BUREAU OF METEOROLOGY

UNCLASSIFIED

PERTH REGIONAL OFFICE.
OBSERVATIONS.

FILE No 45/38 PART No 1

TITLE Observations - Genepal by Outside Authorities (incl U.F.O

RELATED FILES SHOWN ON INSIDE COVER

FORMER PAPERS:

SUBSEQUENT PAPERS: PART 2.

DISPOSAL ACTION:

(1) Folio No	(2) Referred to and Date	(3) Cleared Initials & Date	(1) Folio No	(2) Referred to and Date	(3) Cleared Initials & Date	(1) Folio No	(2) Referred to and Date	(3) Cleared Initials & Date
263	OBSH	CH 11/3						
✓	RAO	CB 19/3						
264/7	RAO	CB 25/3						
269/270	RD	LB 15/4						
✓	MFI	L 16/4.						
✓	OBSH	CH 16/4						
274/275	MFI							
	Registry NEW PART	JJ 3/7						

FILE No 45/38 PART No 1

For Instructions concerning use of File see Inside Cover

RM 74/30884

INSTRUCTIONS

(1) FOLIOING OF PAPERS

Each paper attached to a file is to be given a consecutive folio number by the Attaching Officer. Papers must not be removed from files without the concurrence of the Registry Officer.

(2) MARKINGS

(a) The folio on which action is required will be indicated in Column (1). Column (2) will show to whom the file is referred.

(b) When a folio is cleared, the action officer will initial and date Column (3). If the file is to be referred to another officer, the folio number and the officer concerned should be indicated on the next vacant line.

(3) RE–SUBMIT FACILITY

To re-submit the file at a later date, the relevant folio and the "R/S (date)" are to be entered in Column (1) and (2) respectively. Registry will complete Column (3) when the file is brought forward (or on prior cancellation of the marking).

(4) PUT AWAY

(a) If a file is to be "put-away" the endorsement "P/A" will be made in Column (2). Registry will complete Columns (1) and (3) on examination of file.

(b) **FILES ARE NOT TO BE ENDORSED "P/A" UNTIL ALL ACTION THEREON HAS BEEN COMPLETED.**

USE OF TRANSIT SLIPS

As all file movements must be recorded in Registry, it is essential that a file Transit Slip be completed when a file is handed to another officer or Branch/Section without passing through Registry Section.

RELATED FILES

Number			Title

8/7/81

FILE CLOSED

SEE FILE

PART	2

BJ:KC

276

45/38

Mrs J Ten Seldam
Boxwood Hill
Via BORDEN WA 6338

Dear Mrs Ten Seldam

Thank you for your letter describing your sighting of unusual lights in the sky during June.

The Bureau does not make any research into these sightings, we would usually pass this information to the Astronomical Observatory located in Bickley.

... I have attached a press cutting which details other sightings at that time and gives an explanation from the Astronomical Observatory.

Nell Anderson still retains her ties with the Bureau, she often attends along with other ex-Bureau personnel, regular monthly luncheons and I will pass on your best wishes to Nell when I see her.

Yours sincerely

B

(B JAHN)
for Regional Director

3 July 1981

45/38

275

THE WEST AUSTRALIAN
JULY 1 1981

WEST AUSTRALIAN
July 1st 1981

Meteor theory for SW lights

Strange bright lights in the sky—witnessed by several people in the South-West on Friday night—are believed to have been meteors.

A spokesman for the astronomical observatory at Bickley said yesterday that about half a dozen reports had been received from places as far apart as Bunbury, Albany and Esperance.

He said some witnesses reported that the lights were travelling from noth-west to south-east while others said that the lights came from a south-west to north-east direction.

"Because of the differing reports it is very difficult to say exactly what the lights were," he said. "We are not able to give an answer."

The spokesman said that it might have been a satellite re-entering the earth's atmosphere. The more likely explanation was that the lights were a meteor stream.

One person who saw the lights was 23-year-old Glen Turner, of Scarborough, who was travelling towards Margaret River with a friend.

Boxwood Hill
via Barden 6338.
29th July 1981.

June!

Bureau of Met
Wellington
Perth.

Dear Sirs,

I was trav[illegible] at 10-10pm
[illegible] Bay to
Barden Rd, about 5Km north of
the Hassell Highway when I observed
some unusual lights in the sky. At
first it was a yellowish light, then
as it came overhead as a series of
six or eight white lights with vapour
trails. The lights travel from south-
west to north west (roughly) more or less
over head. The night was clear, &
having had the experience of seeing
Sky ~~the~~ Lab pass, I am wondering
if what I saw was some space
junk burning up as some other

45/38

275

Boxwood Hill
c/o Barden 6338.
29th July 1981.
June!

Bureau of Meteorology
Wellington St.
Perth.

Dear Sirs,

On Friday July 26th at 10-10pm I was travelling on the Bremer Bay to Barden Rd, about 5 Km north of the Hassell Highway when I observed some unusual lights in the sky. At first it was a yellowish light, then as it came overhead as a series of six or eight white lights with vapour trails. The lights travel from south-west to north west (roughly) more or less over head. The night was clear, & having had the experience of seeing sky ~~the~~ Lab pass, I am wondering if what I saw was some space junk burning up or some other

~~thing~~ explanation would be available.
I would be very interested if you could give me some sort of explanation.

Yours faithfully

H ten Seldam

(MRS. J. TEN SELDAM)

P.S.

My father's twin sister Miss Nell Anderson worked for your Bureau for many years.

R.D.	/
SUP M	/
P.T.O.	/
M.S.S.	/
M.F.I.	
R.M.O.	/
R.A.O.	/
C.B.S. 4	/
REG.	

DEPARTMENT OF SCIENCE
BUREAU OF METEOROLOGY

45/38

F 293

FILE

TELEPRINTER MESSAGE

PAGE OF

Note: 1. SHADED AREAS FOR COMMUNICATION USE ONLY.
2. ROUTINE PRECEDENCE WILL BE USED UNLESS OTHERWISE INDICATED.
3. INFORMATION HAVING A NATIONAL SECURITY CLASSIFICATION HIGHER THAN "RESTRICTED" MUST NOT BE TRANSMITTED BY THIS METHOD.

RECEIVED
11 06 '81
BUREAU OF METEOROLOGY
W.A.

1 SOM	CSN	PRIORITY	ROUTING INDICATORS	
(5LTR) ZCZC		C (OR) D	91391	(2CR LF LTR)

3 CALLING STATION CODE	STN. SER. NBR.	DATE/TIME OF FILING	
DE	134	13/4 1325 Z	(2CR LF LTR)

4 **FROM** D.K. EVANS FACILITIES & INFO (2CR LF LTR)

5 **TO** ESPERANCE M.O. (2CR LF LTR)

6 INFO (2CR LF LTR)

7 XMT (2CR LF LTR)

8 (LF)

9 TEXT COMMENCING WITH FILE &/OR ORIGINATOR'S REFERENCE

REF YR REPORT AURORA SIGHTING ⊙

GA
91391
METESP AA91391
METWA AA93286

134

FROM : D K EVANS F AND I WHR PERTH

REF YOUR REPORT AURORA SIGHTING.
HAVE PASSED TO ASTRONOMICAL OBSERVATORY PERTH. THEY WERE
~~XXXX~~ DELIGHTED WITH THE DETAILS YOU SUPPLIED AND WILL PASS IT TO
GLASGOW, UK, IMMEDIATELY.

CHIEF ASTRONOMER PERTH CONVEYS HIS THANKS.

13/4/81
1325 WST
METESP AA91391

272

9th. Dave Evans.

