



These two pictures of Comet 1948 were taken on the same morning, November 13th, but as the one at the right was made at Harvard's South African station (by W. D. Victor), it shows the position and appearance of the comet a few hours earlier than does the picture above, which was taken at the Montevideo Observatory in Uruguay (by Esteban Rondanina). The 10-inch Meccall triplet required an exposure of 37 minutes to make the Harvard photograph, while the camera used at Montevideo was so fast it recorded equally faint stars and as much of the comet's tail in only five minutes exposure. The star field is principally in Hydra; Beta Corvi is situated near the center left edge of the Montevideo picture, with two fainter stars to the right and above it.



## The Eclipse Comet of 1948

BRITISH Astronomical Association Circular No. 303, dated November 30, 1948, under the title, "The Eclipse Comet, 1948I," reads in part:

"There can be little doubt that the

firmation of it, saying it was 93' from the centre of the Sun in position angle 226°, and was very bright, with a tail."

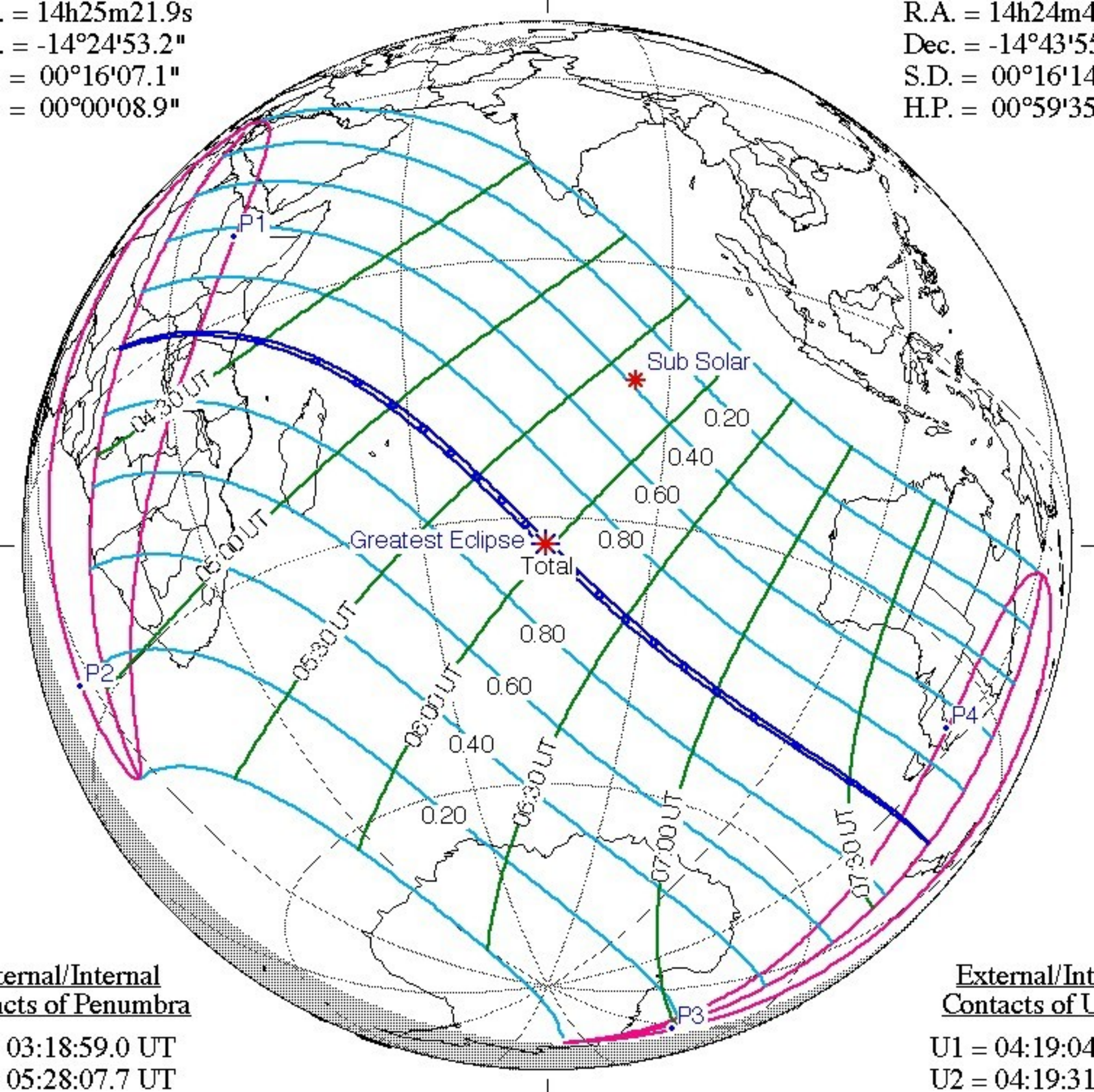
Harvard Announcement Card 956, dated November 30, 1948, reads in part:

of the sun provided a favorable opportunity to observe the comet practically a week before southern observers viewed it in their morning sky. It well can be called the "eclipse comet" of 1948.

Incidentally, the BAA circular also reports that Dr. Atkinson's eclipse expedition (*Sky and Telescope*, VIII, 37, November 30, 1948) arrived at the

$\alpha = 14^{\text{h}}25^{\text{m}}21.9^{\text{s}}$   
 $\delta = -14^{\circ}24'53.2''$   
 $\text{S.D.} = 00^{\circ}16'07.1''$   
 $\text{H.P.} = 00^{\circ}00'08.9''$

$\text{R.A.} = 14^{\text{h}}24^{\text{m}}4$   
 $\text{Dec.} = -14^{\circ}43'55$   
 $\text{S.D.} = 00^{\circ}16'14$   
 $\text{H.P.} = 00^{\circ}59'35$



