

The great saucer of 1882

On the night of 17 November 1882, one of the greatest flying saucers of modern times sped swiftly and silently across the heavens, exhibiting the characteristic cigar-shaped form when it attained maximum altitude.

The object was remarkable in other ways. By all odds, it was the best-observed flying saucer in history, and it is one of the most difficult to explain. The observers included a number of distinguished scientists skilled in the art of observation. E. Walter Maunder, Greenwich astronomer and one of the foremost students of the sun, and J. Rand Capron, a well-known spectroscopist, saw the event from England. Observers on the Continent included the Dutch scientists Professors Audemans and Zeeman, of whom the latter eventually received a Nobel prize for his researches on magnetism.

For a description of this phenomenon, let us turn to the account given by Maunder, not the original report that he gave at the time of the event, but one that he wrote almost 34 years later. I have checked the two versions and find that they are consistent with one another.

Professor Maunder entitled his paper "A Strange Celestial Visitor."¹

In response to the invitation of the Editors of the *Observatory* to furnish some reminiscences to the 500th number of this Magazine, I tried to recall my most striking experiences during the past 43 years, and my memory has gone back to one that stands out from its unlikeness to any other.

It was a quiet and fairly clear evening in the late autumn, and the time was nearly two hours after sunset. The Moon was near her first quarter, and had crossed the meridian a little more than half an hour before. There was, therefore, a fair amount of light in the sky, and the principal stars were clearly seen.

I was at the Royal Observatory, Greenwich, and, as a violent magnetic

storm had broken out at about 10^h 15^m in the forenoon, was expecting an auroral display. I had therefore taken up my position close to the "Sheepshanks Dome," on the "Library Leads," as the flat roof over the smaller library was then called, whence I had a view uninterrupted in all directions except for the great dome towards the S.E. Nor was my expectation disappointed, for as the sunset tints faded away in the W.S.W. quarter, a rosy glow, at first hardly to be distinguished from them, spread itself all over the N.W. and gradually strengthened, until about 5.30 P.M. a brilliant ray, mainly of the same red or rosy colour, but with a greenish vein in it, shot up from the horizon in the north and reached the zenith. Other less conspicuous glows and rays showed themselves, but presented no features of special interest.

Then, when the display seemed to be quieting down, a great circular disc of greenish light suddenly appeared low down in the E.N.E., as though it had just risen, and moved across the sky, as smoothly and steadily as the Sun, Moon, stars, and planets move, but nearly a thousand times as quickly. The circularity of its shape when first seen was evidently merely the effect of foreshortening, for as it moved it lengthened out, and when it crossed the meridian and passed just above the Moon its form was that almost of a very elongated ellipse, and various observers spoke of it as "cigar-shaped," "like a torpedo," or "a spindle" or "shuttle." Had the incident occurred in the next century, beyond doubt everyone would have selected the same simile — it would have been "just like a Zeppelin." After crossing the meridian its length seemed to contract, and it disappeared somewhat to the south of the west point. Its entire passage from rising to setting took less than two minutes to complete, and it disappeared at 6^h 5^m 59^s G.M.T.

I watched for several hours longer, but no repetition of the phenomenon occurred. A pale greenish glow fringing the upper edge of the great London-smoke cloud in the north was observed, but it showed little, if any, structure or movement.

The "torpedo," on the other hand, was many times brighter than this northern glow, much brighter even than the Great Comet (of 1882) then visible in the early morning sky, and it had a clearly defined outline, but a plain and uniform surface. The greatest length which it presented was about 30°; its breadth was from 2° to 3°. But in colour the light of the "torpedo" was evidently the same as that of the auroral glow in the north, and this showed me in the spectroscope the familiar auroral line in the "citron-green," to which, indeed, its colour was plainly due, a line now considered to be coincident with a prominent line in the spectrum of krypton.*

This "torpedo-shaped" beam of light was unlike any other celestial object that I have ever seen. The quality of its light, and its occurrence

* We now know that the green auroral line comes from oxygen.

while a great magnetic storm and a bright aurora were in progress, seem to establish its auroral origin. But it differed very widely in appearance from any other aurora that I have ever seen. It was unlike auroral shafts and rays, with their glancing, flickering movements so generally radiating from the magnetic north, since its motion was a steady uniform progress from (magnetic) east to west. It was equally unlike auroral "arches" or the auroral "crown," and its clearly defined outline and restricted size differentiated it as distinctly from ordinary diffused auroral glows.