DEPARTMENT OF SCIENCE
AND THE ENVIRONMENT
BUREAU OF METEOROLOGY

INWARD TELEX

FOR F+T

DATE 13/12

TIME 0820

*
METSEW AA93414
METESP AA91391015

ATTN FACILITIES AND INFORMATION
FROM ESP MET OFFICE

AURORA SIGHTING

FIRST NOTICED AT START OF SHIFT 1545 GMT 12/4/81
AZIMUTH 196.5 TO 209.5 TOP ELEV 16.5
COLOUR PALE PINK CHANGING TO DARK PINK
FADED AND GONE BY 1605GMT

130019GMT

*
METSEW AA93414

Also sighted by Arthur Rae at Kalgoorlie — he thought it was a fire at the rubbish tip.

LB:PAH

271

45/38

Officer in Charge
ESPERANCE

OBSERVATIONS : UNIDENTIFIED OBJECTS

(Reference your 45/7 of 2 April 1981)

From memory your report was passed to the astronomical observatory at Bickley. I phoned them some days ago and they promised to call back and let me know what the object was and provide comment on the use made of your report.

2 The initial reaction was that it was probably a satellite re-entry. When I hear from the observatory I will let you know the outcome.

(L BROADBRIDGE)
Acting Regional Director WA

15 April 1981

45/38

270

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 2/4/81

TO Regional Director. ATTENTION R/P

YOUR REF:

FROM OIC Esperance. W.A.

OUR REF: 45/7

SUBJECT OBSERVATIONS - UNIDENTIFIED OBJECTS

1 On 11/6/80 I telexed a report of above. with two theodolite readings. For my own interest, what use was made of the observation and what result, if any, was forthcoming. ?

2 Attached is a copy of the telex.

SIGNATURE	PRINTED NAME	APPOINTMENT
K Baird	BAIRD	OBS GR3

269

METWR AA92070
GA
92071
METRH AA92071

ATNN DUTY FORECASTER AND POSSIBLE INER++ INTEREST ATC

OBJECT IN FLAT TRAJECTORY FROM NORTH TO SOUTH AND BURNING LEAVING BURNING LUMPS AND FIERY TRAIL PASSED EAST OF STATION AT 1157Z
. FIRE APPEARED TO EXTEINGUISH OVER SEAS ABT ONE MIN AND HALF LATER
.
FOR THE RECORD THEODOLITE READINGS

ZERO TIME 061 AZ TRUE 3.4 EL
ONE MIN 083 AZ TRUE 3.7 EL

OBJECT APPARNTLY BURN OUT .

CONSULTATION WITH MET KAL INDICATES HIS SIGHTING IDENTICAL WITH MINE BUT 1/2 MINS EARLIER
... OIC ESPERANCE

1217Z 11/6/80

p46

DLB:ZP

268

45/38

Acting Officer-in-Charge
PORT HEDLAND

RAINFALL OBSERVERS

I refer to your internal memorandum of 5 March 1981, reference 45/53, and to the discussion between Messrs. Acaster, Harris and Brown on 17 March 1981.

2 Whilst the proposal has merit in it, it is confirmed that there are no provisions whereby access community calls can be charged as against the Bureau's Credit Card, and likewise we are unable to provide the resources to work out what reimbursements Rainfall Observers may require at the end of a set period for calls that they have made under that system.

3 It is also felt that we should not overload Field Officers with 'phone calls, all at about 0900 hours when they are preparing their own reports. In the circumstances no further action will be taken in the matter.

(DAVID L BROWN)
for Acting Regional Director WA

25 March 1981

Rainfall in Western Austr

STATION	TOTAL	
1. NORTH KIMBERLEY		
Kalumburu	191	
Kuri Bay	215	
Mitchell Plateau	321	
Wyndham	255	
2. EAST KIMBERLEY		
Hall's Creek M.O.	134	
Kununurra	157	
Turkey Creek	-	
3. WEST KIMBERLEY		
Broome M.O.	334	
Cape Leveque	182	
Cockatoo Island	109	
Derby M.O.	252	
Fitzroy Crossing	403	
La Grange	378	
Nita Downs	432	
4. DE GREY		
Bonney Downs	104	R/F
Goldsworthy	216	
Mandora	260	
Marble Bar	146	
Nullagine	139	
Port Hedland M.O.	264	
Red Mont	-	
Roebourne	241	
Yandee	189	
5. PORTESCUE		
Barrow Island	63	
Ethel Creek	208	R/F
Karratha	140	
Learmonth M.O.	19	
Mardie	127	
Onslow P.O.	107	
Pannawonica	125	
Sand Hill	171	
Wittenoom	169	
6. WEST GASCOYNE		
Carnarvon M.O.	26	
Gascoyne Junction	22	
NANGA	NIL	
Nyang	94	
Shark Bay	NIL	R/F

STATION	TOTAL	
7. EAST GASCOYNE		
Errabiddy	41	
Mt. Vernon	-	R/F
Mundiwindi	263	
Newman	159	
Paraburdoo	25	
Bryah	46	R/F
Three Rivers	71	
7a. MURCHISON		
Boolardy	-	R/F
Cue	43	
Meekatharra M.O.	36	
Mt. Magnet	13	
Murgoo	30	
PAYNES FIND	21	
Wurarga	18	R/F
Yalgoo	-	
Yuin	-	R/F
8. NORTH COASTAL (SOUTH WEST DIV.)		
Ajana	NIL	
Ballidu	50	
Barberton	7	
Berkshire Valley	24	
Buntine	22	
Canna	21	
Carnamah	36	
Chapman (Nabawa)	-	
Coomberdale	17	
Coorow	23	
Dalwallinu	50	
Dongara	30	
Eneabba	27	
Geraldton M.O.	5	
Kalbarri	NIL	
Kondut	41	
Latham	14	
Maya	23	
Miling	30	
Mingenew	20	
Moora	14	
Morawa	28	
Mullewa	16	
Nangetty	16	
Northampton	2	
Perenjori	35	
Three Springs	36	
Walebing	24	
Walkaway	18	
Watheroo	16	
Wongan Hills	48	
Wubin	31	

45/38

BUREAU OF METEOROLOGY

45/38 206

F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 5/3/81

TO RO/WA

MAR 10 08 53 '81 RAO/OBS 4

ATTENTION

YOUR REF:

FROM PORT HEDLAND

OLOGY W.A.

OUR REF: 45/53

SUBJECT RAINFALL OBSERVERS

RECENTLY, IN CONVERSATION WITH MR. GRAHAM FORSYTH OF BRYAH STATION (NORTH OF MEEKATHARRA), I WAS TOLD THAT HIS STATION IS NOW ON THE TELEPHONE SYSTEM AND CAN NOW CONTACT MEEKATHARRA FOR THE COST OF A LOCAL CALL. THIS WOULD REPRESENT A CONSIDERABLE SAVING ON THE COST OF A TELEGRAM IF HE WAS TO PASS RAINFALL REPORTS DIRECT TO MEEKATHARRA MET OFFICE.

MANY OTHER RAINFALL OBSERVERS MAY NOW BE IN A SIMILAR SITUATION, WHERE IT WOULD BE POSSIBLE TO CONTACT A NEARBY MET OFFICE RATHER THAN SEND TELEGRAMS.

PERHAPS IT WOULD BE WORTHWHILE INVESTIGATING THIS AS A COST SAVING.

R.D.	~
SUP M	~
P.T.O.	~
M.S.S.	~
M.F.I.	~
R.M.O.	~ (2)
R.A.O.	(1)
OBS. 4	11/3
REG.	~

SIGNATURE	PRINTED NAME	APPOINTMENT
Ray Acaster.	R. ACASTER	O.I.C.

