appear merely as formless, diffused lighting in the sky. Faint auroras may appear colorless. Bright auroras are usually yellow-green, but other colors such as red, blue, grey and violet sometimes appear. A yellow-green curtain often will be tinged with red around its lower edge. Auroras may appear high in the sky or low on the horizon, depending on the distance of the particular phenomenon from the observer.

While the chances of the aurora borealis itself being mistaken for a flying object are remote, the erratic lighting conditions it produces may often be a contributing factor to a sighting.

There are other phenomena believed to be associated with auroral activity which can produce apparitions resembling flying objects. Such phenomena occur during magnetic storms and probably are the result of gases emitted from explosions on the sun, and other solar activity. One such phenomenon, observed in northwest Europe, was described as a large brilliant disk which appeared on the east-northeast horizon and moved slowly across the sky, changing into an elongated ellipse, thence back to a disk before it disappeared below the opposite horizon.

This phenomenon was observed by many scientists who were out in force to observe expected auroral displays in connection with the magnetic storm they knew to be in progress. It is believed to have been caused by gases traveling through layers of the upper atmosphere in the auroral zone. Its color was described variously as white, pearly-white, greenish-white and yellowish-white. Calculations based on numerous observations of the phenomenon indicate that it may have been about 70 miles long by 10 miles in diameter.

This phenomenon occurred before the advent of the airplane and all observations were from the ground. However, a phenomenon of this size and brilliance could be seen for hundreds of miles from the air, and in myriad fantastic shapes and maneuvers if complemented by compatible atmospheric conditions. Official astronomical records reveal numerous equally fantastic illusions resulting from phenomena of this sort.

* * * * *

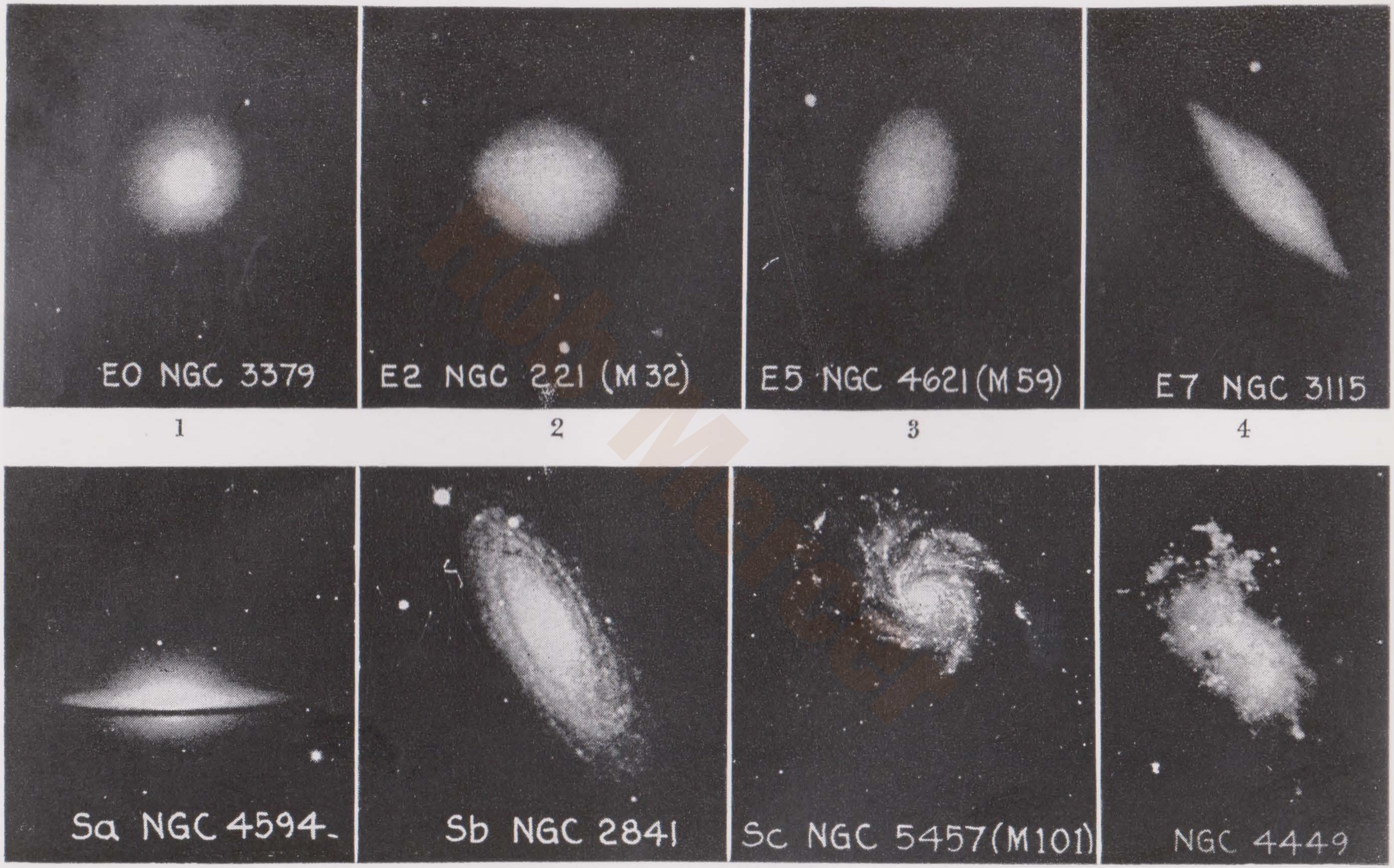
The composition and structure of the earth's atmosphere and the space which lies beyond, and the natural laws which govern them, are complex. The foregoing is not an attempt to relate all apparently unexplainable aerial phenomena to meteorological and astronomical causes. Rather, it is a summation of the more important aspects of meteorology and astronomy which contribute to sightings of illusionary and real flying objects that cannot be identified readily. The information is designed to orient the potential observer in meteorological and astronomical conditions which affect human perception, thereby enabling him to understand the implications involved and report his sightings more rationally and lucidly.