It appeared to be a definite body, and the inference which some observers drew from this was that it was a "meteor," not in the old vague sense of some object high in the Earth's atmosphere, but in the sense of a solid cosmical substance the orbit of which has brought it within the terrestrial atmosphere. But nothing could well be more unlike the rush of a great meteor or fire-ball, with its intense radiance and fiery train, than the steady — though fairly swift — advance of the "torpedo." There was no sign of the compression of the atmosphere before it, no hint that the matter composing its front part was in any way more strongly heated than the rest of its substance — if substance, indeed, it possessed. The gleam of a search-light, focused on a cloud and steadily swept along it, is a more accurate simile for the impression which the appearance produced upon my own mind.

The late Mr. Rand Capron, of Guildford, who made the study of aurorae one of his chief specialties, communicated an interesting discussion² of the observations of this singular phenomenon to the *Philosophical Magazine* for 1883 May, pp. 318–339, a paper which I briefly summarized in the *Observatory* for 1883 June (vol. vi, pp. 192, 193). For myself, the "torpedo beam" stands out in my memory, not only as a celestial object unique in my experience, but as associated with the great magnetic storm of 1882 Nov. 17–21, and as synchronizing with the great sunspot group, No. 885 of the Greenwich Photoheliographic Results, the largest I had then observed. From that date onward I had no doubt that in some way or other magnetic disturbances on the Earth were connected with disturbances in the Sun, though it was not until more than twenty years later that the nature of the connection became clear.

J. Rand Capron, F.R.A.S., F.N.S., gave a detailed analysis of all available observations.³ Capron points out many interesting features of "the auroral beam," as he terms the phenomenon. And indeed several independent arguments suggest that the apparition was of the character of or at least associated with the auroral display that Maunder reported.

First, the month of November 1882 was remarkable for its high degree of magnetic activity (disturbances of the magnetic compass)

and for the associated series of auroral storms that appeared over a wide geographic area.

The sun, which we now know to be the source of both auroral and magnetic activity on the earth, was intensely spotted. In fact, one of the largest spots ever recorded up to that time was visible on the surface of the sun.

As Maunder reported, the expectation of seeing a brilliant auroral display had brought out many distinguished observers, who were certainly well repaid for their effort by the sight of the remarkable beam.

Another fortunate circumstance resulted from the expected auroral display. Five students of auroral spectra, including Capron, quickly and independently swung their spectrographs around to get some idea of the colors of light radiated by this object. All seemed to agree that the light was auroral, and showed the characteristic green line — “citron,” as some of the observers graphically described the precise tint. In addition, Capron reported a “faint greenish-white continuous spectrum.” By that expression he meant that some radiation seemed to be present other than that from a glowing gas. And indeed the range of colors reported by many observers placed as much emphasis on the white as they did on the green shade.

Of course, everyone finds difficult the precise estimation of the color of faint illumination. At night we are all more or less color-blind. Even in brightest moonlight it is difficult to separate flowers according to their shade. A bright aurora, however, will usually appear distinctly green, sometimes with red fringes. Hence the fact that many observers emphasized the “brilliant white” hue of the beam suggests, from the color estimates alone, that we are perhaps overemphasizing the auroral association.

But there is another reason for associating the 1882 beam with auroral activity. A number of observers independently noted that the beam did not swing exactly from east to west along a path parallel to the rising and setting of the stars. The motion was somewhat askew with respect to the geographic north and south and corresponded much more closely to magnetic coördinates. Since the aurora is a magnetic phenomenon, with the positions of the auroral rays, curtains, and arcs dictated by magnetic rather than geographic

directions, this triple coincidence of a beam associated with an auroral display, apparently also containing auroral radiation, and conforming to the geometry of the aurora is indeed suggestive.