FILE COPY

RAO I dont think we should overload Met Offices with phone calls, all at 9am when they are preparing their own reports. Maybe one to each station would be OK, especially as it may assist getting SAT + SUN. Could you give me the Community Access exchange for the stations marked R/F. The rest are synoptic. OBS 11/3

CFP:KG

265

45/38 RAO

Registry

45/38

Director of Meteorology

Attention : Facilities - Obs Standards and
Practices Sub-Section

EVAPORATION PAN - FUNGICIDE

CSIRO agricultural division have experimented with alternate fungicides to that which is issued by the Bureau for control of fungus in the "A" class Pans. Our substance is not greatly effective in areas of high rate of growth due to hot conditions and local water supplies which in some cases is dam water.

The successful tests have been provided to us for information:

"A" class Pan : one fluid ounce of Diquat, trade name Reglone, manufactured by ICI and distributed by Eldersmith.

Dam : 2½ grams per kilolitre, Simatox Herbicide, agent not supplied.

Should you consider it worthwhile for trial I will forward samples of the substances. I have no information as to whether either of them increase the temperature of the water as some pool type chemicals do.

(C F PHILLIPS)
for Regional Director WA

13 March 1981

Off to File

COMMONWEALTH BUREAU OF METEOROLOGY
DEPARTMENT OF SCIENCE

RECORD OF TELEPHONE CALL

File /

F294

FROM Arthur Rogers CSIRO Wembley TO Sleeman TIME AND DATE 0900 11.3.81

Subject: Alternative Fungicide for Evap. Pan

Further to a previous advice, Mr Rogers has now conducted a successful test of an alternative fungicide in the Evaporation Pan at Deniliquin near Narrogin.

The substance used was a Diquat-Compound Trade named "Reglone" manufactured by ICI + distributed by Elders.

It was applied in January at the rate of 1 fluid ounce to the freshly filled pan + no evidence of algae or fungus growth has appeared since.

He advised that fungus proliferates during the hotter months, especially in the Narrogin area. This was noted during my inspection of the Evap. Pan at Narrogin Post Office on 23rd April last.

Sleeman.

11/3/81

Further action

0804 / file

243

F294

COMMONWEALTH BUREAU OF METEOROLOGY
DEPARTMENT OF SCIENCE

RECORD OF TELEPHONE CALL

File /

FROM J. Weeldenburg CSIRO Bowen Hill TO Steane TIME AND DATE 1130 3.3.81

Subject: Alternative Fungicide for Evap. Pans

Mr Weeldenburg advised that a pre-emergence Herbicide, SIMATOX which is available from ICI in Wettable powder form, has been used successfully in the dams at Yallambee Research Station to Control Algae & fungus growth.

The application rate was 2½ grams per K.L.

He suggested this may be suitable for use in our Evaporation Pans if supply problems persist with Met. issue fungicide.

S. Steane

3/3/81

Further action

HK:KG

202

XXXXXXXXXXXXXXXXXXXXXXXX

45/38

Mr G Neads
3 Vanston Court
KELMSCOTT WA 6111

Dear Geoff

We have passed on your negatives to Flight Lieutenant Rod Bencke of RAAF Pearce, who has an authoritative interest in these matters. Unfortunately, we do not deal with UFO's, but F/L Bencke may be able to assist your enquiries.

The negatives will be returned to you when they have been examined.

Good luck.

Yours sincerely

(H KOT)
for Regional Director

6 February 1981

45/38 31/1/81

3 Vanston Crt 2nd
Helmscott
6111

Dear Sir,

I do hope your office has a little to do with unidentified flying objects. Because i have enclosed a negative of a picture i had taken in New Zealand. This was about 2 years ago, however i have not noticed these two bright circles in the picture until today.

So id appreciate it if you could have a look at it and give me your opinion the number of the negative is 19

yours faithfully
Geoff Neado.

MFI.

Passed negatives & letter onto F/L Rod Bencke, c/o RAAF Pearce also wrote to Geoff and advised him of our actions.

H. Kot 6/1/81

AS:KG

260

45/38

Mr J May
c/- Department of Agriculture
District Office
Fitzgerald Street
NORTHAM WA 6401

Dear Jim

... Please find enclosed two copies of the magazine "Weather" forwarded to me by Bob Lourensz along with a copy of a letter received from the photographs editor of this magazine.

It would probably be appropriate if you liaised with Colin regarding this matter and replied direct to "Weather" or alternatively, if you wish, we will reply with your instructions.

The Bureau has indicated that it wishes to use one of the photos on the front cover of its "Climate of Australia" publication which is an extract from the Commonwealth Year Book. We have used your letter giving approval of use for scientific purposes as justification for going ahead with this.

Yours sincerely

(A SCOTT)
for Regional Director

14 October 1980

AS:KG

259

45/38

Mr C Crane
Manxes
BINDI BINDI WA 6574

Dear Colin

... Please find enclosed two copies of the magazine "Weather" forwarded to me by Bob Lourensz along with a copy of a letter received from the photographs editor of this magazine.

It would probably be appropriate if you liaised with Jim regarding this matter and replied direct to "Weather" or alternatively, if you wish, we will reply with your instructions.

The Bureau has indicated that it wishes to use one of the photos on the front cover of its "Climate of Australia" publication which is an extract from the Commonwealth Year Book. We have used your letter giving approval of use for scientific purposes as justification for going ahead with this.

Yours sincerely

(A SCOTT)
for Regional Director

14 October 1980

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 6/10/80

TO Regional Director W.A. ATTENTION Mr A.N Scott

YOUR REF:

FROM Physical Research Section

OUR REF: 65/803

SUBJECT Northern Tornado - Pictures

Dear Alan.

Refering to our telephone conversation of 3/10, I am enclosing 4 copies of 'Weather' - May 1980 Issue - 2 copies each to be sent to Mess Colin Crane & Jim May.

I am also enclosing copies of the letter from Mr K.B Shone (Photographs Editor of Weather) dated 4 July 1980, of which I spoke to you about.

It might be a good idea if they reply individually to Mr Shone perhaps?

Kind Regards
Bob

SIGNATURE	PRINTED NAME	APPOINTMENT
R Lawrence	R.S. Lourensz	TO2

For Alan Smith

257

Weather

A monthly magazine
for all interested in meteorology

Published by the Royal Meteorological Society

JAMES GLAISHER HOUSE
GRENVILLE PLACE
BRACKNELL
BERKSHIRE
RG12 1BX

Telephone BRACKNELL 22957-8

Our ref: PE/58/80

4 July 1980

R S Lourensz Esq
PO Box 1289K
Melbourne
Victoria 3001
Australia

Dear Mr. Lourensz,

Please find five copies of the May 1980 issue of WEATHER with the compliments of the Editorial Board.

Usually we forward photographic material to the National Meteorological Library for copying when it has appeared in the magazine. I shall do this with the colour print you supplied originally and also the one which you supplied in January. If you decide that you would rather copies were not made then they can be destroyed on your instructions. Copyright remains with you or the photographers as the case may be but the material is accessible to a wider market and you may receive requests for use for a fee.

If I do not here from you to the contrary then I shall assume that this course of action meets with your approval. Do you wish me to return the prints? I should point out that the National Meteorological Library is a part of the British Meteorological Office.

Yours sincerely,

KB Shone.

K B Shone
Photographs Editor

Rec'd Sep '80 pt.

Scott

LB:KG

256

45/38

45/38

The Government Astronomer
Observatory
Walnut Road
BICKLEY WA 6076

Dear Sir

... Please find enclosed a letter received from Mrs York at Tammin. Mrs York has been advised that her letter is being forwarded on to you. Could you please reply direct to her.

Yours faithfully

(L BROADBRIDGE)
ACTG REGIONAL DIRECTOR

15 August 1980

RH:KG

45/38

Mrs D H York
Anameka Farms
PO Box 12
TAMMIN WA 6409

Dear Mrs York

Thank you for your letter concerning the unusual phenomena you were fortunate to observe. My opinion is that you observed a meteorite and the tremor could have been the sonic boom caused by its movement through the air.

I am forwarding your letter to the Observatory at Bickley. The staff there may be able to give you a full explanation of the phenomena.

