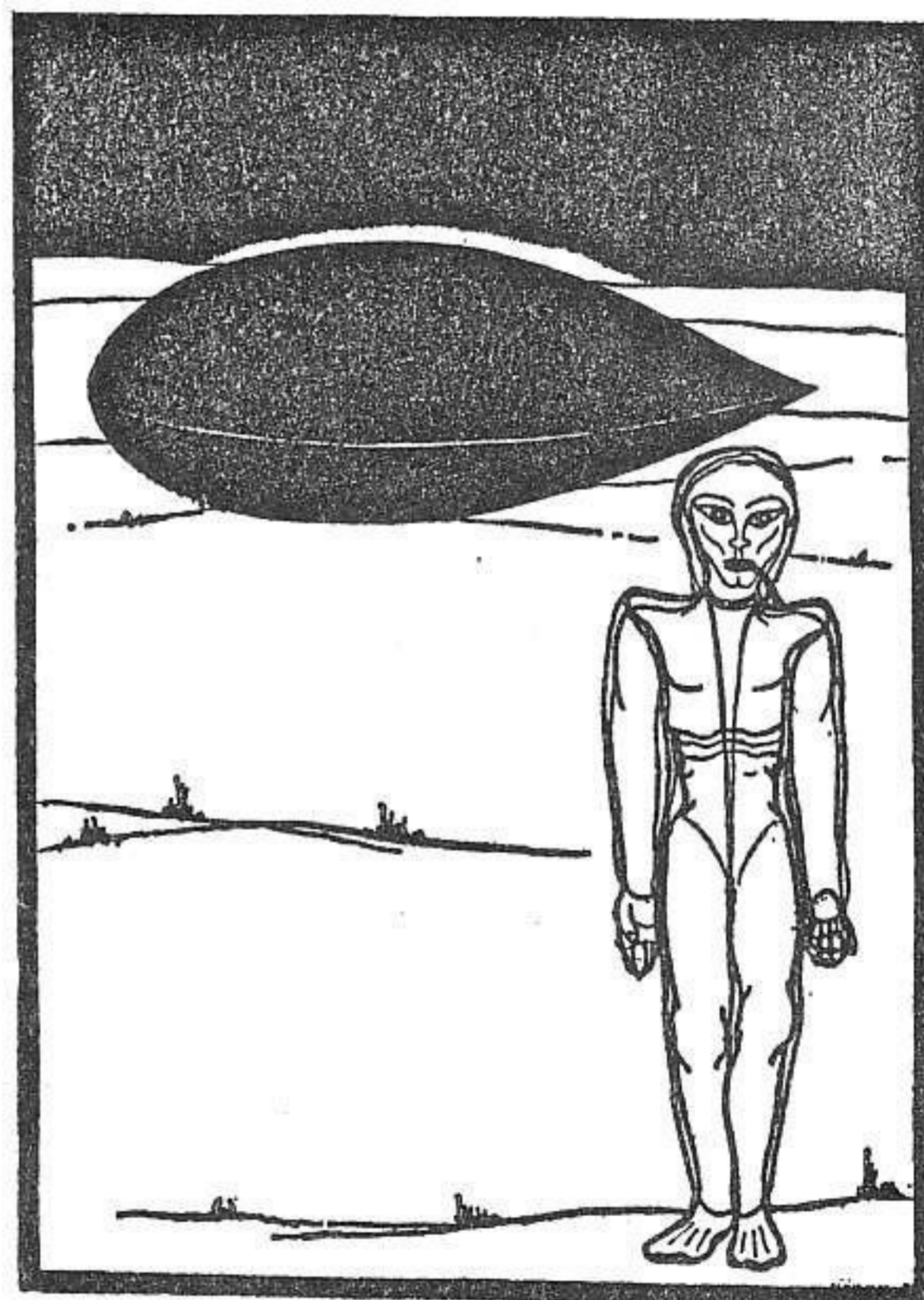
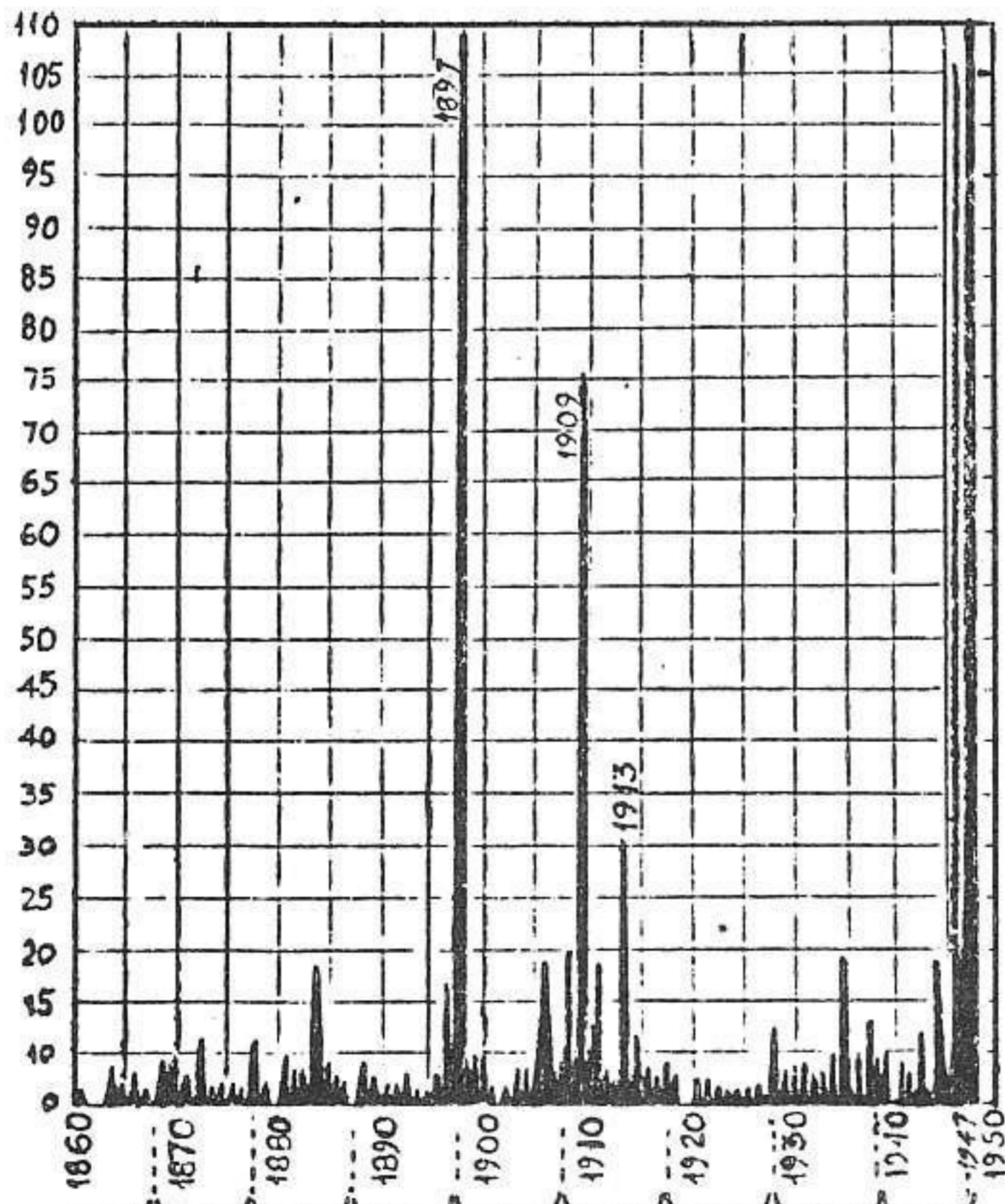


PROCEEDINGS -
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Edited By

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AN OBJECTIVE ANALYSIS OF THE UFO PHENOMENON

(A paper for presentation at the BUFORA National Conference,
November 1976)

by

T R DUTTON

SUMMARY

This paper summarises some nine years' independent research investigating the reality of the strangest of reported UFO events.

The work commenced in 1967 with a detailed analysis of objects reported within the UK during a period of intense UFO activity. This first study led to further UK-centred research.