External/Internal  
Contacts of Penumbra

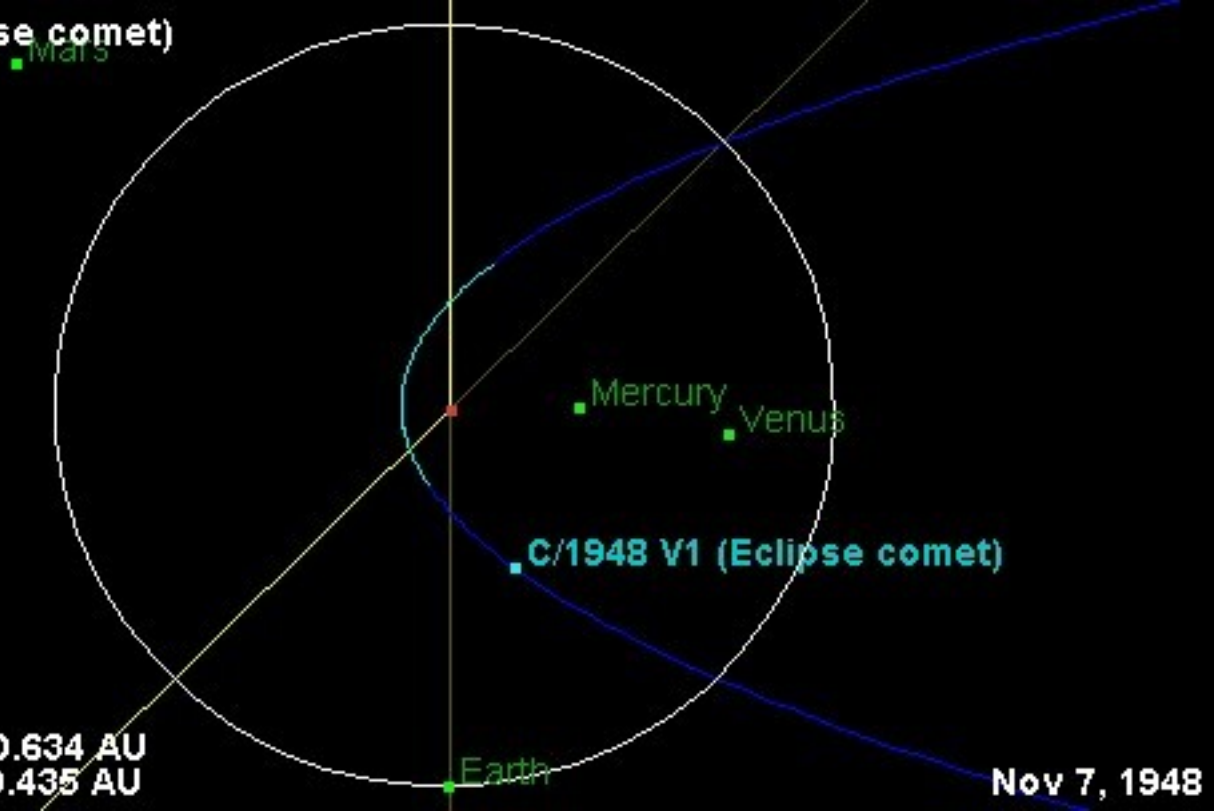
03:18:59.0 UT  
 05:28:07.7 UT

External/Internal  
Contacts of Umbra

U1 = 04:19:04  
 U2 = 04:19:31



**C/1948 V1 (Eclipse comet)**



**Earth Distance: 0.634 AU**  
**Sun Distance : 0.435 AU**

**Nov 7, 1948**

Eclipse comet (C/1948 V1)

Sun  
The Moon

**C/1948 V1** *Discovered:* 1948 November 1.2 ( $\Delta = 0.75$  AU,  $r = 0.25$  AU, Elong. =  $2^\circ$ )  
**(Eclipse Comet)** *Last seen:* 1949 April 3.16 ( $\Delta = 3.09$  AU,  $r = 3.08$  AU, Elong. =  $80^\circ$ )  
*Closest to the Earth:* 1948 November 24 (0.5556 AU)  
**1948 XI = 1948I** *Calculated path:* LIB (Disc), VIR (Nov. 1), HYA (Nov. 9), ANT (Nov. 26), PYX (Dec. 7), PUP (Dec. 14), CMa (Dec. 24), LEP (1949 Jan. 17), ORI (Feb. 3)

This comet was discovered by many people as they were watching the total solar eclipse of 1948 November 1.2. Along the entire path of totality, observers saw the comet positioned within  $2^\circ$  of the sun, with a tail stretching toward the horizon. Numerous photographs of the eclipse were taken, which, despite the short exposures, plainly showed the comet. Some of the best photographs were taken by a team of astronomers from the Royal Observatory (Greenwich, England) that had set up in Mombasa (Kenya), as well as by an airplane of the British Royal Air Force flying at 13 000 feet over Kenya. Three photographs were measured by R. d'E. Atkinson, who determined the comet was  $105.4'$  from the moon's center in PA  $230^\circ$ . This indicated a position of  $\alpha = 14^h 19.5^m$ ,  $\delta = -15^\circ 31'$ .

A few days after the eclipse, additional independent discoveries were reported. On November 4, Frank McCann (pilot for Pan American-Grace

# Eclipse Comet of 1 November 1948

"THE" famous Eclipse Comet of 1948

The Great Eclipse comet of 1948 has been discovered during the total solar eclipse of 1 November 1948. The comet (1948 1 or 1948XI with perihelium on 27 October 1948) was only 2 degrees from the Sun when it was observed in Nairobi, Kenya. The comet has been observed after the eclipse till 3 April 1949 on the Southern Hemisphere. On 10 November, the comet had a magnitude of +2 and the coma was 20 arc minutes. The tail was 30 degrees long on 13 November.

The Eclipse Comet was photographed in Nairobi by R. d'E. Atkinson. The picture can be seen in many publications. The comet was observed from as well land as in the air. The Royal Air Force observed the comet only 4 lunardiameters from the Moon. Totality in Nairobi was only 45 seconds.