Yours sincerely

(L BROADBRIDGE)
ACTG REGIONAL DIRECTOR

15 August 1980

Anameka Farms,
Box 12, TAMMIN, 6409.
9th August, 1980.

Mr. R. Southern,
Regional Director,
Bureau of Meteorology,
231 Adelaide Terrace,
PERTH.

Dear Bob Southern,

I have only met you once on the occasion of your visit to the Tammin Shire Council for the presentation of that lovely painting to Mr. Tom Packham for 50 years of rainfall figures, and I was wondering whether you or Department could assist me.

At approximately 5.08 a.m. on Wednesday, 6th August, 1980, I was awakened by a brilliant light shining in my eyes. We have large corner windows in our bedroom facing south and east and I was facing the south with my head towards the east. A greenish orb of incandescent light was moving steadily across the sky from S.W. to N.E. in a high arc just east of our house. I observed it for 3 - 5 seconds and craned out of bed to see it disappear in a N.E. direction and as it did, the colour changed to orange-red. There was no tail of light as in a comet or falling star and the whole sky (and it was a clear starlit and moonlit early morning) was lit up and the light spilled over into our bedroom as it passed. Only a badly injured leg prevented me getting up and running outside to see more. My exclamations woke my husband but it had passed over before he was properly awake. I switched on the light to check the time and settled down again.

2 or 3 minutes later - approximately 5.10 a.m. we both distinctly heard and felt a reverberating tremor of only approximately 5 seconds duration in a N.E. direction. Our first thought was that it was the start of an earthquake tremor, but it was quite different from this - it was definitely an impact tremor, as if a very heavy object had hit the earth - whether 50 or 150 miles away I would not know. I felt it must have been either a meteorite falling to earth or part of a man-made satellite, but I saw no tail of light as it passed over.

I have heard of no-one else who saw this light, but one brother-in-law who lives 200 yards from us was awakened at 5.10 a.m. by what he presumed to be an earth tremor and my other brother-in-law who lives 12 miles N.E., of here was similarly awakened at 5.10 a.m. but felt it was quite a different type of tremor to the usual ones experienced here. Since 14.10.1968 as you know, we in the central wheatbelt frequently experience earth tremors and automatically time them and asses them for strength and duration. I consider the path of this bright object was in a line from Youndegen through Yorkrakine, Trayning, Welbungin and between Wialki and Bonnie Rock, as seen on the Perth - World Aeronautical Chart which I have for Bird Atlassing.

I can not believe that these two phenomena are not related and feel sure that many more people ,must have seen the light or felt the tremor even more than we did and wonder if any reports of sightings have reached you or anyone else.

I listened to all the radio news sessions that day and heard nothing and in desperation rang the A.B.C. Newsroom and asked if they had any reports, but they had not, and a very disinterested voice listened to my story and that was that. The "West Australian" likewise has had nothing to report about it either.

Sorry for this long preamble - I am not a fanciful person, but have a strong conviction that somewhere, some day, in the N.E. wheatbelt some evidence may be found to corroborate my story. There must have been many people out and about on the roads of Western Australia on Wednesday morning who saw or heard something. Have you had any reports ? I would be most interested to hear. I have long been interested in meterology and astronomy, and have always studied the night sky and read the monthly reports in the paper, and will certainly continue to do so - you never know what you might see!

Yours sincerely,

Kate York

(Mrs. D. H. York ~~O~~ as above.)

ANS:PAH

45/38

Mrs C R Barrett-Lennard
Cane River Station
Via CARNARVON WA 6701

Dear Mrs Barrett-Lennard

Thank you for your letter of 14 July. The information regarding the rainfall and pluviograph has been noted.

Mr Neil Bates contacted me on 6 June regarding the ground marks you have referred to. Subsequently I have seen a set of 35 mm slides taken by Dr Derak Milton from the Geography Department of the University of WA. I hope to obtain copies of some of these for reference and to pass to several people who are compiling data on tornadoes.

Yours sincerely

(A SCOTT)
for Regional Director

6 August 1980

cc File 005067

MF1

005067

QGS. 010 – 74982

Mrs L. R. Barrett-Lennard,
Cane River Station,
via Carnarvon 6701.
14th July 1980.

The Regional Director
Bureau of Meteorology,
Perth.

Dear Sir,

I was not able to service the Cane River Pluviograph during June and until today, as we had to go to Perth suddenly on 6th June. And got caught down there by the Carnarvon and Murchison floods. I was not able to arrange for anyone dependable to attend to the Pluviograph but the Rain Gauge was read at various times. The rainfall recorded at Cane River was as follows:

27.5 mls was recorded 12th, 13th + 14th June.
101.0 " " " 20th + 21st "
71.0 " " " 9th + 10th July.

An interesting phenomenon was observed from the air on 5th June and later inspected on the ground. It was a narrow strip of ground approx 13 kms long out on the property, bare of all vegetation – everything had been demolished on it. It was inspected by a representative from the C.S.I.R.O who estimated that it was caused by a Tornado.

Yours faithfully
(Mrs) L. R. Barrett-Lennard.

250

45/38
6.7 (7 July 1980)

Mitchell Plateau Bauxite Co Pty Ltd
GPO Box 384D
MELBOURNE VIC 3001

Attention : Mr J J Kelly

Dear Sir

METEOROLOGICAL STATION - ALUMINA PLANT SITE, GERALDTON

Instrumentation for this type of station could be based on one of two types now available, that is, either chart recording or data logging equipment.

For a station based on weekly chart recording instruments the following could be used:

Weekly thermohygrograph	$575
Weekly pluviograph	1400
Woelfle anemometer (28 day)	3780
Stevenson screen	600
	$6355

The costs quoted are approximate and exclude installation. The Woelfle anemometer gives a continuous record of wind direction and wind run and so is not able to give maximum wind gust data.

Additional costs associated with this type of installation would include:

(a) installation of a 10 m pole, tower or jackup mast on which the anemometer was to be mounted

(b) installation of bases for the rain gauge and screen

(c) decoding or digitizing of charts
- 3 to 4 hours per month for an experienced officer to decode the anemometer recording to produce mean hourly wind speeds and directions
- digitizing or decoding of thermohygrograph and pluviograph traces

(d) installation of security fencing if necessary.

.../2

There are data logging systems now available which dispense with the chart digitization or decoding process but may require additional hardware and software to allow the stored data to be read from a cassette.

Photocopies of a pamphlet relating to a unit which has recently been purchased by another alumina company are enclosed. I believe the cost of this unit including the wind, temperature and humidity sensors and a rain gauge is about $9000 without a 12 volt power supply. An additional cost of about $850 is involved if the daily maximum and minimum temperature and the mean value of the wind variance is logged. While we have no information on which to assess the performance or reliability of this unit it is probably representative of the type of self contained data logging units designed for field operation which will become more readily available. Although the capital cost is higher than a chart record based station the longer term labour savings on decoding, digitizing and analysis of data should be substantial. Provided this type of unit maintains its calibration, then the final output should be more accurate than might be obtained from weekly charts.

The siting of the equipment is to some extent dependent on the purpose for which the data will be used. If possible the anemometer should be sited on a flat area which is free from obstructions such as trees, buildings etc, within a radius of 100 m or more. If it is necessary to have wind recordings which are representative of the over water situation then it may be necessary to mount the anemometer on a pole on or near a beach so that there are no obstructions to the onshore flow. In this situation it may be difficult to obtain accurate readings for offshore winds because of obstruction by the foredune.

In foreshore and adjacent inland locations it is very difficult to obtain accurate readings of relative humidity because of the salt spray which quickly alters the electrical properties of most sensing surfaces.