A study of world-wide events was begun during 1973, using data for the period 1885-1954. This work is continuing; however, progress to date is described, and a number of tentative suggestions is put forward to explain the nature of the phenomenon.

A theory of seasonably variable Earth-encounters is expounded, which, with further development, might enable future UFO events to be predicted.

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1. INTRODUCTORY REMARKS

I want to begin by stating that, after a life-time of sky-watching, some 9 years of serious research, and having investigated numerous reports personally, I accept that many, perhaps the majority of so-called UFO's might be capable of being identified, by experienced observers, as man-made or natural objects. However, the work described in this paper has been concerned only with objects having a high 'strangeness' rating, in Dr Hynek's terminology. (Ref 5.1)

The paper deals with two studies, the first being concerned with sightings within the United Kingdom, the second, with global activity.

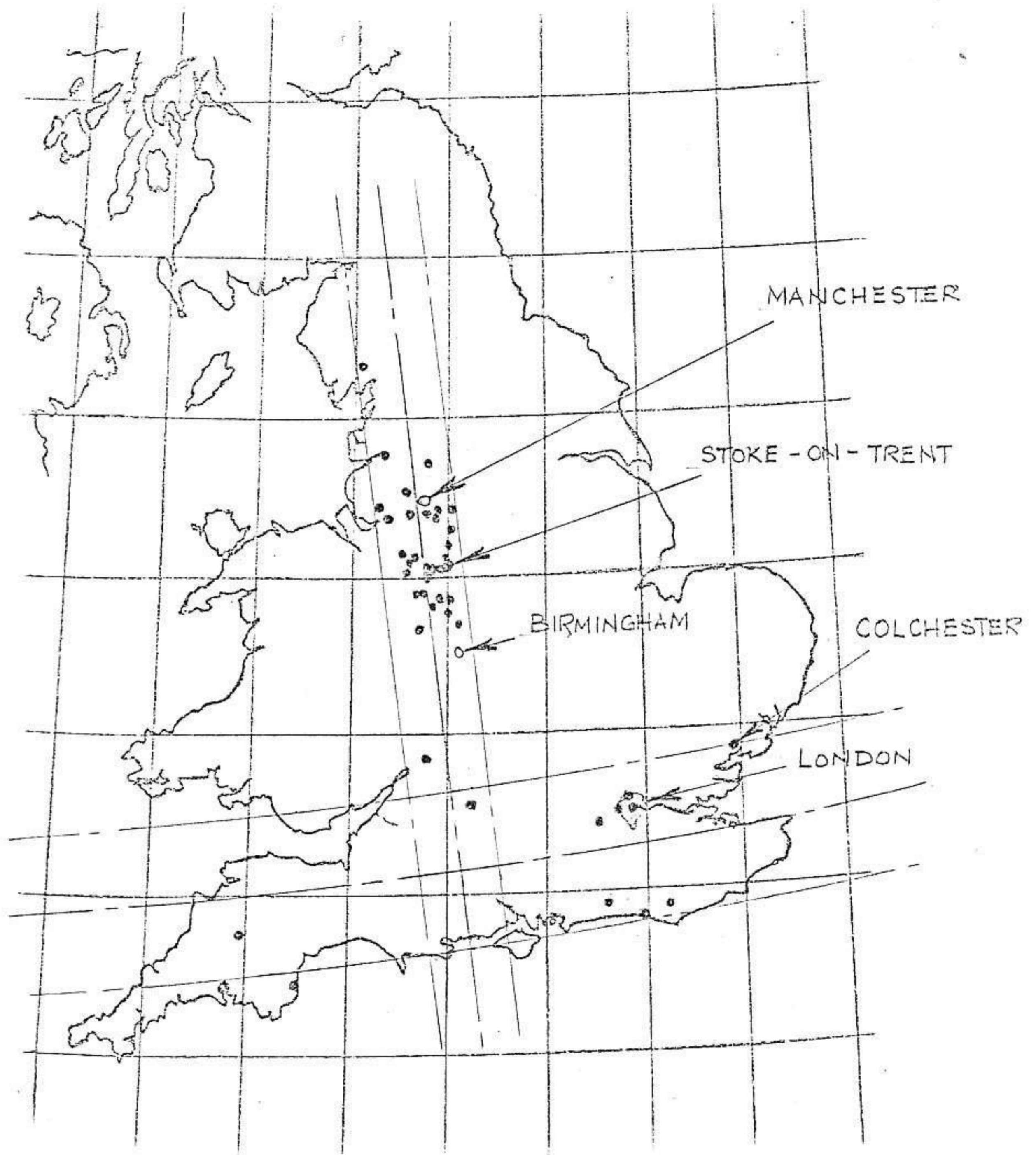
Information for the UK study was obtained largely from Press reports, personal investigations, the files of DIGAP, Manchester, and the Stanway and Pace Report (Ref 5.2).

Data for the period 1885 to 1952 used for the global study were extracted from an unfinished but detailed catalogue of selected reports by Peter Rogerson (Ref 5.3), supplemented by information from the 1972 Catalogue issued by NCCUFOR (Ref 5.4). The Peter Rogerson catalogue is currently being continued in the limited-circulation magazine MUFOB.

The study began in 1967, when it became apparent, from the frequent newspaper reports, that something odd was occurring in British airspace, or perhaps in British minds. Newspaper reports were collected and the contents analysed. The fundamental question to be answered seemed to be

"Is there any coherent evidence to suggest that the Earth is being visited by the products of an alien intelligence?"

It cannot be emphasised too strongly that since the evidence is all circumstantial and the work presented here is unfinished, any conclusions drawn must be regarded as being tentative.



U.K.

SIGNIFICANT SIGHTINGS — 1967

FIG. 1

2. THE UK STUDY

2.1 Analysis of the 1967 Sightings

The first step in the initial study was to mark sighting locations on a map of the UK, the distribution pattern evolving with the passage of time from July to December 1967. Fig 1 shows the result of this exercise.

Towards the end of 1967 it was discerned that a narrow distribution band some 35 miles wide could be drawn North to South which would enclose all known sightings of significance between the Lake District and the South Midlands, and include others in the area beyond, down to the South Coast. It was interesting to note that this band lay roughly Magnetic North/South. By observation, it was further noted that a band of minimum width, covering the scattered sightings in the South of England could be drawn at right angles to the North/South band. This East/West band was some 70 miles wide, twice the width of the N/S band.

These observations were interesting, but could not be considered significant, since a number of questions were posed:-

- (1) Could the sample of data obtained be considered to be representative of the overall pattern for the UK? The absence of reports from East of the Pennines was rather disconcerting in this respect.
- (2) Could the bands be regarded as flight corridors? A survey of the reported flight directions indicated negatively.
- (3) Could the bands be associated with major air routes? A glance at a chart of these suggested otherwise, the Manchester area being the only one likely to be affected in this way.

2.1 Analysis of the 1967 Sightings

- (4) Was there any evidence that people had been influenced by Press stories and had invented the incidents, or misinterpreted natural occurrences? The possibility can never be completely ruled out, due to the suggestibility of the human mind, so, to investigate this aspect, details of the objects described were studied. The results of this study are given below.

2.1.1 Objects Reported

(a) Geometry During 1967 most of the 'high strangeness' events reported involved solid-looking objects of non-aerodynamic appearance. Shapes described were cylinders, spheres, discs surmounted by domes, and a small number of other variations. Consequently, it was concluded that such objects could not be regarded as natural phenomena by any stretch of the imagination, and further could be divided into three classes:-

- (1) Bodies of revolution about a vertical axis, often reported to be rotating about the vertical axis.
- (2) Modified disc shapes having non-circular planforms.
- (3) Bluff cylinders having low length-to-diameter ratios, reported flying with the longitudinal axis horizontal, without the aid of aerodynamic surfaces.

(b) Other Physical Attributes The objects were generally witnessed during the hours of darkness, but, more rarely, were seen in daylight. Daylight sightings reported solid objects sharply outlined against the sky, having a grey or silvery metallic appearance. On one such occasion a small, rotating sphere was seen to display 2 red lights; on another, an oval disc with a transparent dome was said to have carried a white light on the upper surface just aft of the leading-edge, and much incomprehensible detail was described.