References:

G. W. E. Beekman, Zenit May 1983, p. 192

J. E. Bortle, Sky & Telescope, Comet Digest, October 1984

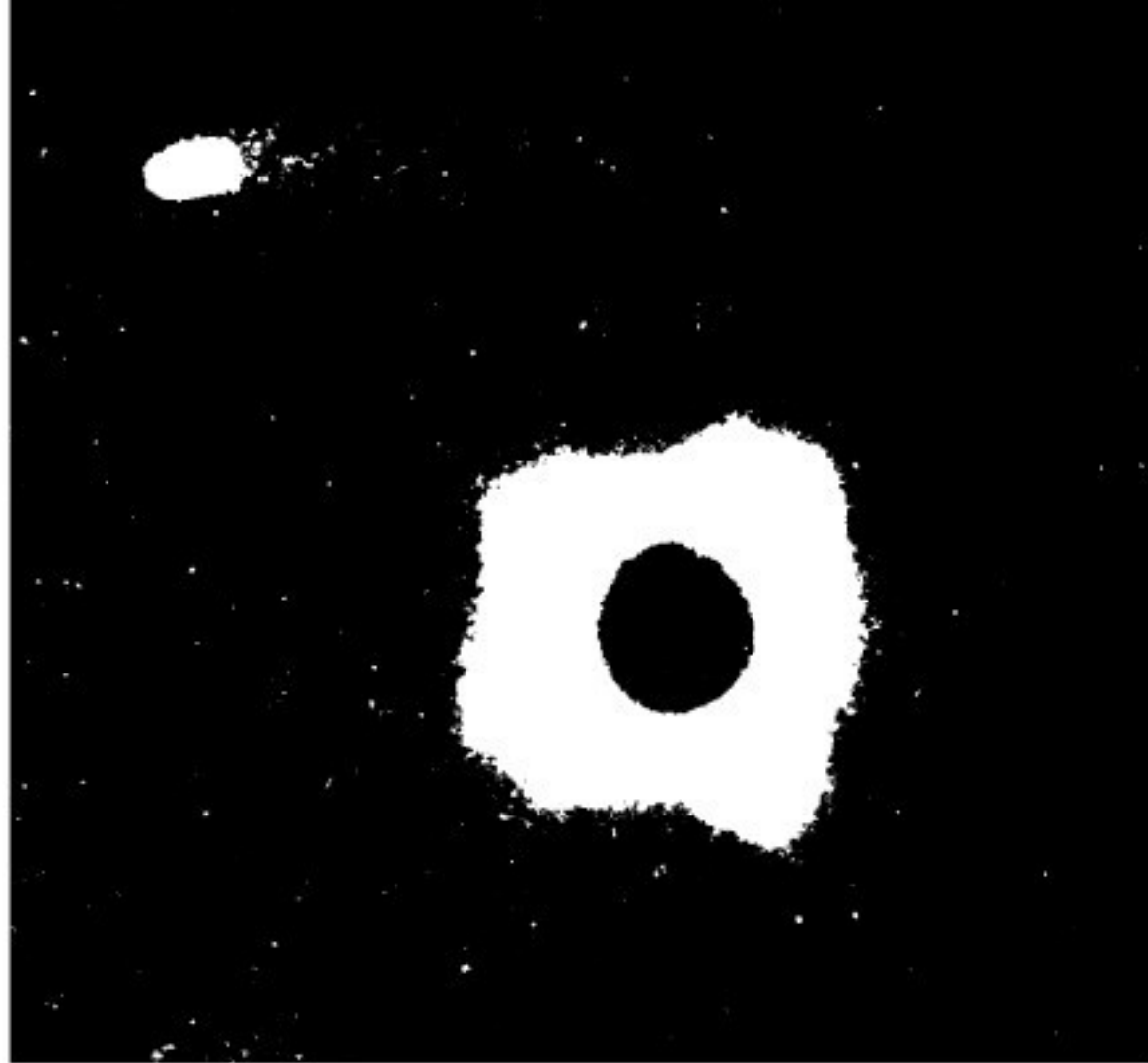
# A note on eclipse comets

M. Šolc

*Charles University Prague, Faculty of Mathematics and Physics, 180 00  
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Received: March 1, 1999

**Abstract.** Eclipse comets are a rare phenomenon but some suitable photographic or photometric observations can be of some scientific value. 10 years of photographic observations, covering six total solar eclipses, have yielded data that indicate the possible existence of one or more relatively objects within 20 solar radii. Three of the events were monitored by more than one observation site; each site produced multiple confirmation plates. The object images indicate some alignment with the ecliptic and range from +9 to +7 equivalent visual magnitude.



**Figure 1.** Eclipse comet 1948 XI as it was photographed by R. d'E. Atkinson in Nairobi, Kenya, on November 1, 1948. Picture was taken in the white light.



## ROBERT D'ESCOURT ATKINSON

Professor Robert Atkinson, former Chief Assistant at the Royal Observatory, Greenwich, was remarkable for the wide diversity of his contributions to astronomy. His early career as a physicist led to pioneering application of nuclear physics to the problem of energy generation in stars, which was recognized by the Society in the award of the Eddington Medal. After the war he was Officer in Charge at Greenwich when Spencer Jones had moved to Herstmonceux, and he was heavily involved in administration of the move of the Royal Observatory. During this period, until his retirement from RGO, his outstanding scientific insight and his mechanical ingenuity were devoted to problems of precise positional astronomy. Unfortunately, at that time, circumstances prevented the fulfilment of many of his ideas. Nevertheless he continued to make substantial contributions to fundamental astronomy for the rest of his life. Shortly before leaving Herstmonceux, and during the following decade at the University of Indiana, he published several papers on general relativity. His mechanical prowess is perhaps best exemplified by the magnificent astronomical clock which he designed for York Minster. He was invited to do this by the Dean of York during the summer meeting of the Society in Leeds in 1952. It was



# CINEMATOGRAPHY OF PARTIAL SOLAR ECLIPSES

## I. GENERAL

*R. d'E. Atkinson*

(Communicated by the Astronomer Royal)

(Received 1952 November 6)

### *Summary*

When a central eclipse of the Sun is viewed from a station slightly outside the central track, the thin unobscured crescent changes its position angle rapidly near mid-eclipse; a detailed record of its behaviour should provide good corrections to the Moon's relative place in both coordinates. An expedition was sent to Mombasa for the eclipse of 1948 November 1, and obtained a successful timed cinema record. The present paper is an introduction to this work and deals with general principles choice of

Eclipse Expedition, New Style  
By Dr. R.d'E. Atkinson, Chief Assistant,  
Royal Observatory,  
Greenwich.

The total eclipse of November 1st was a relatively unfavourable one; the path of totality started in Africa and ran mainly over the South Indian Ocean, so that even at the Kenya coast the sun was still low; the duration of totality was also only 52 seconds there. It was thus not surprising that hardly any attempt was made to observe the eclipse in the traditional way; a small expedition was however sent from the Royal Observatory, Greenwich, for a somewhat new purpose.