Where a security fence is necessary the area enclosed varies with the type of anemometer mounting used. For a free standing pole a 5-10 m square would be sufficient. Where a guyed 3 stage jackup mast is used a 10-15 m square is usually required to accommodate the guy wires. A hinged tower would require a rectangular area about 10-15 m by 20 m to allow the mast to be lowered to the ground.

In the case of the Woelfle anemometer the instrument chart has to be changed every 28 days. This involves either climbing the pole or lowering it to the ground. There is less risk of injury in a one man operation where the pole is of the jackup or lowering type. Some electric power or light poles are now available which can be lowered or raised hydraulically which would be suitable though probably expensive.

As a Department we are not able to offer you any assistance with maintenance or chart changing etc, however if you have any further questions regarding siting and the type and frequency of maintenance we would be pleased to help. Mr P Cheng, phone (03) 6694163, who is an engineer within the Instruments Engineering Subsection of our Head Office, may be able to offer you some further advice.

Yours faithfully

(A SCOTT)
for Regional Director

24 July 1980

(RD)

45/17

248

MITCHELL PLATEAU BAUXITE CO. PTY. LIMITED
(Incorporated in Australian Capital Territory)

55 COLLINS STREET MELBOURNE VICTORIA 3001

G.P.O. Box 384D
Melbourne, Australia 3001
Telephone: (Area Code 03)
Direct Line: 658
Switchboard: 658 3333
Telex: AA30108
In Reply Please Quote 6.7

7 July 1980

The Regional Director,
Bureau of Meteorology,
231 Adelaide Terrace,
PERTH. W.A. 6000.

Dear Sir,

METEOROLOGICAL STATION - ALUMINA PLANT SITE, GERALDTON

Mitchell Plateau Bauxite Co. Pty. Limited (MPBC), a wholly owned subsidiary of CRA Limited, has recently acquired a majority interest in the Mitchell Plateau bauxite deposit in the far north of Western Australia.

It is at present proposed to refine the bauxite obtained from this deposit at a major alumina plant sited on the coast about 25km north of Geraldton. As the only meteorologival records available in the Geraldton area are for the Geraldton Airport where conditions are significantly different to those at the coast, we intend establishing a meteorological station at the proposed alumina plant site.

The data obtained from this station would be used during the feasibility study stage of the project which will extend into 1984. Should the project proceed further into construction and operation, the station would of course be maintained in operation.

I would like to obtain preliminary information from the Bureau about the arrangements which could be made to establish and maintain a suitable weather station at which continuous records would be obtained of temperature, humidity, wind direction/strength and rainfall. Seeing that the site will not be manned, an automatic station would be preferred with charts being changed at appropriate intervals.

In particular, we would like to obtain the Bureau's advice on such matters as the type of equipment which should be installed, its cost, specification for the construction and siting of such a station, typical arrangements which could be made for its maintenance and reading bearing in mind that MPBC will have no

(1) R.D.	
SUP M	—
P.T.O.	—
(2) M.S.S.	
M.F.I.	
R.M.O.	—
R.A.O.	3/7
OBS. 4	4/7
REG.	—

I know nothing about automatic stations, neither have I been invited to inspect one.

2..

17/7

permanent staff in the area for some time, and if any co-operative arrangements could be made between the Bureau and MPBC for installing and/or operating the station.

Yours faithfully,

J.J. KELLY
Manager - Engineering

JJK:VAW

246

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 16/7/80

TO Physical Research Sect. H.O. Melbourne ATTENTION Mr R Lawrence

YOUR REF:

FROM Special Services Perth W.A.

OUR REF: 45/38

SUBJECT Slides of Northam Tornado

Bob,

Please find enclosed a set of 5 slides of the Northam Tornado. These were prepared from colour negatives supplied by Colin Crane though I think it was agreed that acknowledgements be made to both Crane & May.

Please advise me if you feel Dr Lane would prefer one of Jim May's slides and we will see if we can borrow them.

Regards
Alan S

SIGNATURE	PRINTED NAME	APPOINTMENT
AScott	A. Scott	Met 3

FILE COPY

245

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 16/7/80

TO Regional Office South Australia

ATTENTION Mr A Robin

YOUR REF:

FROM Special Services Perth

OUR REF: 45/38

SUBJECT Slides of Northam Tornado

Dear Angas,

Please find enclosed 3 slides of the Northam tornado of 21 December 1977. I hope these suit your needs.

Regards

Alan S

SIGNATURE	PRINTED NAME	APPOINTMENT
A Scott	A. Scott	Met 3

FILE COPY

October 1974

SCOTT
45/38

MARK OUT
TO RAO

244

DEPARTMENT OF SCIENCE
AND THE ENVIRONMENT
BUREAU OF METEOROLOGY

INWARD TELEX

FOR Brown
DATE 17/6/80
TIME 1408

*
METSEW AA93414
AUSCI AA62484

U N C L A F I E D

TO: BROWN, RAO PERTH
FROM: WARREN DEPT SCIENCE AND THE ENVIRONMENT
FILE: 76/1148

SIGHTING BY METEOROLOGICAL STAFF

ON BEHALF OF MR LESLIE AND IN RESPONSE TO YOUR T/T 1756 - 12/6/80. TO DATE THIS OFFICE HAS HAD NO NOTIFICATION OF WHAT THE OBJECT MAY HAVE BEEN.

THE SPACEWARN BULLET IN FOR APRIL 1980 INDICATED THAT THERE WOULD BE SEVEN POSSIBLE SATELLITES RE-ENTER THE EARTHS ATMOSPHERE DURING THE MONTH OF JUNE 1980. SHOULD WE RECEIVE NOTIFICATION THAT ANY OF THESE RE-ENTERED AT THE TIME OF THE MET. OBSERVATION FROM ESPERANCE WE WILL LET YOU KNOW.

ENDS

MESSAGE NO: 1256
17/6/80
4.00

*
METSEW AA93414
AUSCI AA62484

B
17 JUN 1980
Sent to RAO PS

263

C.D.O. 4613

F294

F.N.

FILE

COMMONWEALTH BUREAU OF METEOROLOGY

RECORD OF TELEPHONE CALL

INWARD
OUTWARD

From Scott

To Colin Crane

Time & Date 1100 18/6/80

Subject(s):- Request by Mr Crane to borrow slides of Northam tornado to study for this Mtg & to produce slides for Dr F. W. Lane (UK) & Angus Robin (S.A.).
Mr Crane gave his permission for Dr Lane

Further Action:-

Mr Crane will deliver negatives to Bureau in week of 23/6

Alan B.

Show Mr Crane "The Elements Rage"

DEPARTMENT OF SCIENCE
BUREAU OF METEOROLOGY

242 F 519

TELEPRINTER MESSAGE

PAGE OF

45/38+
P/A

Note: 1. SHADED AREAS FOR COMMUNICATION USE ONLY.
2. ROUTINE PRECEDENCE WILL BE USED UNLESS OTHERWISE INDICATED.
3. INFORMATION HAVING A NATIONAL SECURITY CLASSIFICATION HIGHER THAN "RESTRICTED" MUST NOT BE TRANSMITTED BY THIS METHOD.

1 SOM	CSN	PRIORITY	ROUTING INDICATORS
(5LTR) ZCZC		C (OR) D	62484 (2CR LF LTR)

3 CALLING STATION CODE	STN. SER. NBR.	DATE/TIME OF FILING
DE	1756	12.6.80 1515 (2CR LF LTR)

4 **FROM** BROWN. RAO WA. (2CR LF LTR)

5 **TO** LESLIE SAS SPB CO.