Night-time sightings often involved highly illuminated objects carrying a number of powerful lights, and, in some cases, the entire object was said to be luminous. The overall luminescence sometimes exhibited sudden changes of colour, and further, seemed capable of being switched on and off.

Very few reports involved sound effects, despite the fact that objects seen at close quarters were often said to be large, (estimates of diameters were in the range 30 to 100 feet). However, on a number of occasions involving disc/dome objects, a low hum was reported. Only one object was said to have had luminous jets issuing from it, and on that occasion a high-pitched whine was reported.

Perhaps the most significant sound effect reported was incidentally described in Ref 5.2, associated with a glowing disc/dome object which flew low over house-tops before landing in a nearby field. A sound like a wind was mentioned.

At the time, this seemed to me to be exactly the kind of sound that one might expect to be associated with an extremely energetic, turbulent wake, such as might have been trailing behind the shape described. This idea is given further credibility by letters appearing in recent editions of 'Aerospace', the journal of the Royal Aeronautical Society (Refs 5.5 and 5.6). Two readers have commented on the audibility of the vortices trailing from the wing-tips of large aircraft during landing manoeuvres. The letter in Ref 5.5 describes the sound as "eerie . . . as if the air above my head were rushing down some invisible aerial plug-hole", whilst that in Ref 5.6, referring to recordings and measurements taken in America, notes that the noise level peaked at 30-40 Hz and was characterised by a general 'rushing' sound.

Although the process of energy dissipation in a turbulent wake is somewhat different to that in a tip vortex, for the UFO case in question the energy level could have been of the

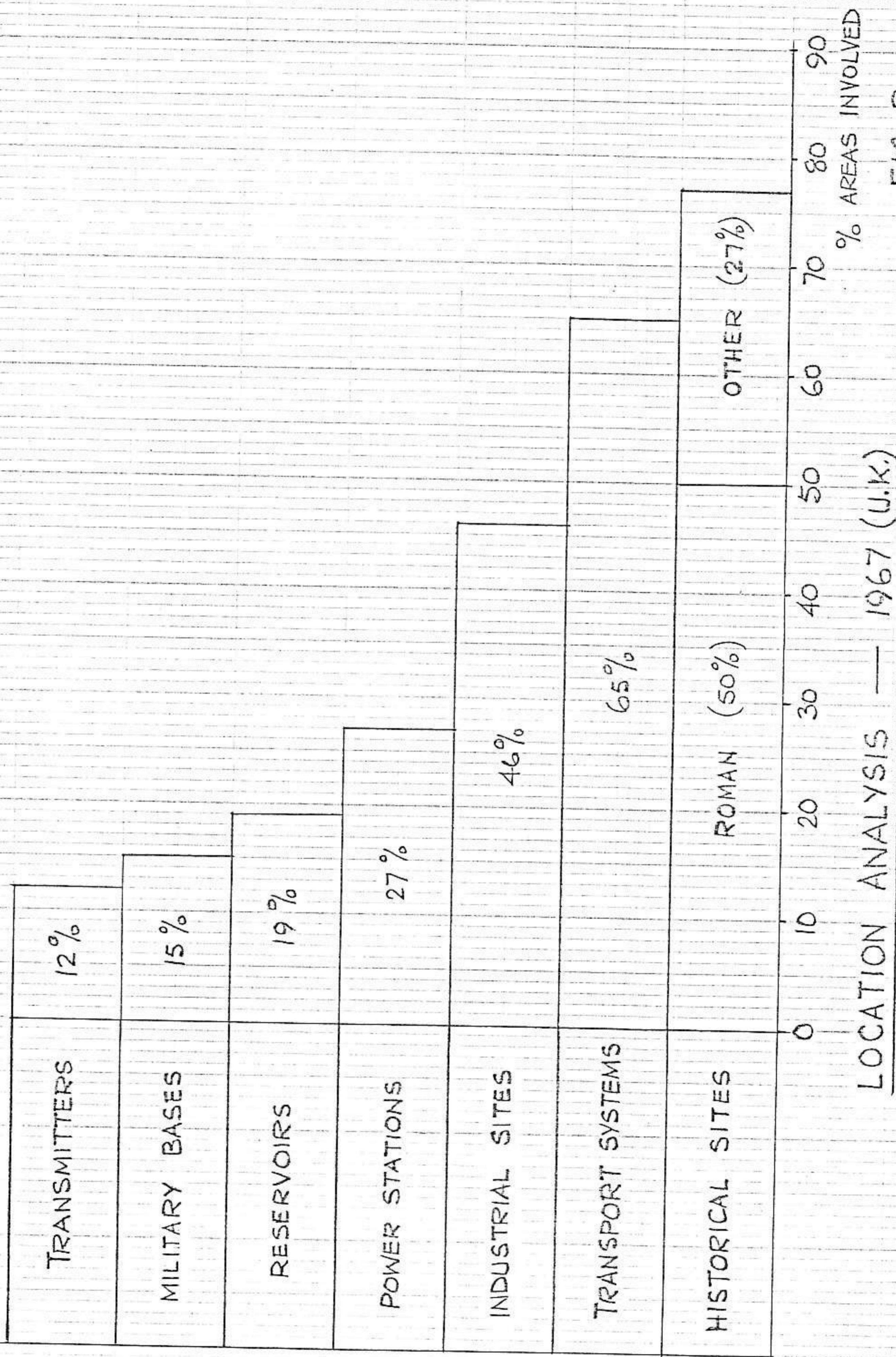


FIG. 2

FIG. 2

same order as that in the vortex generated by a C5A freighter aircraft; however one would expect the characteristic frequency of the sound to have been different and perhaps to have been characterised by blustering.

These observations seem to support the view that the object reported in Staffordshire in 1967, which was geometrically similar to others reported during the same period, was indeed solid. I suggest that the witness could not have anticipated an aerodynamic sound effect for which there had been no precedent at that time.

2.1.2 1967 Location Analysis

Having concluded that at least some of the 1967 objects were real in a material sense, my attention turned to close examination of the sighting locations. On the grounds that the objects seemed to originate from the atmosphere, if not from space, and might be monitoring human development, typical signs of Man's presence such as might be easily observed from high altitude were listed as follows:-

- Transmitting stations
- Military bases
- Reservoirs
- Power Stations
- Industrial Complexes
- Transport systems (M-Ways,
Railways, Airports, Canals)
- Historical sites

Sighting areas were then scrutinised for the presence of these. The conclusions were drawn in the form of a bar chart (Fig 2).

The predominance of historical sites was unexpected. Of course, the chart is not statistically sound since the relative abundance of the seven types of location was not determined. Nevertheless, the finding gives some credibility to the idea that UFO activity may have begun in historical times.

←---○ OBJECTS SEEN OVER SEA



U.K.

SIGNIFICANT SIGHTINGS — 1971

FIG. 3

(Incidentally, it is relevant to mention that the bisectors of the N/S and E/W distribution bands were observed to intersect in the vicinity of Stonehenge, but this could not be considered to be more than a curious coincidence, since no sighting was recorded from that area, and the bands were drawn somewhat arbitrarily).

2.2 UK Activity During The Period 1968-1973

Time limitations allow only a brief survey of the situation in the UK since 1967.

During 1968 only 4 UK sightings were recorded, and no artificial object was definitely involved. 1969 was also a poor year for sightings, 4 being recorded, but 2 of these involved artificial objects of unknown origin.

Then followed a year of complete inactivity, broken early in 1971 by the appearance of a spectacular fireball, witnessed from the centre of Manchester. This was followed by a green fireball event in February, and then, to my knowledge, nothing of significance occurred until late summer. In the period August to end of November 1971 some 30 strange sightings were recorded. Many involved peculiar lights, but there were 12 artificial objects reported.

The geographical distribution of the 1971 sightings was as shown in Fig 3. Although the pattern resembles that of 1967, the orientation South to North is inclined towards the North West and there appears to be some evidence of a line of activity East to West across Manchester, extending to Anglesey.