As for the shape of the beam, the descriptions and similes varied, though they have left little doubt as to the general outline. Near the horizon, the object appeared to be nearly circular, but as it rose higher in the sky it lengthened as previously described (Fig. 10). Then, on setting, the object reverted to the original circular form. It gave the impression of being a roughly cylindrical object some-

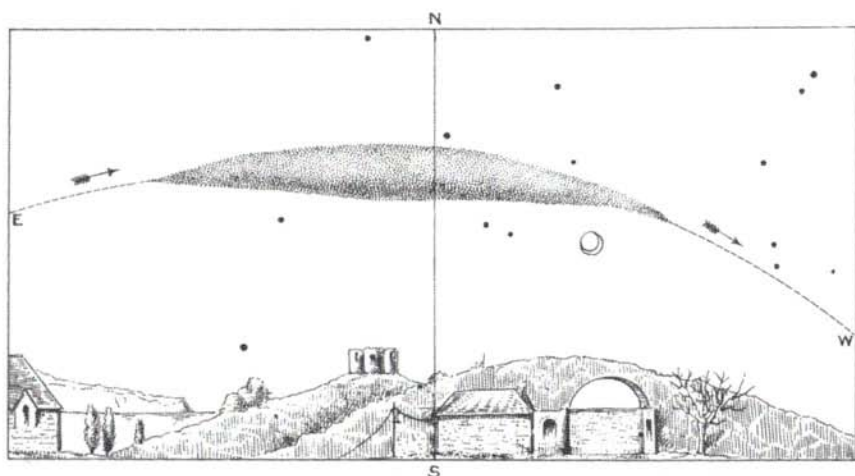


Fig. 10. Sketch of the great saucer of 1882.

thing like an enormous baseball bat hurled directly toward one, parallel to the ground, and overhead. While still at some distance away, the bat looks to be nearly circular. Then it lengthens out as it swings over head and contracts again as it sails away.

The actual words used to describe the shape of the beam varied: "spindle-shaped," "like a torpedo, or weaver's shuttle," "cigar-ship," "lenticular," "like a 'comet's tail,'" or "like a discus seen on edge." — Yes, almost the very words we have sometimes used today: "a flying disk."

The suggested colors were "white," "pearly white," "greenish white," and "yellow white." Various observers described the texture as "glowing." The reports of the detailed structure of the object

varied, perhaps, more than any other reported feature. Some of the observers noted no structure at all. Others regarded the outline as clear-cut, with well-defined boundaries. One of the observers from Holland used the adjective "feathery" to indicate that the outline was not quite sharp.

Descriptions of the internal structure also varied, from structureless uniformity to an actual internal "boiling." One notice called attention to an apparent "rough splintered appearance" of the ends. Many observers, however, saw an internal shadow ranging from "central dullness" to a "dark nucleus" parallel to the long axis of the spindle.

On the assumption that what he saw was truly a physical object, Capron used the various observations to determine its height above the surface of the earth. This study placed the torpedo-shaped object at an altitude of about 130 miles — a value not inconsistent with the observed heights of other auroral forms. If we accept this measured distance, we now can calculate that the body was roughly 70 miles long by 10 miles in width, and that its speed was about 10 miles per second. This speed, incidentally, is not inconsistent with values observed for various meteors.

Although some of the persons watching this phenomenon thought they were seeing a material body, perhaps the 1882 equivalent of the interplanetary saucer, the figures given above show that this could not have been either a single large body or a swarm of small ones. It could not even have consisted of a cloud of "cosmic dust," as a few persons suggested.

A solid body of this size, moving at this speed through the upper air, would have produced a very different type of phenomenon. Its leading edge would have seemed to be on fire and sparks would have showered behind to form a long, luminous trail that would probably have persisted for hours.

The swift, silent motion, performed without any changes of shape ascribable to the motion itself, makes it imperative for us to discard the hypothesis that the body was solid. Similar arguments apply perhaps even more forcefully to liquid objects, which could scarcely persist for any time in interstellar space, without either solidifying or evaporating. Hence we are left with just one possibility: namely,

that the luminous region was gaseous — that is, if we are to consider it as being material at all.