(2CR LF LTR)

6 INFO

RAO

7 XMT

8

9 GA
62484
AUSCI AA62484
METSEW AA93414
1756

FROM: BROWN RAO WA
TO: LESLIE SAS SPB CO

UNUSUAL SIGHTING BY METEOROLOGICAL STAFF

THE FOLLOWING TELEX REPORT WAS RECEIVED FROM THE BUREAU OF METEOROLOGY OIC AT ESPERANCE TODAY RE ABOVE
''OBJECT IN FLAT TRAJECTORY FROM NORTH TO SOUTH AND BURNING LEAVING BURNING LUMPS AND FIERY TRAIL PASSED EAST OF STATION AT 1157Z. FIRE APPEARED TO EXTINGUISH OVER SEAS ABT ONE MIN AND HALF LATER . FOR THE RECORD THEODOLITE READINGS
ZERO TIME 061 AZ TRUE 3.4 EL
OBJECT APPARENTLY BURN OUT
CONSULTATION WITH MET KAL INDICATES HIS SIGHTING IDENTICAL WITH MINE BUT 1/2 MINS EARLIER
1217Z
11/6/80''

THIS MAY BE OF INTEREST TO YOURSELVES AND NASA
AND WOULD APPRECIATE ANY ADVICE IF IT IS ASCERTAINED WHAT OBJECT WAS

12/6/80
1515WST*
AUSCI AA62484

B 12/6.
Jill ~~NASA~~ UFO pls.

10 (LTR 2CR BLK) ORIGINATOR EXTN. NBR. AUTHORISED BY

(LTR) BRANCH, GROUP OR SECTION DESIGNATION

July 1974

DEPARTMENT OF SCIENCE
BUREAU OF METEOROLOGY

242 F 519

TELEPRINTER MESSAGE

PAGE OF

45/38+
P/A

Note: 1. SHADED AREAS FOR COMMUNICATION USE ONLY.
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3. INFORMATION HAVING A NATIONAL SECURITY CLASSIFICATION HIGHER THAN "RESTRICTED" MUST NOT BE TRANSMITTED BY THIS METHOD.

1 SOM	CSN	PRIORITY	ROUTING INDICATORS
(5LTR) ZCZC		C (OR) D	62484 (2CR LF LTR)

3 CALLING STATION CODE	STN. SER. NBR.	DATE/TIME OF FILING
DE	1756	12.6.80 1545 (2CR LF LTR)

4 **FROM** BROWN. RMO WA. (2CR LF LTR)

5 **TO** LESLIE SAS SPB CO. (2CR LF LTR)

6 INFO (2CR LF LTR)

MT (2CR LF LTR)

(LF)

TEXT COMMENCING WITH FILE &/OR ORIGINATOR'S REFERENCE

Unusual Sighting by Meteorological Staff.

The following Telex report was received from the Bureau of Meteorology OIC at Esperance today re above.

11.

This may be of interest to yourselves e NASA. would appreciate any advice if it is ascertained what object was.

	ORIGINATOR	EXTN. NBR.	AUTHORIZED BY	DATE
R 2CR 8LF)		222	[signature]	12/6
NN (12 LTRS)	BRANCH, GROUP OR SECTION		DESIGNATION RMO	TIME 1445

July 1974

241

DEPARTMENT OF SCIENCE
AND THE ENVIRONMENT
BUREAU OF METEOROLOGY

INWARD TELEX

FOR RAO
DATE 12/6
TIME 0800

*
METSEW AA93414
METWR AA92697

THE FOLLOWING RECD FROM MET ESPERANCE

ATNN DUTY FORECASTER

" OBJECT IN FLAT TRAJECTORY FROM NORTH TO SOUTH AND BURNING LEAVING
BURNING LUMPS AND FIERY TRAIL PASSED EAST OF STATION AT 1157Z
. FIRE APPEARED TO EXTEINGUISH OVER SEAS ABT ONE MIN AND HALF LATER
.
FOR THE RECORD THEODOLITE READINGS

ZERO TIME 061 AZ TRUE 3.4 EL
ONE MIN 083 AZ TRUE 3.7 EL

OBJECT APPARNTLY BURN OUT .

CONSULTATION WITH MET KAL INDICATES HIS SIGHTING IDENTICAL
WITH MINE BUT 1/2 MINS EARLIER
... OIC ESPERANCE

1217Z 11/6/80 "

*
METSEW AA93414
METWR AA92697 1223Z

Telex RAOPS
B 12/6

Registry.

240

45/38

GA
93414
METSEW AA93414
METWR AA92697

P/8

THE FOLLOWING RECD FROM MET ESPERANCE

ATNN DUTY FORECASTER

OBJECT IN FLAT TRAJECTORY FROM NORTH TO SOUTH AND BURNING LEAVING BURNING LUMPS AND FIERY TRAIL PASSED EAST OF STATION AT 1157Z
. FIRE APPEARED TO EXTEINGUISH OVER SEAS ABT ONE MIN AND HALF LATER

FOR THE RECORD THEODOLITE READINGS

ZERO TIME 061 AZ TRUE 3.4 EL
ONE MIN 083 AZ TRUE 3.7 EL

OBJECT APPARNTLY BURN OUT .

CONSULTATION WITH MET KAL INDICATES HIS SIGHTING IDENTICAL WITH MINE BUT 1/2 MINS EARLIER
... OIC ESPERANCE

1217Z 11/6/80

Pse file "sightings"

METSEW AA93414
METWR AA92697 1223Z

0853 RFC 12/6

45/38

SCOTT

239

ALCOA OF AUSTRALIA [W.A.] LIMITED
PINJARRA, WESTERN AUSTRALIA. 6208

ALCOA
AUSTRALIA

SS:eas

Attention:
Mr. Allan Scott
Bureau of Meteorology
127 Wellington Street
PERTH W A 6000

10th March, 1980.

Dear Sir,

Please find attached wind information recorded 7 kilometers north-west of Dwellingup Forestry Station during the months of January 1980 and February 1980.

I would also like to thank you personaly, for the great assistance you have been to myself and Bill Delaney while we have been working on this weather project. Would you please pass my thanks to your various forecasters who have helped during this period.

Yours faithfully,

Sandy Scott.

S. SCOTT
Del Park Minesite.

ad 11/3

FEBRUARY.

E/TIME	1	2	3	5	7	10
6/2 05	105 16	095 14	090 16	075 14	090 06	065 22
6/2 03	095 14	085 18	105 16	065 06	120 04	065 20
7/2 03	080 10	080 12	090 10	125 10		
7/2 06	100 08	110 16	125 08	060 06		
11/2 05	250 06					
12/2 05	125 08	115 06	125 08	165 16	180 16	225 22
13/2 03	175 06	180 08	190 02	250 08		270 22
16/2 02	105 08	110 10	135 10	140 06	235 04	265 06
16/2 06	125 12	130 08	135 10	145 10	120 04	155 04
18/2 06	270 06	280 06	300 08	325 08	310 14	300 18
19/2 05	110 18	115 16	110 16			
20/2 04	100 14	100 18	115 16	145 08	035 04	330 10
20/2 06	135 04	140 04	085 02	355 08	325 12	
~~21/2 05~~	~~280 14~~					
21/2 05	100 14	100 16	075 06			
23/2 05	100 08	135 04	335 01	340 20	340 36	315 36
27/2 05	110 02	020 01	285 01	275 08	285 16	
28/2 05	150 02	095 02	020 04	275 12	285 20	270 36
29/2 05	085 04	260 02	255 08	265 20	260 24	275 26

JANUARY.

DATE/TIME GMT	1	2	3	5	7	10
10/1 04	12 10	13 12	13 10	15 10	17 18	16 16
11/1 04	10 06	09 10	08 10	03 08	05 14	01 14
13/1 06		19 18	19 12			
14/1 04	08 14	06 12	02 10			
23/1 05	11 06	10 02	04 06	31 06	34 14	
24/1 05		14 14	16 18	23 14	24 20	25 24
25/1 03	12 24	12 24	11 18	15 12	20 14	22 16

BJ:KG

237-1

P/A

45/38

Miss Carolyn Brace
St Columba College
NEDLANDS WA 6009

Dear Carolyn

We have forwarded your letter to the Government Astronomer, Astronomical Observatory, Bickley, for their comments.