During the first three months of 1972 several 'Fireball' events occurred, these being reported in various colours. The late summer again produced a spate of sightings which mainly involved balls of brilliant light behaving as though under control. However, one sighting in August reported a grounded object near Thirsk in Yorkshire. This story was

rivalled for impressiveness by the much publicised Cairo Mill event, near Oldham, Lancashire, in October.

Autumn 1972 was also remarkable for a spate of sighting reports emanating from Salford, which I investigated personally. Almost without exception, these involved strange lights, usually balls of light, which apparently flew in a controlled manner at roof-top level, to the considerable consternation of certain residents of Lower Broughton. The events began in August, and, after a lull throughout September, activity peaked during November. The last sightings occurred on the 13th December.

1973 was a year of strange lights and 'fireball' events. However, there was a spectacular report of a grounded device near Winsford, Cheshire, on 28th January. My records contain some 38 reports for 1973.

Significant UK Activity since 1973 seems to have been minimal, but interesting cases have been reported. Perhaps the most outstanding report has been that involving the rectangular object witnessed at low altitude by a Trinity House employee on the Isle of Wight during January this year. Such reports seem to imply a continuing presence, even in periods of apparent quiescence.

2.3 Evidence For Cyclic Fireball Events

It was noted that, with the exception of 1967, fireball and sometimes other occurrences were reported on and around certain dates in each year. Although sightings were not reported at regular intervals in any one year, by superimposing sightings for several years, a 36/37 day cycle became evident. This cycle divides the year into 10 equal divisions, commencing on or around January 10th. Of course, an astronomer would immediately suspect that some natural mechanism, such as that producing the annual meteor showers, might be responsible, but in fact would find great difficulty in explaining the events in this way. For example, if the cycle exists, only 2 of the 10 dates can be associated with the well-established meteor showers. The suggested occurrence dates are:-

10th January
14th February
22nd March
3rd June
9th July
15th August
21st September
28th October
3rd December

whereas the regular meteor showers occur during the periods:-

3-4th January	Quadrantids
19-22nd April	Lyrids
1-13th May	Aquarids
27th July-17th August	Perseids
15-25th October	Orionide
26th Oct.-16th November	Taurids
15-17th November	Leonids
9-13th December	Geminids

Events on 15th August and 28th October might just be attributable to the Perseids and the Taurids, respectively, but in general, the UFO dates seem to slot neatly between the meteor shower periods.

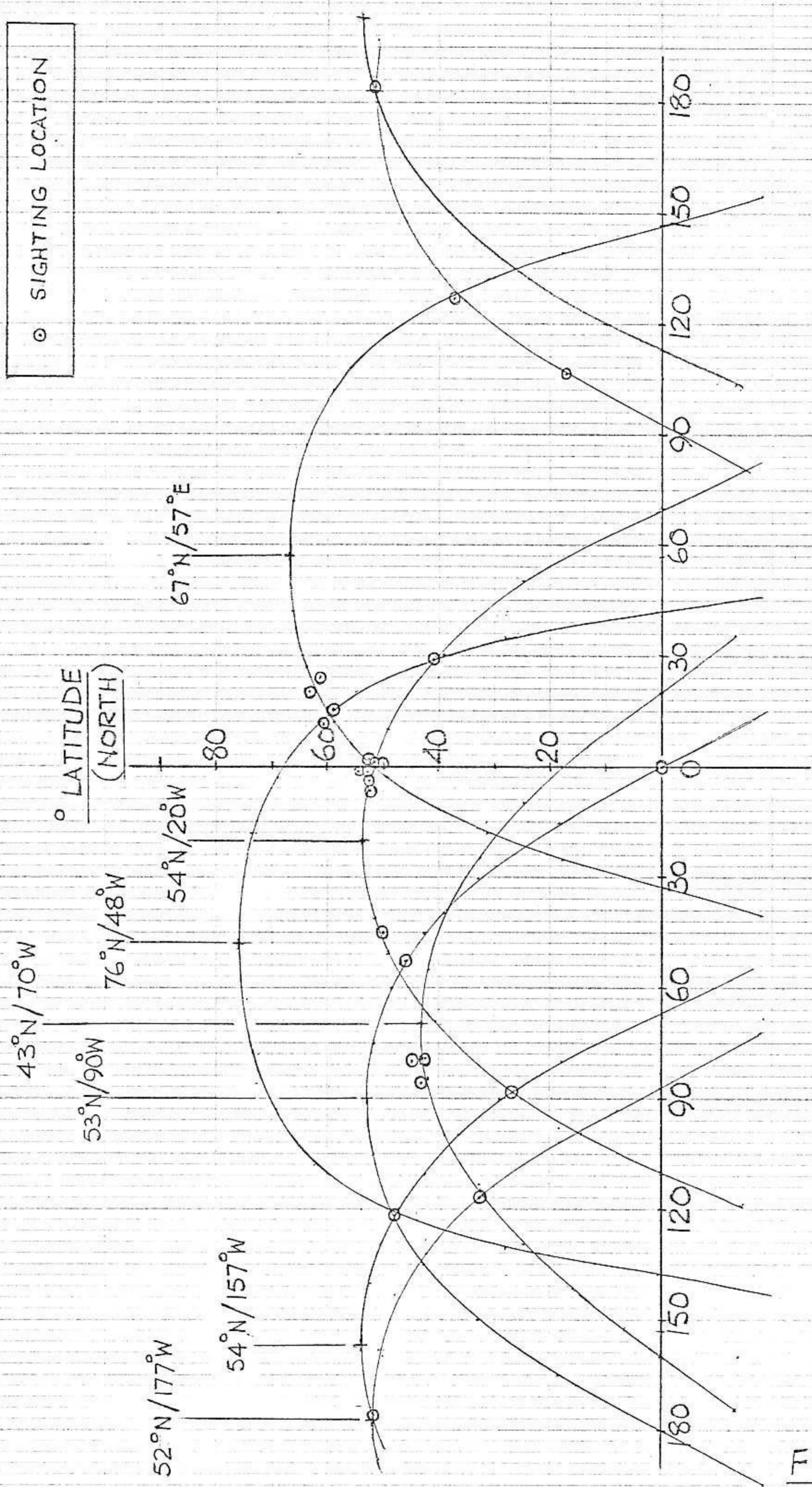
3. THE GLOBAL STUDY

3.1 The Evidence

The study of world-wide activity began with the first issue of Peter Rogerson's international catalogue in 1973. Details of events were summarised in a list giving the date, time, place, the type of sighting and the latitude/longitude co-ordinates. This last item of information involved much search activity using the most comprehensive atlas available to me. Sometimes the place names could not be located, presumably because the events had occurred in remote areas. Often, the time of the occurrence was not given, and even when time was stated, the standard used (eg GMT, local time) was omitted. If such information had been included in the original reports, doubtless it would have been included in such an otherwise excellent catalogue.

Events during the period 1885 to early 1954 form the basis of my

⊙ SIGHTING LOCATION



GREAT CIRCLES — WATER EVENTS (1885 - 1954)

FIG. 4

FIG. 4

work on global activity, to date. The exercise began with a straight-forward plotting of the located sightings on a world atlas. This task proved to be fruitless. Sightings were concentrated in the Northern Hemisphere and were in distinct blocks.