Photo of 1957 Comet
Mrkos
Photo by Curtiss A Griffin
(See July & Aug. 1967
Airmen mag)

COMETS

Comets and meteors have their effect in the field of mistakenly-identified flying objects, although sightings of comets are rare simply because their incidence is so low.

Comets are nebulous bodies revolving around the sun for the most part in long ellipses. Although their periods are very uncertain, some few such as Halley's Comet, which pursues unmistakeable ellipses, can be expected to return. The nucleus of a comet, a minute disk of condensed light, strengthens in brilliance the nearer its orbit brings it to the earth. Some comets become bright enough to be discerned even in daylight. Since the long tail of the typical comet is composed of matter repelled away from the sun, it may either follow or precede the head, depending on whether it is approaching or going away from the sun.


E0 NGC 3379
E2 NGC 221 (M 32)
E5 NGC 4621 (M 59)
E7 NGC 3115
Sa NGC 4594
Sb NGC 2841
Sc NGC 5457 (M 101)
NGC 4449

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PLANETS

Although there are other planets that may resemble flying objects under certain conditions, Venus and Mars are most commonly mistaken in this sense. Venus is the brightest of all the planets and Mars is next. Venus, at its brightest, can be seen in daylight and can cast shadows after dark. This planet is a morning star from January to April, and an evening star during the remainder of the year. Mars is an evening star from January to September and a morning star the rest of the year.

In the past, both Venus and Mars, when low on the horizon, have been observed to change color and move at fantastic speeds, when viewed through haze or mist. Venus appears low on the horizon during the spring and is unusually bright. Mars has been reported to resemble a flying object when it was low on the horizon in early summer. If one of these planets is stared at for any length of time without any balancing point of reference, it can appear to perform erratic maneuvers. Thus, the planets of brighter magnitude in our galaxy provide a constant source of illusionary flying objects.

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STAR HOPPING IN THE NORTHERN HEMISPHERE