Generally, eclipse expeditions go exactly to the path of totality, with a programme based on the fact that the bright disk of the sun will thus be completely covered, so that its outer layers and "corona" can be studied better than is otherwise possible. Sometimes, in addition, the moments when the last bit of the disk disappears, and when the first bit reappears after totality, are timed as accurately as possible, in order to determine how much the predicted motion of the moon is in error. In the present instance, however, the plan was to go to a place where the eclipse would just fail to be total; in that case it is easy to show that the thin crescent which is left uncovered

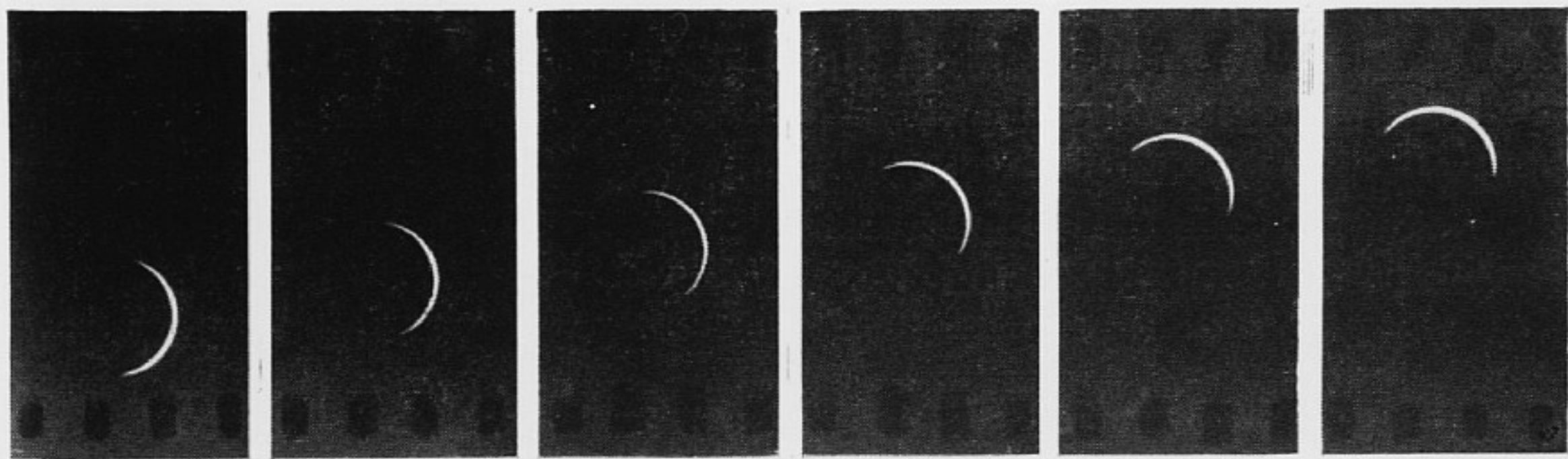


## *AN ECLIPSE EXPEDITION*

On November 1st there occurred a total eclipse of the sun, starting at sunrise near Lake Victoria in Africa and ending at sunset near New Zealand. Not many astronomers planned to observe this eclipse, but a small expedition from the Greenwich Observatory, headed by Dr. R. d'E. Atkinson, went to Mombasa, on the Kenya coast, where the eclipse was 98 per cent total, to photograph the narrow crescent sun. The purpose was to try out a method for obtaining more accurate positions of the moon from measurements of the position angles of the line of the eclipse cusp. As seen from Mombasa, this

## THE TOTAL ECLIPSE OF NOVEMBER 1

News has been received that the expedition under Dr. R. d'E. Atkinson, from the Royal Observatory, Greenwich, was able to carry out its programme successfully. The object of this expedition was to test a method of obtaining corrections to the Moon's place from observations on the thin crescent of the eclipsed Sun as seen from a station just off the belt of totality (*Nature* **162**, 521—522, 1948 Oct. 2). Measurements of the position angle of the line joining the cusps, as a function of the time, can give corrections to the differential co-ordinates of the Sun and Moon; and if a large number of such measures is made the result may be considered independent of the effects of irregularities of the Moon's limb, and is likely to be of an accuracy higher than that from several thousand ordinary occultations.



04 : 26 : 20

04 : 26 : 54

04 : 27 : 28

04 : 28 : 02

04 : 28 : 36

04 : 29 : 10

(Greenwich Mean Time)

Fig. 1. Six of the 3100 pictures obtained at the Mombasa eclipse of 1st November, 1948. The times shown are only approximate, and actual times are good to a hundredth of a second or better, for all 3100 exposures. The camera was stationary, the Sun was rising almost vertically, and the Moon was rising less fast and moving south. The minimum separation of centres of Sun and Moon was just over  $1'$ , which accounts for the rapid rotation



A general view of the En Nahud station. On the left is the tent with radios and chronographs; in the center, the cinema pier, with the sun screen beyond; on the right are the photoheliograph and coelostat.

# GREENWICH ECLIPSE EXPEDITION

By R. D'E. ATKINSON, *Royal Greenwich Observatory*

THE PROGRAM of the Royal Observatory, Greenwich, at the eclipse of February 25, 1952, provided for two stations in the Sudan and two in the Persian Gulf area; their purpose was to use the cinema method of the author, which had been successfully

path, were at Batha in Iraq, and near Al Jahara in Kuwait; these stations did not undertake large-scale pictures, as the difference in libration, compared with the view from the Sudan, was not serious.

The main task at all four stations was

between the predicted and observed rates of change gives a correction to the other. The method allows both to be obtained with comparable accuracy, using position angle measurements only, and as the rate of rotation is rapid the accuracy to be expected is high. The



Atkinson's interest in positional astronomy was not confined to meridian observations. The accurate determination of the position of the Moon had always been a problem of major importance, historically because of its use for navigation, and in more recent years as a means of determining Ephemeris Time. In 1948 he carried out a novel experiment at the total solar eclipse of November 1 from a point just outside the zone of totality, near Mombasa. During the eclipse, the rapid change of position angle of the line of cusps was recorded with a cine-camera, and timed relative to the Rugby time signal. Very accurate measurements of the relative positions of the Sun, Moon and observing station were obtained; this involved the first use of the detailed charts of the lunar limb which had been prepared at the US Naval Observatory by C.B.Watts. Although the 1948 experiment was successful a more ambitious expedition in 1952 to the Sudan and the Persian Gulf failed mainly because of weather conditions.