Sightings of meteors etc would normally be reported to the Bickley Observatory therefore we are unable to confirm your observation.

Yours sincerely

(B JAHN)
for Regional Director

22 February 1980

23C

MFI

US 38

FRI 20 JUN 04 '80
BUREAU OF
METEOROLOGY
W.A.

Miss Carolyn Brace.
St Columba College,
Nedlands, W.A. 6009.
15 February 1980.

Chief Meteorologist.
231 Adelaide Tce,
Perth, W.A. 6000.

Dear Sir,

On Friday the 8th of February I saw what appeared to be a meteor landing not far from Beverly. The details are included on a seperate data sheet. I

I was wondering wether anyone else reported this and if it was possible to confirm that this was a meteor I saw. If I can be of any more assistance please contact me at the above address. I hope that you can help me with my enquiry.

Yours faithfully,
Carolyn Brace.

MFI

RH:KG

236

45/38

Mrs F Muir
181 Geldercliffe Street
SCARBOROUGH WA 6019

Dear Mrs Muir

In answer to your enquiry about the southern lights, the Astronomical Observatory informed me that there were no other reports of such sightings. I checked the weather maps for indications of lightning to the South but there was no such evidence.

Aurora Australis or Southern Lights is the most probable cause of the lights that you observed. The term Aurora is applied to phenomenon in which visible light is emitted by the high atmosphere. The moon can cause a glow in certain circumstances even though the moon itself may not be visible.

There is no accepted relationship between the immediate weather and the Southern Lights.

Yours sincerely

(R HOATH)
for Regional Director

20 February 1980

45/38
Surm.

45/38

Institute for Disaster Research
Dept. of Civil Engineering
BOX 4089 /Lubbock, TX 79409

234

Mr. A. Scott
Bureau of Meteorology
P.O. Box 6070
Perth. W.A. 6000
Australia

Dear Alan:

My visit to Perth was very productive. The conference was excellent and I was able to acquire the needed information from the Northam Tornado site.

I want to thank you for organizing the Northam field trip. Bill Linthorne was very helpful and accommodating. We met Colin Crane who helped immensely. Colin is a very interesting person. He has a good feel for research and seems very systematic in his approach. Perhaps this is why he was involved in research at one time.

The soil sample which Bill brought from Northam was to be delivered to P.J. May. I am writing Mr. May with instructions regarding the specific tests which need to be run. I will inform you as to what we find out relative to the model which we described in the "dusty vortex" paper. We plan another, more detailed paper on the event, and will include you as a co-author.

I have sent you three additional copies of the Weatherwise article. Please inform me if you can use additional copies of this or other of our publications.

The Perth group did an excellent job in hosting the Conference. I heard nothing but good remarks about the conference, Perth, and the local hosts. Bob Southern's presentation deserves comment, as well. I thought it was particularly well-done.

Please keep in touch. I look forward to future contact with you and the fine people in Perth. Thanks again for all that you have done.

Best personal regards.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.
Director

cc 30/1

Mr Linthorne 6/2

Texas Tech University
Institute for Disaster Research
Dept. of Civil Engineering
Box 4089/Lubbock, TX 79409

LUBBOCK, TX
PM
15 JAN
1980

22c USA

Mr. A. Scott
Bureau of Meteorology
P.O. Box 6070
Perth, W.A. 6000
AUSTRALIA

AEROGRAMME VIA AIRMAIL PAR AVION

(2) Second fold

Additional message area

45/38

233 1/6

Department of CONSERVATION and ENVIRONMENT

Regional Director,
Bureau of Meteorology,
127 Wellington Street,
PERTH W.A. 6000

your ref:
our ref: 107/71 CM:JNM
enquiries:

Dear Sir,

This Department has recently received a letter concerning lights on the southern horizon from Mrs. Muir of Scarborough.

As the questions relate to meteorology, I am referring the letter to you. I have informed Mrs. Muir that you will reply direct to her.

Thank you in anticipation,

Yours faithfully,

C. F. Porter

C. F. PORTER
DIRECTOR

1 FEBRUARY, 1980.

[illegible]	/
SUPT.	
P.T.O.	/
M.S.S.	/
M.F.I.	
R.M.O	/
R.A.C.	/
OBS. [illegible]	/
REG.	

1 Mount Street, Perth, W.A. 6000 tel. 322 2477

23 15

181 Gelderclyffe St
Scarborough 6019
Mon 21 Jan 80

Dept Conservation & Environment
BP House
1 Mount St.
Perth

Dear Sir,

at this date, I am visiting our farm in the Jarramungup area.

at about 10-15 pm yesterday evening, we could see the horizon, South East of us, was well lit up.

Could you explain this (1) please - & also, is it fact or fallacy, that there lights in the Southerly district have any bearing on the immediate weather patterns! (2)

Yours sincerely,
Mrs F.L. Muir

contacted the Observatory they have no knowledge of any strange lights or Ufonds.

CM

Texas Tech University

Institute for Disaster Research

October 8, 1979

Mr. A. Scott
Bureau of Meteorology
P.O. Box 6070
Perth, W.A. 6000
AUSTRALIA

Dear Alan:

I will be in Perth 25 Nov.-2 Dec. attending the International Conference on Tropical Cyclones. I look forward to seeing you and others at the Bureau of Meteorology--Bob Southern, Mal Lamond, and Kevin Lynch.

I received a letter from Mr. P.J. May who is now at the Department of Agriculture in South Perth. He suggested the possibility of a trip to Northam when I arrive in Perth. If such a trip could be arranged I could resolve some unanswered questions about the site. Please coordinate any plans that can be made with Mr. R.A. Wittenoom (322 2777) who is coordinating my schedule for the week.

Best personal regards.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.
Director

dg

Dr J Minor taken to Northam by Bill Linthorne on 30/11/79. Colin Crane met them at station. AJ 4/12

AJ 17/12

Box 4089 / Lubbock, Texas 79409 / (806) 742-3523

AS:KG

230

45/38

Dr J E Minor
Director
Institute for Disaster Research
Texas Tech University
Box 4089
Lubbock
TEXAS USA 79409

Dear Joe

... Please find enclosed a copy of a letter received today from Colin Crane and the copy of the map he sent. He has marked in some details which may be helpful.

It may now be worthwhile locating the tank position and also interviewing Trevor Budd.

Colin Crane's notations regarding the state of the land in the paddocks confirms what I suspected. It is almost inconceivable that any ploughing would be undertaken in the early summer with 3-4 dry months to follow.

I will await any further thoughts you may have.

Yours sincerely

al.

(A SCOTT)
for Regional Director

7 September 1979

Correct address
8/10/80

COLIN CRANE
"MANXES"
BINDI BINDI
W.A. 6574.
Phone. 095 433060

MR. A. SCOTT
Bureau of Meteorology
Regional Office.

Dear Alan,

Thank you for your correspondence and please keep me informed as to when Joe Minor is visiting Northam as I am very interested to meet him. Please note that the above phone number is my brothers through which you may contact me at present.

Trevor Budd. is the fellow at the college who observed the formation of the tornado. you will find him a very helpfull person.

I have marked on the map the approximate position of the tank in question and place of propogation of the tornado but these could only be marked accurately "on site". I hope I have been of some use

Yours sincerely
C.J. Crane.