We generally accept the idea that great clouds or filaments of gas, shot from the sun, cause the aurora borealis. We have occasionally seen the sun spewing intense clouds of gas into space, and many scientists believe that the aurora occurs when one of these clouds strikes the earth, causing the upper air to glow. For the moment, I see no better alternative than to describe the great saucer of 1882 as some unusual form of auroral activity.

I have studied what happens when a cloud of hot hydrogen gas encounters the earth. The earth's magnetic field tends to concentrate the gas and focus it, by a sort of funnel action, along a parallel of magnetic latitude. The more common form of the aurora consists of a curtain hanging nearly vertically over such a parallel rather than a cigar-shaped beam tunneling its way through. But the beam of 1882 certainly followed a parallel, and the new science of "magneto-hydrodynamics" indicates that such tunneling can occur. The studies further show that the magnetic fields themselves would probably serve to bind together a cloud of gas and temporarily keep it from dispersing or diffusing away, as gas would ordinarily do if no magnetic field were present. Some of the modern ideas will appear in a later chapter.

There is no doubt that the 1882 saucer was very different from the average modern variety, but nonetheless a flying saucer, which term includes a multitude of odd atmospheric apparitions. Condensations and bright auroral beams have appeared with sufficient frequency to cause special comment. I have checked a number of such references and find that what they describe might be luminous auroral fragments, swinging through space as independent units.

One of the earliest phenomena of this type occurred on 12 October 1859, as reported by Charles P. Knight,⁴ who observed from Solva, Pembrokeshire, England. Although Mr. Knight uses the word "meteor," we assume that he was using that word in its more general sense, to indicate some phenomenon of the upper air.

I send you an account of the most extraordinary appearance in the sky this evening, which has quite frightened the superstitious here. We had a fine day except two short showers in the afternoon, the wind had been

southeast until this evening when it changed to south; the moon rose in a nearly cloudless sky; there were scattered rain clouds in the eastern horizon, and rather a dense bank in the western horizon; a few very light filmy rain clouds were moving rapidly from southeast to northeast. At 6:30 there was a slight shower, after which the sky was almost cloudless, the only kind of clouds being a very few rain clouds at a low elevation. The moon was unusually bright. At 7:20 a brilliant red light appeared to the south by east, about half-way between the zenith and the horizon, it looked very much like the red smoke from a port fire, and faded away all round from a focus of light in the center (its shape was oblong); in about fifteen minutes it rose to the zenith, and as it rose the red shot up from it in long streaks on all sides, except to the northeast, but particularly one broad mast that stretched right away to the western horizon, of a beautiful rose colour all the way; some clouds near the horizon in its track were coloured purple by it. This may have been either by seeing it through them, or its being beneath them. The center of the meteor was now dark crimson, blood red, darker than the clear sky, but the stars shone brightly through it. The reddest rays were those to the west and south; those to the south gradually faded to pale green; those to the northwest and north were in more marked and finer lines, and only red near the center; and a few, after appearing for a short distance pale green, shot out to the northeast, growing wider apart as they approached the moon, and passed it, clearly showing that the dark spaces between the rays could not be shadows caused by the moon. Only one ray to the northeast was red; they were all fainter as they approached the moon, and much fewer in number than on the western side of the heavens. It lasted until 8:15; all the red colour gradually faded away, and only left the focus from which it had sprung still in the zenith; it became pale green, and then disappeared. The last rays to fade were those to the northeast. No rain fell during the time it lasted. The air was calm. A good deal of ground sea coming into the bay from the westward.