J. D. Pope adjusts the coelostat mirror at the Iraq station. The sun screens are removed to give a clear view, and the theodolite is also shown, in the position used for checking azimuth and level. The box on the pier contains the chronometer.

# British Astronomical Association Circular

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No. 303

1948

November 10

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## THE ECLIPSE COMET, 1948I

There can be little doubt that the bright comet now reported seen in the southern morning sky is identical with the one seen during the eclipse of November 1. The *Times* of November 2 in the report of the eclipse from its correspondent at Nairobi stated that a bright comet, with a long tail, was seen both by the crew of an R.A.F. aircraft and by observers on the ground. The head, it was stated by one amateur astronomer, was still visible a few seconds after the Sun began to emerge.

A cable received by Dr. R. d'E. Atkinson, leading the Royal Observatory expedition, reports photographic confirmation of it, saying it was 93' from the centre of the Sun in position angle  $226^\circ$ , and was very bright, with a tail.

# HARVARD COLLEGE OBSERVATORY

## ANNOUNCEMENT CARD 956

**Bright Comet (1948I).**—Dr. Leland E. Cunningham, Students' Observatory, University of California, Berkeley, writes: "New elements have been determined for the bright comet as below. These place the comet in position angle  $228^\circ$  and  $104'$  distant from the sun at the time of the total eclipse on November 1, which are in moderate agreement with Atkinson's observed values of  $226^\circ$  and  $93'$ , respectively (B.A.A.C. 303).

### ELEMENTS

T	1948 October 27.38775 U.T.	$\omega$	107.61057	} 1948.0
q	0.1376847	$\Omega$	210.52125	
		i	23.19994	



COMET NOTES.—The interest of those watching the total eclipse of the Sun on November 1 was unexpectedly enhanced, and much excitement caused, by the presence of a very bright comet within two degrees of it, with a tail stretching down to the horizon. The party from the Royal Observatory, Greenwich, placed, for the purposes of their work, just outside the belt of totality, did not see the comet, but it was reported by many people within the belt and was recorded on photographs of the eclipse taken from a R.A.F. aeroplane, with exposures of only  $1/300$  second ( $f/5.6$ , 8 inches' focal length). Three of the negatives were later measured by Dr. R. d'E. Atkinson. He found the comet to be  $105'.4$  from the Moon's centre in position angle  $230^\circ$ , but there are uncertainties especially in the orientation.

# The Eclipse Comet of 1948

**B**BRITISH Astronomical Association Circular No. 303, dated November 10, 1948, under the title, "The Eclipse Comet, 1948 I," reads in part:

"There can be little doubt that the bright comet now reported seen in the southern morning sky is identical with the one seen during the eclipse of November 1. The *Times* of November 2 in the report of the eclipse from its correspondent at Nairobi stated that a bright comet, with a long tail, was seen both by the crew of an R.A.F. aircraft and by observers on the ground. The head, it was stated by one amateur astronomer, was still visible a few seconds after the Sun began to emerge.

"A cable received by Dr. R. d'E. Atkinson, leading the Royal Observatory expedition, reports photographic con-

firmation of it, saying it was 93' from the centre of the Sun in position angle  $226^\circ$ , and was very bright, with a tail."

Harvard Announcement Card 956, dated November 22nd, reads in part:

"Dr. Leland E. Cunningham, Students' Observatory, University of California, Berkeley, writes: 'New elements have been determined for the bright comet. . . . These place the comet in position angle  $228^\circ$  and 104' distant from the sun at the time of the total eclipse on November 1, which are in moderate agreement with Atkinson's observed values of  $226^\circ$  and 93', respectively.'"

Thus, although Comet 1948 I was missed by northern observers before it passed perihelion late in October, when its tail must have extended into the evening sky after sunset, the total eclipse

## MEETING OF THE ROYAL ASTRONOMICAL SOCIETY.

Friday, 1948 November 12, at 16<sup>h</sup> 30<sup>m</sup>.Professor W. M. H. GREAVES, F.R.S., *President*,  
in the Chair.*Secretaries:* W. H. McCREA.  
R. O. REDMAN.

The Minutes of the Ordinary Meeting of 1948 October 29 were confirmed and signed.

*Prof. Milne.* It is unusual at our Meetings to make any comment on the Minutes, but I think that the Society would not wish Minutes of such a character as those of the last Meeting to pass without remark. The reading of these Minutes in a sense completes what has been a unique occurrence in our annals: the holding of a Meeting of the Society outside London. As a private Fellow who had no part in the preparations for, or organisation of, this Meeting, I should like to testify to the outstanding success of the Edinburgh Meeting. This success was partly due to the

*The President.* Prof. Chapman has impressed on us both the difficulty of the problem and the fact that he is not deterred by it. I ask you to return thanks to him. I now call on Dr. R. d'E. Atkinson to tell us of the recent eclipse expedition to East Africa.

*Dr. Atkinson.* I propose to speak mainly about the comet which was observed during the eclipse; as far as our own eclipse observations are concerned, I believe they were successful, but the films have not yet been developed.

The comet, though very bright, was not visible at Mombasa, where we were (98% totality), but several newspaper reports from further north referred to it; they did not sound very convincing. A photograph was published, but as printed it did not actually show the comet; the accompanying description was also based on an error, as I later learnt. On the journey to Nairobi, sixty hours after the eclipse, I spoke to an eye-witness, whose account disagreed with that in the paper. It was not until I had seen the photographs taken by the R.A.F. at Nairobi, and had found that they agreed with eye-witness reports at both places, that I realised it must have been a comet; I then made a very rough measurement of its place on the R.A.F. film, and telegraphed Dr. Merton. As a result of my interest in these photographs, which were taken at 13,000 feet just within and just outside the shadow, the Air Commodore very kindly let me bring the films home for thorough examination. The first slide shows a picture very much enlarged from a hand-camera snapshot also taken by a member of the crew; in this case I have no negative. The tail is clearly visible; visual observers all agreed that it extended downwards until it reached



either clouds or the horizon, and it must have been twenty degrees long at least. The visible part of it does not point away from the Sun at all; any portion which does this must have been extremely foreshortened. The next slide shows one of the "official" photographs; the scale is larger and the definition much better, but the tail is too much underexposed to show except with a magnifying glass. Viewed in this way, and accepting the idea that the root of the tail will point away from the Sun, one can see enough indications of curvature to make it seem that it is convex to the west; I therefore included in my cable a guess that the motion would be westwards, and this has proved correct. The comet must certainly have been very bright; these pictures were taken with an aperture of  $f/5.6$  and an exposure of  $1/300$  second; moreover, the head was visible for some 5—10 seconds after the end of totality. It must certainly have been brighter than Venus. I have now measured up three separate negatives, and they agree closely in giving a distance from the centre of the Sun of 105.4 minutes, and a position angle of  $230^\circ$ ; however, there is some possibility of systematic error, and I have written to the Air Commodore to ask for further details. If systematic errors can be eliminated, the place should, I think, be useful for orbit determinations; it is a week earlier than any other place.