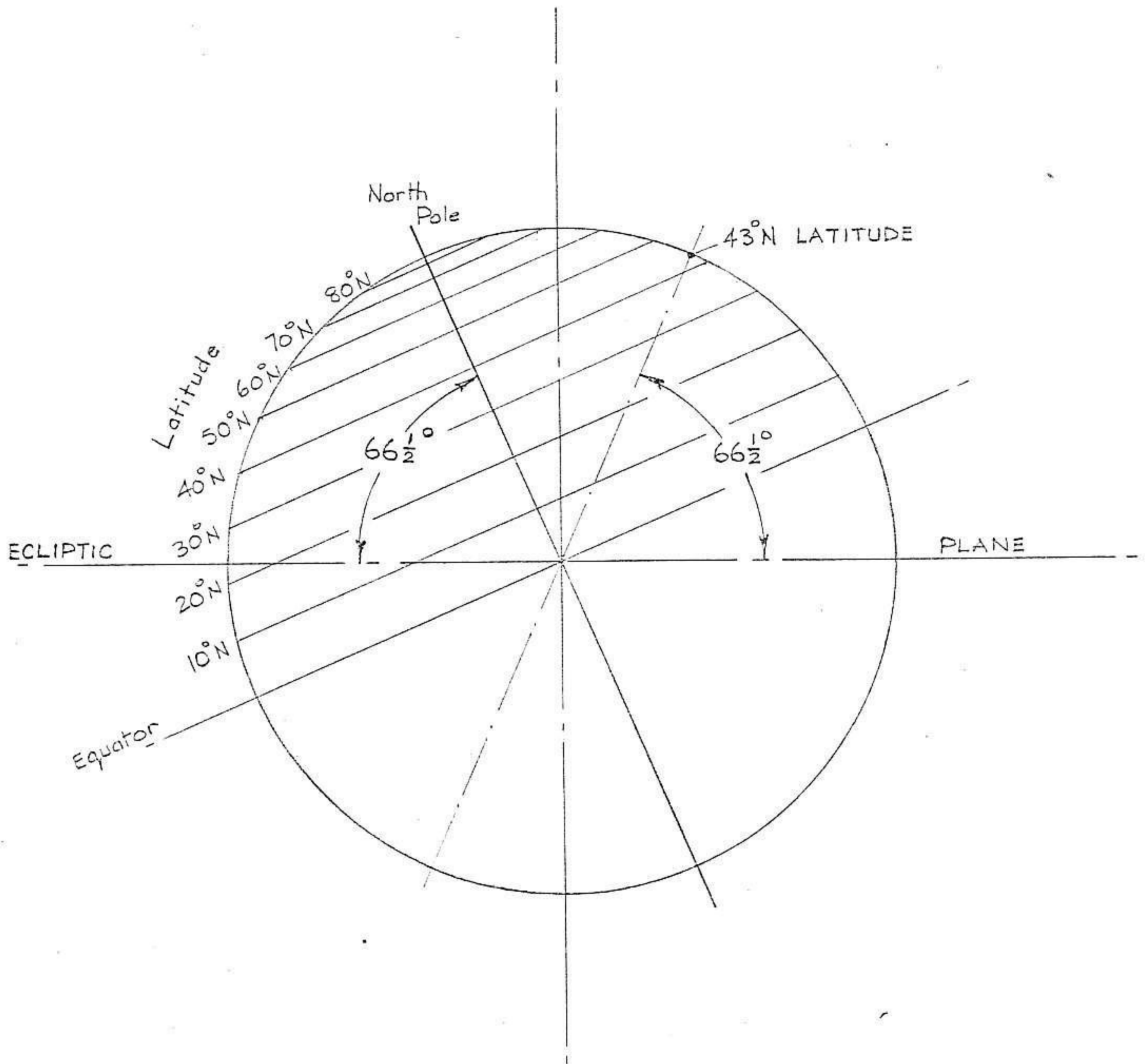
It was next noted that a number of the objects sighted over extensive areas of water had been witnessed not only entering the water, but also exiting from it. Since such behaviour is extremely unnatural, it seemed a logical step to extract water entry and exit events for special treatment. First results were disappointing. Although 23 events could be located they were concentrated in only 12 areas, all in the Northern Hemisphere. Then the idea occurred to me that if these objects had originated from space in a planned way, there might be a series of orbits or Great Circles involved. To investigate this, the area locations were marked clearly on the surface of a small globe atlas, and with a piece of cotton, Great Circles passing through 3 or more well-spaced points were sought.

Seven circles were defined in this way, with maximum latitudes located approximately at the following points, these being confirmed later by a Cartesian presentation as shown by Fig 4.

<u>Max Latitude^o (N)</u>	<u>^oLongitude</u>
43/44	70W
52	177W
53	90W
54	20W
54	157W
67	57E
76	48W

The circles were computed assuming a spherical Earth.

One of the interesting observations made about these circles was that some of the sightings close to 43^o on the 43^oN/70^oW circle had occurred near the Autumnal Equinox at sunset. This became



BASIC GEOMETRY AT AUTUMNAL EQUINOX

VIEW FROM SUN

FIG. 5

of special interest because it was realised that, at the Autumnal Equinox 43° N latitude at sunset reflects the position of the North Pole on the terminator, about an axis drawn at right angles to the Ecliptic, the plane of the Earth's orbit round the Sun. (Fig 5)

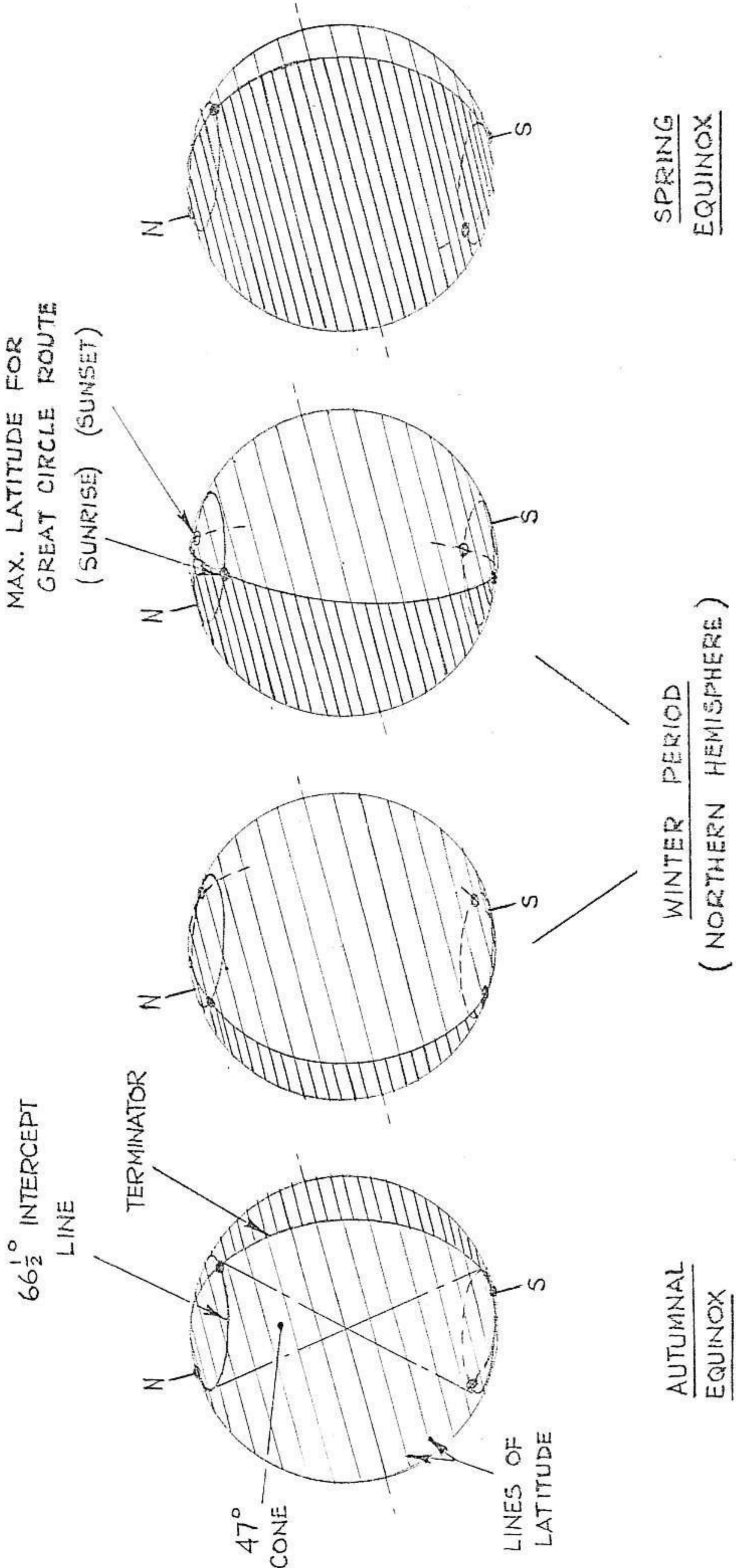
Since all the other values of maximum latitude lay between 43° and 90° , the possibility was presented that the other Circles related to specific periods of the year.