A somewhat similar phenomenon was described by Erasmus Ommanney,⁵ 26 August, 1894, from Llanberis, North Wales. He reports:

I was outside the hotel in Llanberis at 10.30 P.M. admiring the lustre of the stars – for it was a cloudless night – when, gazing upwards into the region of Cassiopeia, I was startled by a sudden flash from a brilliant effulgence of white light situated proximately to the two stars of greatest magnitude in that constellation, which immediately resolved itself into a clearly defined disc, about three times the diameter of Jupiter. After a brief interval I observed a body of brilliant orange colour discharged from the disc, which was projected directly towards Perseus. This body assumed a form resembling an elongated flatfish, but terminating in a point, the disc

forming a nucleus to the apparition, which was marvellous to behold; but its visibility proved to be only of short duration, for the white disc, or nucleus, suddenly disappeared, leaving the orange coloured mass quiescent for about half a minute, and then I saw it fade away gradually, and it vanished out of my sight.

The appearance of this strange body did not occupy more than five minutes of time; its dimension in length I estimated was about fifteen degrees of arc. I likewise noticed an important fact — that it evidenced no motion in space.

During my professional career, including Arctic and Equatorial services, a great part was spent in nightly watchings, in which all sorts of meteoric phenomena came under my notice, yet I never beheld one which manifested such marked singularity and distinctiveness combined. I could only regret that no one was at hand to affirm what I saw.

D. E. Packer ⁶ reported a slightly different though possibly related phenomenon, a connection between an aurora and a meteor. On 14 September, 1908, at 8:40 P.M. on a clear, moonlit night, he was watching an auroral display, which possessed one very spectacular feature,

a bright, horizontal cloud observed stretching across the fore part of Ursa Major, and superposed upon a dark cloud or darkness, so intense as to appear almost black in the general twilight. The bright cloud was in a constant state of fluctuation, flashing up and fading with almost the same rapidity as the well-known scintillation effect observed in bright stars. The colour was a pale white, and, as far as could be judged, the cloud was stationary over the magnetic meridian during the whole period of observation. At 8:45 a meteor from Perseus approached it, and on entering the cloud at its eastern extremity burst out with extraordinary splendour, far surpassing Venus in lustre, and exhibiting a string of many smaller nuclei on each side of the main nucleus. At 8:50 the cloud at this point had thrown out a streamer, which was traceable between Auriga and Perseus into Aries. At 9 P.M. the streamer had faded, and the cloud showed signs of disruption into two separate masses, united by a narrow neck; also there now appeared evidences of other clouds forming in the neighbourhood, less luminous than the main cloud, and more difficult of observation, owing to the increasing moonlight. Subsequently the main cloud became more compact as at first, the fluctuations became less pronounced, and by 9:30 no traces of the phenomenon were visible.

Here are three separate events. Although the accounts of 1859 and 1894 do not mention the aurora specifically, it is significant that intense sunspot activity marked both of these years.

The association with the passage of a meteor suggests one additional way that the great 1882 saucer may have occurred. When a meteor, even a small sand grain, passes through a layer of the upper air it may act like a match, to "ignite" or intensify any faint auroral glow already present. The actual process is complicated, and certainly not one of combustion. But it may very well be related to magnetohydrodynamics as previously described.



Fig. 11. A display of northern lights at Rothenburg, Germany. The oval form at the left suggests that this picture may refer to a saucer similar to that of 1882. The Biblical inscription says "Watch and pray" (Matthew 26:41).

We do not know exactly what happened back in 1882. There are many gaps and uncertainties in our knowledge, but even so I contend that any natural explanation, however incomplete and tentative it may be, is highly preferable to one that invokes the aid of fairies, ghosts – or interplanetary saucers. Saucers, mind you, 100 miles long!

I have sometimes wondered whether the reported "great green fireballs" of New Mexico might be auroral phenomena related to the 1882 beam. I conclude, however, that they are not. Most of the green fireballs are probably meteors and the rest will be a type of mirage or reflection saucer. On some occasions the green glow of a faint aurora borealis seen on the northern horizon may be turned

downward and focused by air lenses or by ice crystals to produce an elevated saucer. And indeed, if this were done, the resulting saucer would certainly display the characteristic auroral green. But the aurora borealis is a rare phenomenon in New Mexico, since this state is so far from the magnetic pole. Hence intense auroral displays with saucers resulting from that kind of activity will be extremely rare. As for the green fireball variety, we shall consider them in more detail in Chapter 18.