# The Journal of the British Astronomical Association

Editor: PETER DOIG, F.R.A.S.

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VOL. 59

SESSION 1948-49

No. 2

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## REPORT OF THE ORDINARY GENERAL MEETING OF THE ASSOCIATION

Held on Wednesday, 1948 November 24,  
at Burlington House, Piccadilly, W.1.

DR. J. G. PORTER, *President*

M. W. OVENDEN, *Secretary*

MR. OVENDEN read the Minutes of the Ordinary General Meeting held on 1948 October 27, and these were approved as correct.

MR. OVENDEN read the list of presents received: "The Night Sky", by J. G. Porter, Ph.D., F.R.A.S., from the publishers; "Galileo and the Freedom of Thought", by E. S. Taylor, London, 1938, from Dr. G. Merton. The thanks of the Meeting were accorded to the donors of these presents.

THE PRESIDENT called on Dr. Atkinson to address the meeting on his experiences in Africa when observing the recent eclipse of the Sun.

DR. ATKINSON said he was conscious of a great sense of self-denial, in that although he had travelled about 10,000 miles he had deliberately gone where he would just fail to see the total phase of the eclipse; the programme he had worked out demanded a site where the eclipse was about 98% total. In ad-

dition to missing the wonderful spectacle itself, he had as it turned out also missed a most impressive comet. He described the principle of his programme, showing how the thin crescent of the Sun must swing round rapidly in position-angle as the Moon's centre moves past the Sun's, and he sketched the arrangement used for photographing the phenomenon with a stationary cine-camera. At each exposure the shutter operated an electrical contact which operated one pen of a chronograph; the other pen recorded the time, and the results should provide corrections to both coordinates of the Moon's place. The regular camera lens had been removed, and a telescope lens of about 40-inches focus substituted, so that the diurnal motion carried the image right across the frame during the two or three minutes of the observations; the diurnal motion could thus provide a zero of position angles. The very large number of exposures would help to eliminate the effects of unknown features on the Moon's limb. Two complete stations were used, to increase the chance of observation if there was patchy cloud; at one of them special time signals were received from Greenwich directly, and at the other the time was obtained from a contact-chronometer which was checked before and afterwards.



The newspapers had reported that a comet was seen during the eclipse, but the report did not sound very credible, as it stood. When Dr. Atkinson visited Nairobi, he stayed with Mr. H. K. Binks, a B.A.A. member, who arranged for him to visit the R.A.F. officers who had taken photographs flying at 13,000 feet. The comet was distinctly visible on four photographs, with an undeniable indication of a tail; visual observers reported a very long tail, and their reports checked with the photographs as to position, etc. The Air Commodore had let Dr. Atkinson bring the original negatives back to measure, and he had hopes of getting a place from them; it would be a week earlier than any other place and only four days after perihelion passage. He showed prints of three photographs on which the head was visible before and after totality as well as during it, and one print also of a hand camera which had a longer exposure so that a considerable length of tail appeared; this one, however, was not suitable for measurement. Dr. Atkinson spoke of Mr. Binks's private observatory, where he had a 12-inch reflector that has already been described;\* Mr. Binks had been most hospitable, and had arranged for him to see as much of Nairobi as possible; in particular, he had been taken by the Warden on a special trip into the National Park, where they had been able to drive up close to a pride of sixteen lions. There was a rule against getting out of one's car on these occasions, which had been kept, but Dr. Atkinson had been able to obtain close-up photographs. Mr. Binks had spoken very warmly of the help received from members, and especially from the Assistant Secretary of the Association.

THE PRESIDENT then asked for comments.

DR. MERTON.—I would like to add that Dr. Cunningham has sent me an orbit based on northern observations, and the position computed from it for the time of the eclipse is in good agreement with that derived by Dr. Atkinson from the aeroplane photographs.

DR. ATKINSON said that he had not yet received all the necessary details regarding the camera and its adjustment but he had written to the Air Commodore concerned asking for further particulars from which he hoped to get much improved positions for the comet. The agreement so far was not bad.