An examination of the occurrence dates for the 'water' sightings was inconclusive, since some points were common to more than one circle, and others occurring at different dates, clustered in such a way that it was impossible to determine whether they all belonged on the same circle or not. The exercise was then extended to include all the located and dated sightings between 1885 and 1954. (This excluded those which could not be located or for which no accurate date was given). Again, the outcome was inconclusive. There was little to suggest that the 8 circles defined were preferred distribution lines, or that they occurred at predictable times of the year. With this, the work came to a temporary halt.

Inspiration came several months later, with the realization that the previous work had not necessarily disproved the idea that the Great Circles were seasonably variable. Instead of there being just a limited number of Great Circles with maximum latitudes between 43° and 90° , there might be an infinite number. In other words, each point on the Earth's surface could lie on any Great Circle with maximum latitude greater than, or equal to its own. To prove conclusively the existence of a seasonal variation would require much more observational detail than was available.

3.2 $66\frac{1}{2}^{\circ}$ Theory

There was one other approach possible, viz to construct a model to fit the known situation.



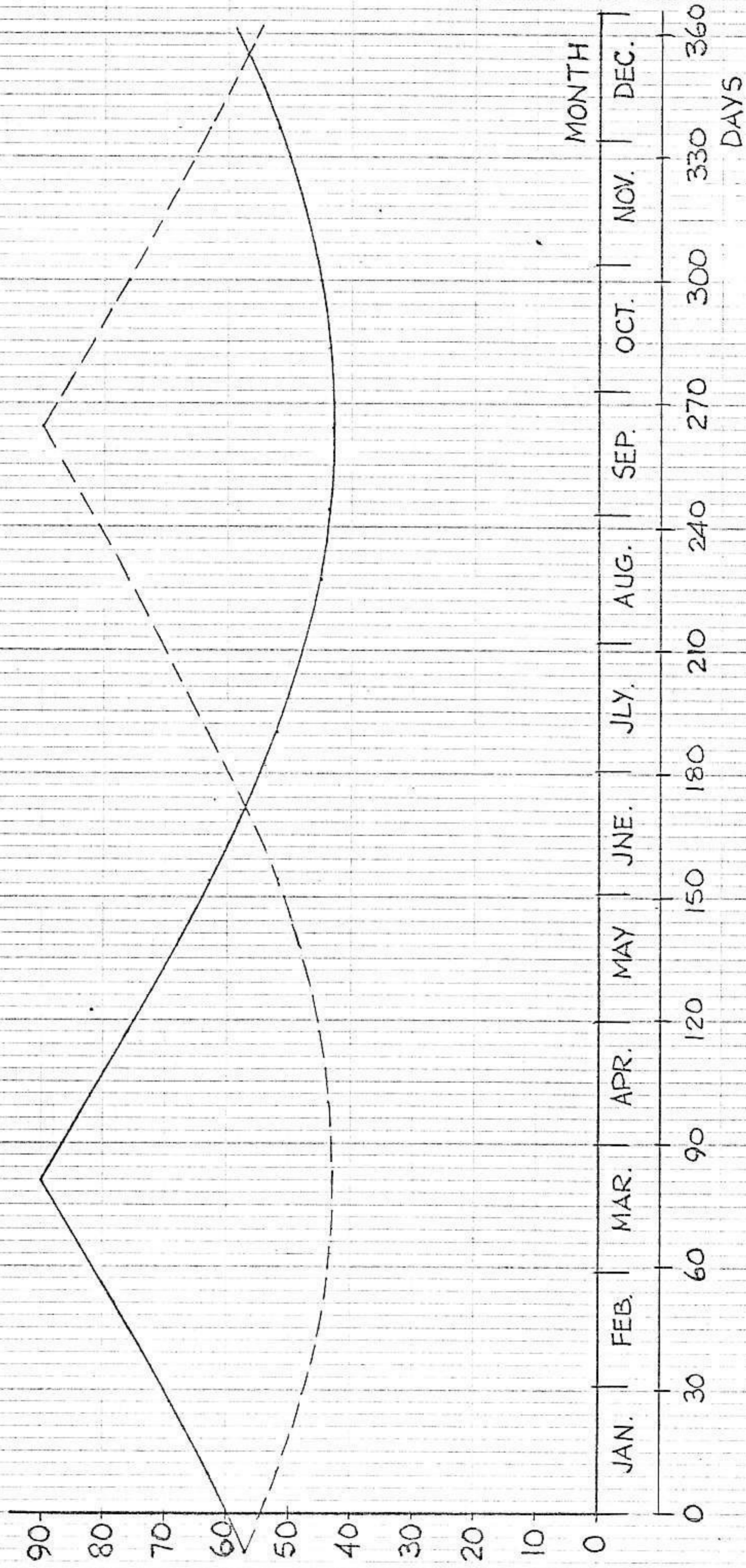
MODEL FOR 66 1/2° THEORY

FIG. 6

FIG. 6

{ SUNSET LATITUDES (NORTH)
 { SUNRISE LATITUDES (SOUTH)
 { SUNRISE LATITUDES (NORTH)
 { SUNSET LATITUDES (SOUTH)

°N & °S
LATITUDE



MAXIMUM LATITUDES — 66½° THEORY

FIG. 7

FIG. 7

All the maximum latitude angles noted had been in excess of 43° . Some observations at approximately 43° N latitude had occurred on the sunset terminator at the Autumnal Equinox. Could the seasonal variation in the location of the terminator, relative to the Earth's spin axis, be the key? Further, perhaps it was significant that both 43° latitude and the Earth's spin axis created angles of $66\frac{1}{2}^{\circ}$ to the ecliptic, in the plane of the terminator. These ideas are illustrated by Fig 6.

The Earth's North Pole is orientated towards a fixed point in space - this is located approximately by the Pole Star, Polaris. As the Earth moves in its orbit round the Sun, its fixed angle of tilt to the ecliptic causes the position of the terminator, relative to the poles, to vary. Therefore, an angle of $66\frac{1}{2}^{\circ}$ to the ecliptic, in the plane of the terminator, intercepts the Earth's surface at points corresponding to angles of latitude between 43° and 90° during the period between the Equinoxes, the actual angle of latitude being determined by the position of the Earth in its orbit.

This was exactly the sort of model being sought. Of course, it was realised that it was just one of many possible models that might explain the situation; nevertheless, the not inconsiderable task was begun of determining the seasonal variation in the latitude co-ordinate on the terminator corresponding to the $66\frac{1}{2}^{\circ}$ intercept with the Earth's surface. The resulting $66\frac{1}{2}^{\circ}$ intercept curves are shown by Fig 7.

At any given time of year in the Northern Hemisphere there were two possible values of intercept latitude, one corresponding to sunset, the other to sunrise, Further, the sunset latitude in the Northern Hemisphere was the same as that at sunrise in the Southern Hemisphere, and vice versa. Using these curves, the significance of the 7 Great Circles was investigated, and the following correlations noted:-

<u>Great Circle Max Latitude</u>	<u>Predicted Occurrence Dates</u>
76°N	14th February *
	27th April *
	15th August *
	29th October *
67°N	22nd January
	22nd May
	22nd July
	22nd November
52-54°N	2-10th* January *
	3-10th* June *
	1-9th * July *
	3-12th December *
44°N	1st March
	10th April
	1st September
	10th October
43°N and 90°N	21st March *
	21st September *

The difference between 43° and 44° maximum latitude is obviously critical, but in view of the approximate manner in which the original circles were obtained, it was clearly not possible to differentiate to 1° latitude accuracy.

However, if the dates corresponding to 43° latitude are taken into account, it will be observed that all the fireball dates predicted from the UK study are accounted for and marked* in the above list.

This was totally unexpected and fortuitous, consolidating the results of two largely intuitive, but distinctly separate, exercises.