A List Of Prominent Stars In Order Of Brightness

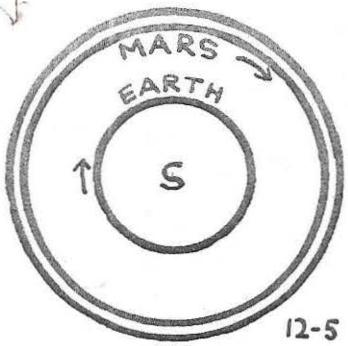
Star-name	Star-position (Right Ascension/Declination)	Color	Magnitude
Sirius	6 hours, 42.9 mins./ —16° 39′	Blue-red-white-green	—1.58
Vega	18 hours, 35.2 mins./ +38° 44′	Blue-white	+0.14
Capella	5 hours, 13 mins./ +45° 57′	Yellow	+0.21
Arcturus	14 hours, 13.4 mins./ +19° 27′	Orange to yellowish	+0.24
Rigel	5 hours, 12.1 mins./ —8° 15′	Blue-white	+0.34
Procyon	7 hours, 36.7 mins./ +5° 21′	Yellowish-white	+0.48
Altair	19 hours, 48.3 mins./ +8° 44′	Yellowish-white	+0.89
Betelgeuse	5 hours, 52.5 mins./ +7° 24′	Red	+0.92
Aldebaran	4 hours, 33 mins./ +16° 25′	Orange to reddish	+1.06
Pollux	7 hours, 42.3 mins./ +28° 9′	Yellow	+1.21
Spica	13 hours, 22.6 mins./ —10° 54′	Blue	+1.21
Antares	16 hours, 26.3 mins./ —26° 19′	Red	+1.22
Formalhaut	22 hours, 54.9 mins./ —29° 53′	White	+1.29
Deneb	20 hours, 39.7 mins./ +45° 6′	White	+1.33
Regulus	10 hours, 5.7 mins./ +12° 13′	Blue-white	+1.34
Castor	7 hours, 31.4 mins./ +32°	Green-white	+1.58
Epsilon Ursae Majoris	12 hours, 51.8 mins./ +56° 14′	White	+1.68
Bellatrix	5 hours, 22.4 mins./ +6° 18′	Blue	+1.70
Mira	2 hours, 16.8 mins./ —3° 12′	Red (variable star)	+1.7 to 9.5
Epsilon Orionis	5 hours, 33.7 mins./ —1° 14′	Blue	+1.75
Beta Tauri	5 hours, 23.1 mins./ +28° 34′	Blue-white	+1.78
Alpha Persei	3 hours, 20.7 mins./ +49° 41′	Yellow-white	+1.90
Eta Ursae Majoris	13 hours, 45.6 mins./ +49° 34′	Blue	+1.91
Gamma Geminorum	6 hours, 34.8 mins./ +16° 27′	White	+1.93
Alpha Ursae Majoris	11 hours, 0°.7 mins./ +62° 1′	Orange	+1.95
Delta Canis Majoris	7 hours, 6.4 mins./ —26° 19′	Yellow	+1.98
Beta Canis Majoris	6 hours, 20.5 mins./ —17° 56′	Blue	+1.99
Zeta Orionis	5 hours, 38.2 mins./ —1° 58′	Blue	+2.05
Beta Aurigae	5 hours, 59.9 mins./ +44° 57′	White	+2.07
Polaris (Pole Star)	1 hour, 48.8 mins./ +89° 2′	Yellowish	+2.12
Alpha Ophiuchi	17 hours, 32.6 mins./ +12° 36′	White	+2.14
Delta Sagittarii	18 hours, 52.2 mins./ —26° 22′	Blue	+2.14
Alpha Andromedae	0 hours, 5.8 mins./ +28° 49′	White	+2.15
Alpha Hydrae	9 hours, 25.1 mins./ —8° 26′	Orange	+2.16
Mizar	13 hours, 21.9 mins./ +55° 11′	Green-white	+2.16

EXPLANATORY NOTE: Right Ascension on the Celestial Sphere is equivalent to Longitude on Earth; Declination is equivalent to Latitude. A plus (+) sign before Declination indicates north of the Equator; a minus (—) sign means south of the Equator. In terms of magnitudes, minus-numbers are indicators of increasing brightness as the numbers grow larger; plus-numbers indicate a decrease in brightness as the numbers grow larger. The degree symbol (°) should be understood by everyone. The symbol for minutes of arc (′) indicates fractions of a degree: each degree is comprised of 60 minutes of arc. "Mins.," of course, is a common abbreviation for "minutes." In the case of Right Ascension, or Celestial Longitude, the minutes are minutes of time and not of arc.

These stars can be located in several ways: a) by the use of well-aligned setting circles on an equatorial mount, b) by the use of commercially available star-finders (one type is illustrated on the pages of this chapter—the Edmund Star-Finder—which is highly recommended) and finally c) by the use of good star-plotters such as the AccuStar, also pictured in this chapter.

STARS	COLOR	
ALTAIR	BLUE*WHITE	0.9
ANTARES	REDDISH	
SPICA	BLUE*WHITE	
ARCTURUS	YELLOW*ORANGE	0.2
REGULUS	BLUE*WHITE	1.3
SIRIUS	BLUE*WHITE*YELLOW	-1.5
VEGA	WHITE	0.1
DENEB	BLUE*WHITE	1.3
BETELGUESE	REDDISH	1
RIGEL	BLUEISH	
ALDEBARAN	REDDISH	1.1
PROCYON	YELLOW	0.5
CASTOR	WHITE	1.6
CAPELLA	YELLOW	0.2

Denebola



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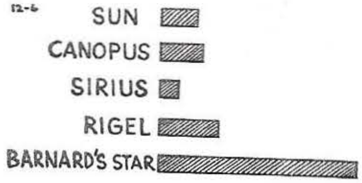

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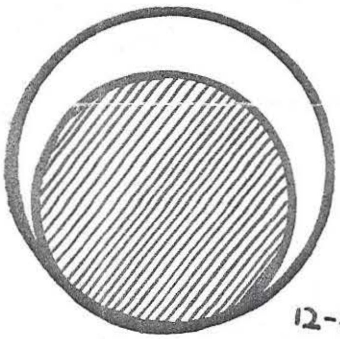

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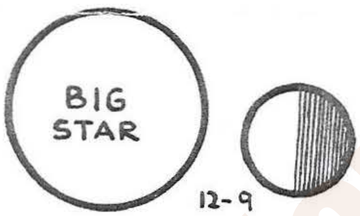

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