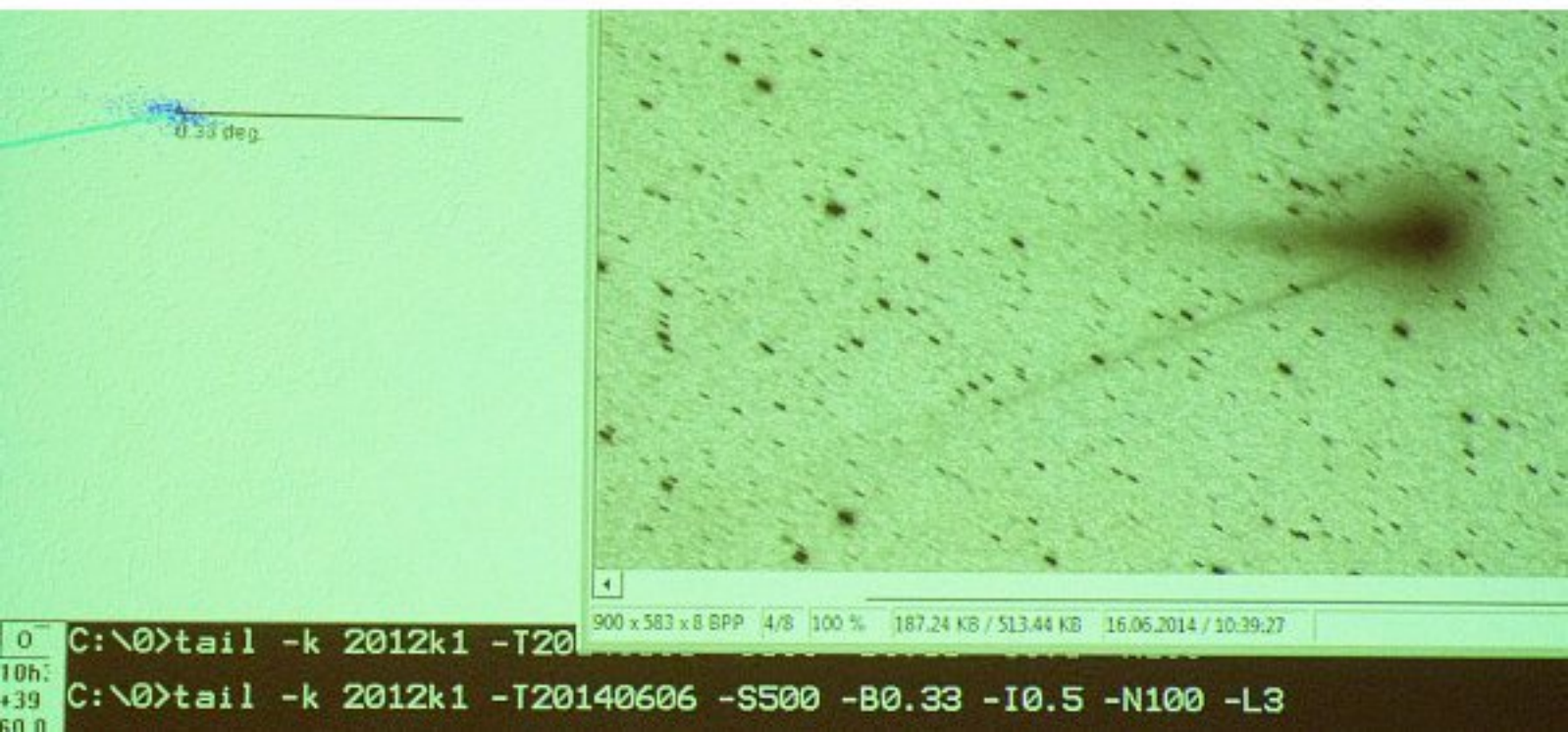
DR. STEAVENSON.—I think that, with one possible exception, this comet must be the brightest since the appearance of the "Daylight" comet of 1910. The

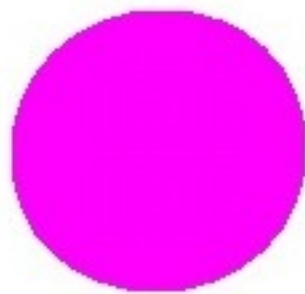
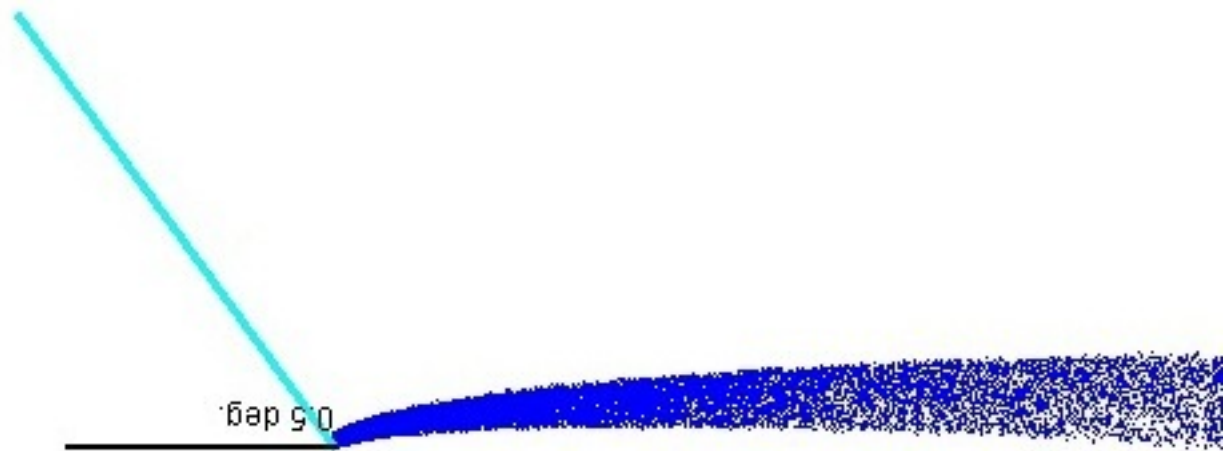