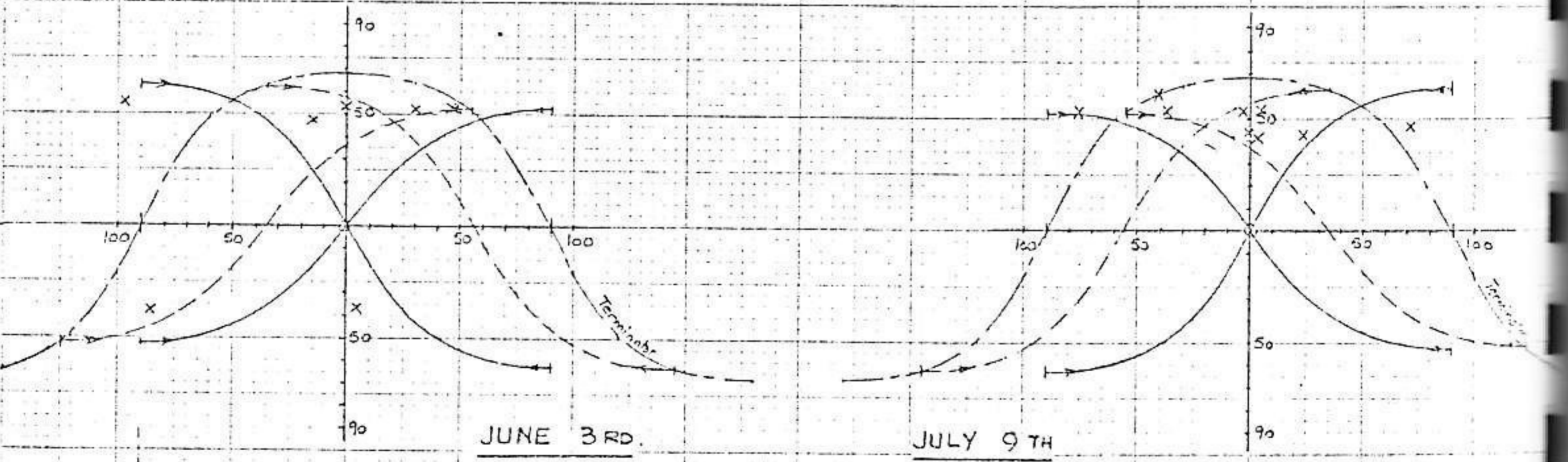
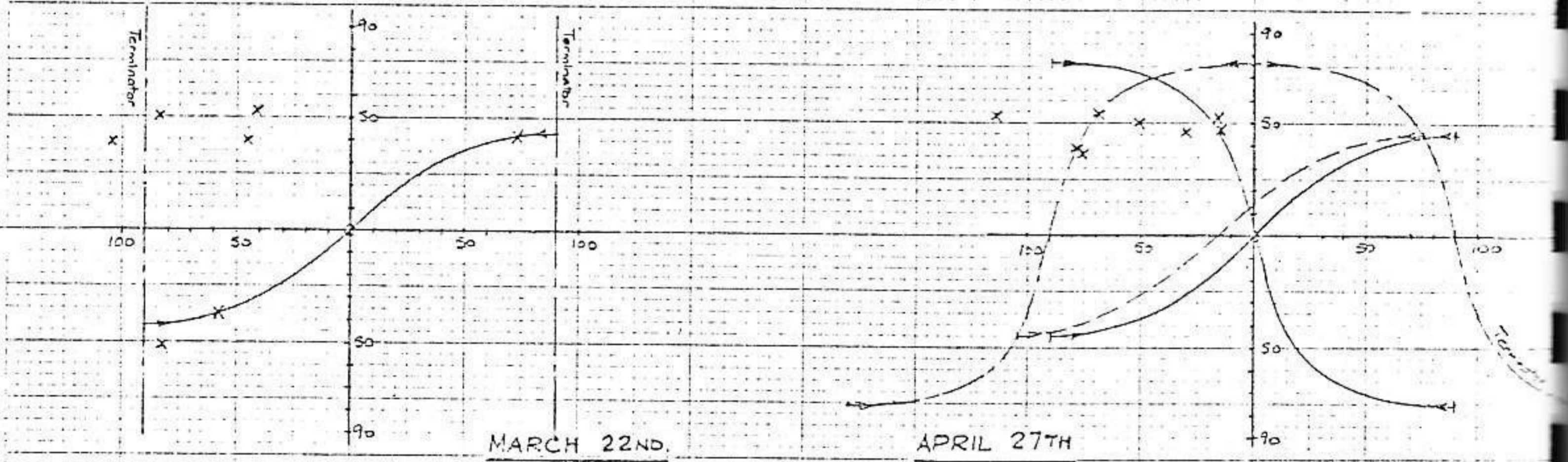
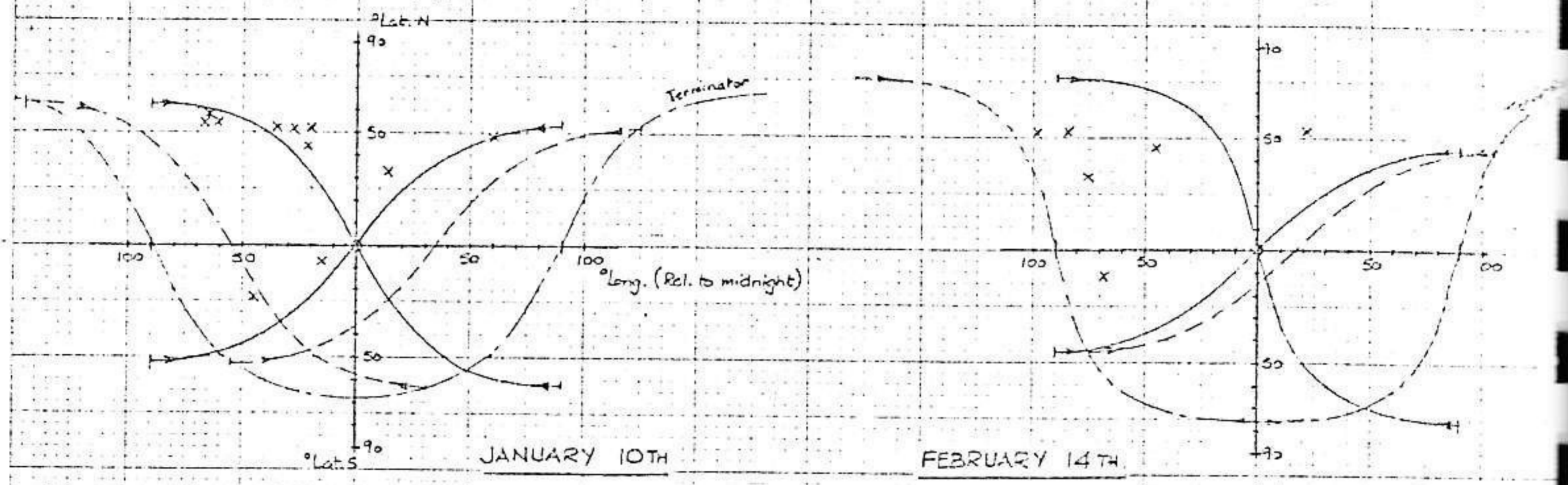
It is pertinent to note that the key events in the formulation of the $66\frac{1}{2}^{\circ}$ theory involved not fireballs, but artificial devices. Thus another tenuous link was forged between fireball events and objects of artificial appearance.

3.3 Possible Implications of $66\frac{1}{2}^{\circ}$ Theory

It has been suggested, in the previous section, that the intersection of the 47° cone (created by $66\frac{1}{2}^{\circ}$ theory) and the terminator determines the maximum latitude for the Great Circle adopted at any given time of year. Since the ecliptic seems to be the reference plane throughout, it could be guessed that objects approach the Earth in the plane of the ecliptic, and establish sub-orbital entry paths with maximum latitudes close to the terminator. Since most UFO sightings occur during the hours of darkness, it could be further deduced that the objects approach the terminator from the direction of the Sun, and after establishing sub-orbital entry, proceed to a landing area on the dark side of the Earth.

Such an admirably simple tactic would have much to commend it to anyone wishing to conduct regular clandestine excursions to Earth from outer space. An approach from the Sun is in the best fighter-pilot tradition, and the rapid transit at hypersonic speeds to a predetermined landing site would be witnessed only as a transient fireball event.