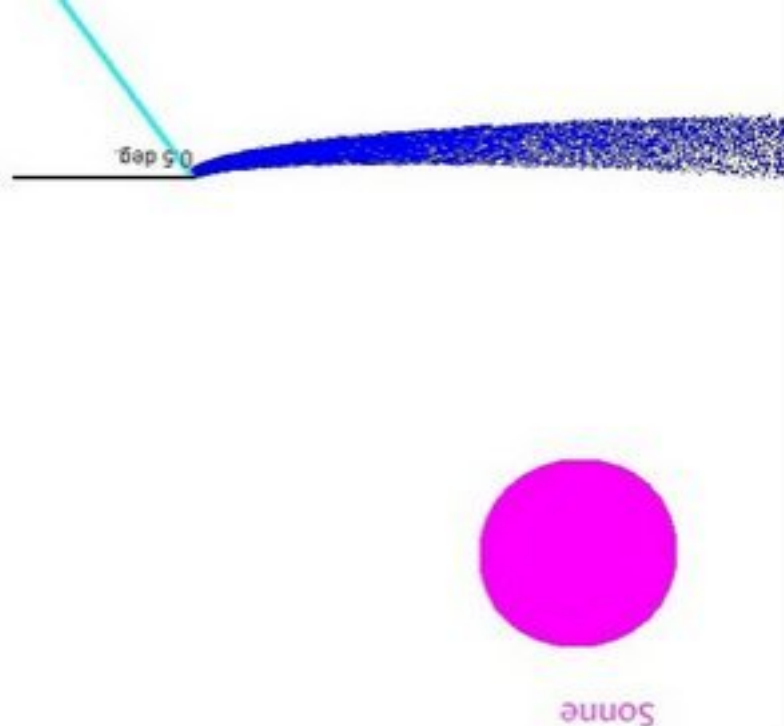




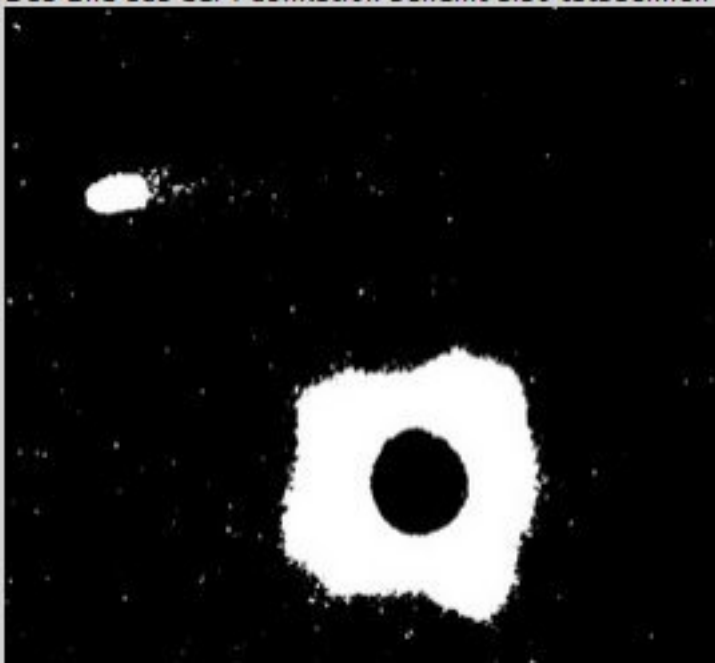




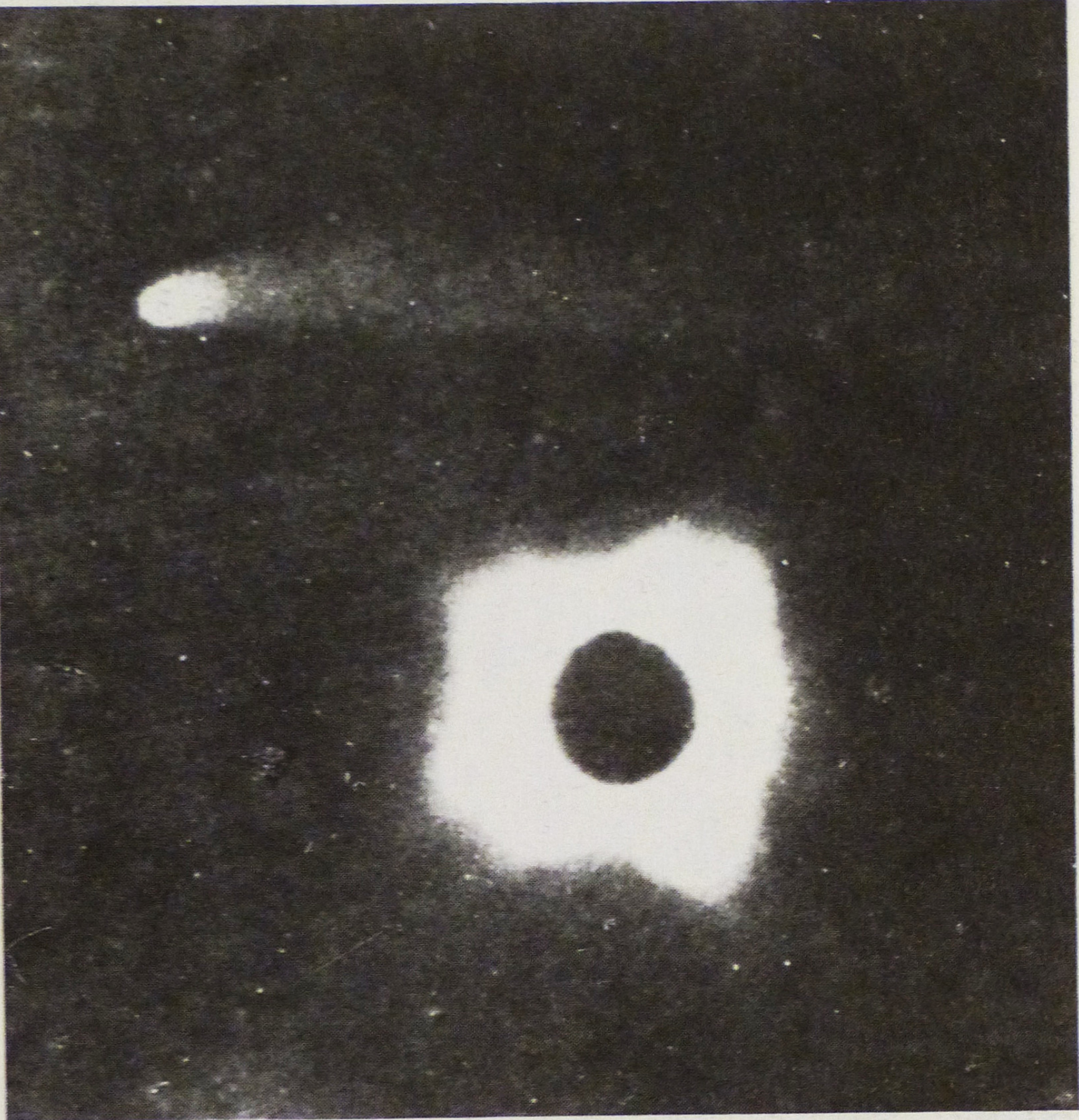
Sonne



Das Bild aus der Publikation scheint also tatsächlich "echt" zu sein:







*Fig. 4. De beroemde Eclipskomeet (1948 XI), gefotografeerd door R. d'E. Atkinson in Nairobi (Kenia) tijdens de totale zonsverduistering van 1 november 1948, was géén lid van de Kreutz-groep. Uit latere waarnemingen bleek dat hij op 27 oktober de zon op een afstand van maar liefst 20 miljoen km was gepasseerd. In de afgelopen eeuw zijn er tijdens totale zonsverduisteringen vier van zulke kometen ontdekt, maar slechts één ervan maakt aanspraak op het lidmaatschap van de Kreutz-groep: die uit 1882. (Foto: Royal Greenwich Observatory)*