To investigate this guess another exercise was begun. It was argued that, if sub-orbital entry is always initiated close to the terminator, and a particular Great Circle is followed across the dark face of the Earth, it should be possible to determine the local times of sighting occurrences at all latitudes below the maximum. The shape of the terminator, and the Great Circles corresponding to each of the ten dates previously mentioned were determined and plotted, as in Figs 8a and 8b. Timed sightings within ± 18 days of the dates were superimposed onto these curves, the date scatter band having to be accepted to increase the quantity of data on each chart.



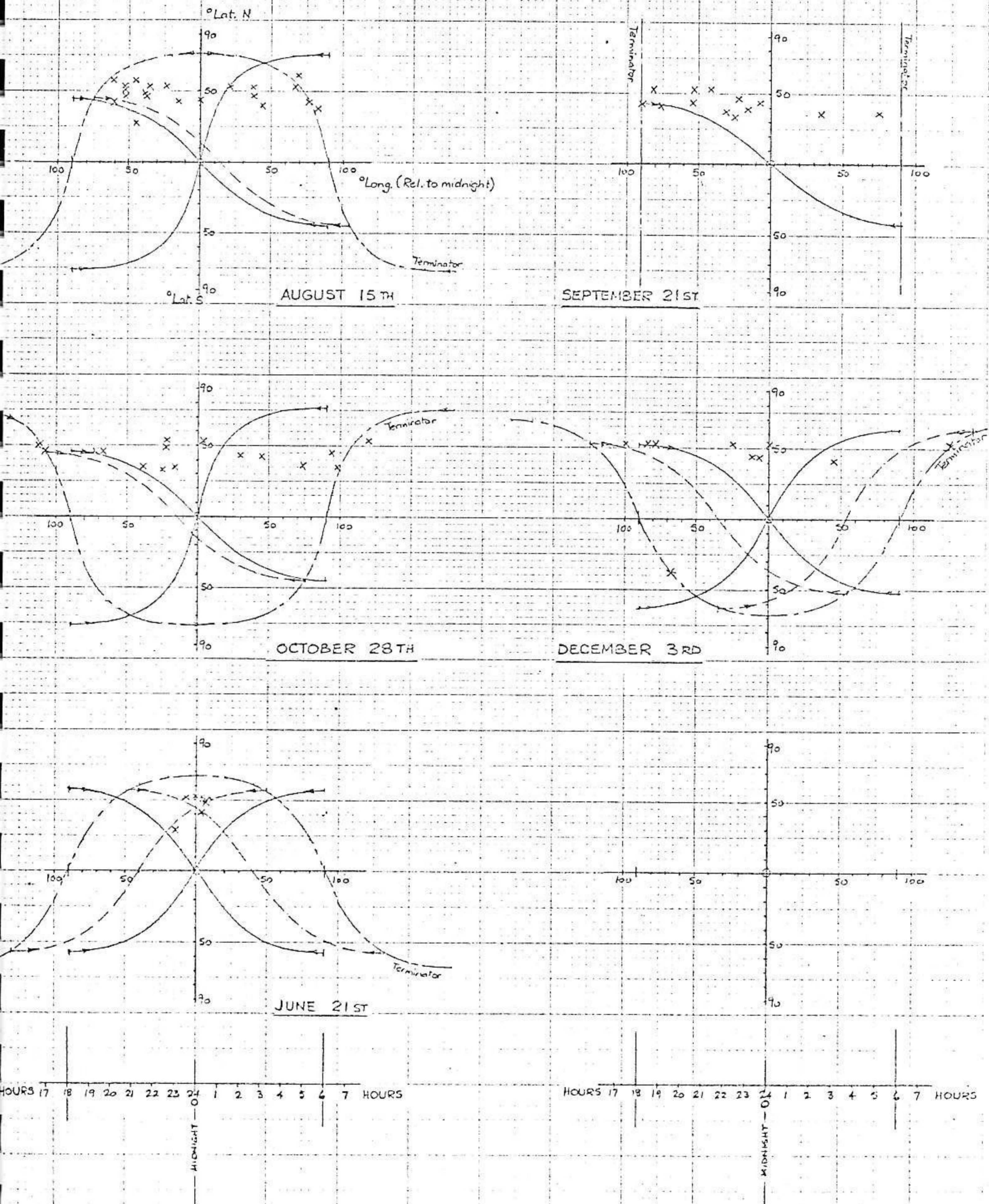
HOURS 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 HOURS

HOURS 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 HOURS

SEASONAL PREDICTIONS & RECORDED EVENTS

FIG. 8(a)

} ALTERNATIVE ENTRY PATH PREDICTIONS
 X DENOTES RECORDED EVENT WITHIN ± 18 DAYS
 --- TERMINATOR



SEASONAL PREDICTIONS & RECORDED EVENTS FIG. 8(b)

At the Equinoxes, one of the options would be a polar route. This means that time prediction could be particularly difficult during these periods. A study of the patterns of actual occurrences suggests that Great Circle routes are being followed, at least at some times of the year, but that they are displaced from those predicted by approximately 1 hour ie 15° longitude.

Displacement of actual circles from those predicted may be due to:-

- (1) Incorrect assumptions on the seasonal variation of maximum latitude.
- (2) Incorrect assumptions on the sub-orbital injection points relative to the terminator.
- (3) Errors in the times plotted. Due to non-statement of the time standard, local time was assumed throughout.
- (4) Objects may not have been witnessed during the arrival or departure sequence.

In the August-October period the random scatter of points across the hours of darkness is indicative of 'wave' activity. Given sub-orbital injection rules similar to those proposed, it is possible that during periods of intense activity, the objects hide in remote places and carry out close reconnaissance missions at all times of the day and night.

There is evidence to support this view. A recent report (Ref 5.7) is of special interest in this respect:-

In thick fog off the West Coast of Ireland, an object was detected on ship's radar, initially, close to the sea and approaching at low speed (6 Knots, estimated). Within 30 seconds the object had apparently accelerated to an estimated 7,000 Knots before radar contact was lost. Other details given were:-

Ship's position	52°30' N 20°W
Date	23rd June, 1975
Time	12.37 (hours?)
Object's track bearing	105° true (constant)

Examination of the appropriate chart (Fig. 8b) indicates that this object was following one of the predicted paths, but at the wrong time of day. However, it should be noted that the object was first detected travelling slowly near the surface of the sea before accelerating away. This suggests an arrival in the sea at some earlier time, perhaps during the night, followed by continuation along the predetermined flight path during daylight.

Given that the objects have this degree of operational flexibility, the task of time prediction becomes well nigh impossible, unless only the times of arrival to, or departure from Earth are considered. For this reason, the exercise illustrated by Figs. 8a and 8b may be meaningful only when sighting data for quiet, non-wave periods are used.

4. CONCLUSION

Even when the inadequacies of the available data are fully recognised, there is much circumstantial evidence, from eye-witnesses' reports gathered throughout the world, to suggest that artificial devices of unknown origin are visiting the Earth on a continuing basis.

This being the case, it must next be concluded that the nature of the objects described is unknown in the terms of present-day science and technology. Any theories propounded to explain the nature, propulsion, purpose and place of origin of these objects must therefore be regarded as being purely speculative. (It is my view that the widespread publication of such theories over the past 30 years has only served to discourage serious scientific research into the phenomena, and therefore, it is not

my wish that the speculative content of this paper should be quoted out of context.) Nevertheless, analysis of the global data has predictable tactic to facilitate visitations to this planet, but due to the apparent variability of this tactic with the time of year, and possibly the use of staging points in remote places and underwater, the accurate prediction of time and place of occurrence is difficult. However, it is suggested that further exhaustive statistical analysis might improve our knowledge of the situation.

There is evidence to link periodic fireball events with other UFO activity, and it has been implied that such events could signal the arrival (or departure) of an alien device.

Finally, scrutiny of sighting locations in the UK during 1967 suggested a link between close-approach UFO activity and the outward signs of human development, an observation supported by the findings of a more recent analysis of sightings in the Manchester area.

Being acutely aware of the incompleteness of the study, and the tentative nature of the conclusions drawn, I have been extremely reluctant to publish this work at its present stage of development. However, recognising the need for a more comprehensive and detailed study, and my own resource limitations, it seemed that a presentation at this Research Conference would not be inappropriate.

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