HALF MILE HILL
899

PT 39

BROOK

RIVER

ROAD

Spring Hill
Elm 27c

BRIDGE

BROOK

Logue Crossing

NORTHAM RESEARCH STATION

Research Station
(Dept. of Agriculture)

HOUSE

TREES

POWER LINE

Pt 1

Pt 4

Pt 1

Pt 1

ROAD

Boodjahmun Spa

CARTERS RD

NORTHAM YORK RD

Mt MARY

Muresk Agricultural College

Agricultural College(Muresk)

105.4°
5100+
229°
206°
135.6°
3225

very short grazed dry pasture

approx path of tornado

Stubble (harvested wheat)?

approx. tank position

Trevor Budd was working (harvesting) in this area - to be confirmed

Tornado began as "Willy Willy" and spread into a wide dust cloud before reforming

M

N

K

C

SOUTH WEST MINERAL FIELD

2 Miles

AS:KG

227

45/38

Dr J E Minor
Director
Institute for Disaster Research
Texas Tech University
Box 4089
Lubbock
TEXAS USA 79409

Dear Joe

Thank you for your letter of 1 August and the copy of the preprint paper enclosed. I am glad that this paper has been accepted for publication in the preprint volume of the 11th Conference on Severe Local Storms. The suggestion of Bob Lourensz that the paper be submitted to Australian Met. Mag. is a good one as it would then be very much available to the Australian community.

It is now almost impossible to obtain any data from Northam without a further visit. Colin Crane has resigned from the Department of Agriculture and is apparently working on his brother's property about 80 miles north of Northam. His address is now:

Mr C Crane
c/- Burra Burra
Post Office
BINDI BINDI WA 6574

Jim May has been transferred to the Department of Agriculture in Perth. His address is now:

Department of Agriculture
Jarrah Road
SOUTH PERTH WA 6151

I have just written to Colin Crane to clarify a few points he made when we first visited Northam. If his answers add anything of interest I will pass this to you.

... On the attachment I have set out comments etc regarding the additional data you are seeking.

.../2

Unfortunately on the two visits made we have not met up with the Rodgers. If we had this might have made some of the data easier to acquire. It will require a meeting with Mr Rodgers to determine the state of the paddocks and to define the various fence lines.

Please let me know if the enclosed data clarifies any of the problems you have had. I will wait for an answer from Colin Crane and possibly yourself before deciding on another trip to Northam. I certainly hope to be able to arrange a trip there when you visit Perth in late November.

Yours sincerely

(A SCOTT)
for Regional Director

23 August 1979

Attachment

ADDITIONAL DATA REQUIREMENTS
FROM NORTHAM TORNADO SITE

Landmark Locations for Early Photos in Sequence

1 The house in photo 8 is actually the office of the Northam Agricultural Research Station. We did not measure the direction to this building but photos 8 and 11 can be overlapped as in the attached photocopy. It is then obvious that camera B is about the same distance from camera A as this house. The house would normally have a $7\frac{1}{2}$ or 8 foot ceiling, thus giving it a wall to wall width of about 22-24 feet. (These are estimates only.)

2 The power poles in 7A, 8A, 9A and 10A are along a service road which runs at right angles to the plane of photo 8 and just to the right of the photo. I think the pole without the cross arm in photo 8A is just apparent on the right edge of photo 8 (see photocopy enclosed). My attempt to draw a plan of the area is attached. Note that camera B moved from X to Y to its final position.

Paddock Boundaries

1 and 2 I do not know if the actual paddock boundaries are as marked on the map. There is at least one additional fence line of which I am aware. This bounds part of the road from the Rodgers' house to the front entrance to the property.

3 The status of each paddock could only be established by contact with Mr Rodgers.

4 The boundary along the road leading to the Rodgers' house is obvious on photo 13A (see photocopy). On photos 11A and 12A this actual boundary is not directly obvious because the road is in a shallow gully as it approaches the house. In other words it is below the ridge level in the foreground paddock. The contrast of colour between the foreground and background paddocks to the left of the Rodgers' house does tend to suggest a boundary near the ridgeline, however this is not the case.

What I am not absolutely certain about is whether the fence line along the road to the house is parallel to the power line as it approahces the house. I suspect that it is. Going towards the front gate which is at E the road veers to the left and leaves the trees through which the tornado passed 100-200 yards away to the right.

.../2

5 This will require a visit to Rodgers.

6 The path was as estimated by Crane and May. Jim May did not visit the Rodgers' property. Colin Crane only inspected the area where the tornado passed through the trees.

The letter I have written to Colin Crane seeks to identify the location of a tank on the Muresk property which may have been damaged by the tornado. He also mentioned that a farmhand on this property had seen the tornado during its early stages. If we can track him down we may be able to define the track a little better.

AS:KG

223

45/38

Mr C Crane
c/- Burra Burra
Post Office
BINDI BINDI WA 6574

Dear Colin

Further questions have been raised by Joe Minor regarding the boundaries of the paddocks on the Rodgers' property and what the ground cover was at the time eg stubble, ploughed etc. I think these questions can only be resolved by another visit to the site.

I think during our first visit you mentioned that one of the staff at Muresk Agricultural College observed the formation of the tornado. Are you able to remember who this was and any of the details such as where he observed it to form and the subsequent track? I expect we may have to contact him.

You also mentioned that the top of a tank was damaged, could you indicate on the map enclosed the approximate position of this tank.

I believe you no longer work with the Department of Agriculture but I hope this letter finds you. Joe Minor is coming to an International Conference on Tropical Cyclones in Perth in the week from 25 November-1 December next. He is expecting to visit Northam and will no doubt hope to meet you and Jim May if this is possible.

Thank you for anything you are able to offer regarding the above questions.

Yours sincerely

(A SCOTT)
for Regional Director

22 August 1979

Texas Tech University
Institute for Disaster Research

August 1, 1979

Mr. Alan Scott
Bureau of Meteorology
P.O. Box 6070
Perth, W.A. 6000
AUSTRALIA

Dear Alan:

We have been busy hosting foreign visitors to the U.S., many of them Australians who attended the 5th International Conference on Wind Engineering in Ft. Collins, 9-14 July. George Walker and John Holmes from James Cook University were here, as were Bill Melbourne (Monash Univ.), Dick Aynsley (U. Sydney) and Charles Bubb (Dept. Housing and Construction, Canberra). Each of these visitors expressed interest in our work with Australian tornadoes, especially the Northam event.

We are proceeding with our evaluation of the Northam photographs. We are working with two sequences: the "shell sequence" (photographs 7a, 8, 8a, 9a, 10a) and the "transition sequence" (photographs 11, 11a, 12, 13, 13a, 14, 15, 15a). A few questions of clarification have come up (see enclosure). If you or Messrs. Crane and May can provide the additional information it would be helpful. Please do not make additional field surveys to answer these questions.

I plan to be in Perth 25 November-1 December to attend the International Conference on Tropical Cyclones. Perhaps it would be possible to organize a trip to Northam late in the week to meet Messrs. Crane and May and to visit the site.

Regarding publication plans, we have submitted a brief paper on the Northam Tornado to Weatherwise and have included your name as a co-author. Dr. Joe Golden who is an associate editor is helping us with the paper. He had some contact earlier with Dr. Brook in Melbourne regarding the photographs. We plan a technical report as a basic document with submissions to journals to follow.

We will include you as a co-author on these documents and will be sending manuscripts for your review as the publications are developed.

We continue to work with Bob Lourensz on more general papers about Australian tornadoes. The manuscript I forwarded to you was not accepted for publication in the Proceedings of the 5th International Conference on Wind Engineering, but was accepted for the Preprint volume of the 11th Conference on Severe Local Storms in an abbreviated form (advance copy enclosed). At Bob's suggestion we will submit the complete manuscript to Australian Met. Magazine.

Thanks again for your assistance. I will look forward to seeing you in Perth in November.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.
Director

enclosures

dg

ADDITIONAL DATA REQUIREMENTS FROM
NORTHAM TORNADO SITE

Landmark Locations for Early Photos in Sequence

1. Location of house in photo 8 relative to Camera A. Also confirm building dimensions.

2. Location of power poles in photos 7A, 8A, 9A, 10A.

Paddock Boundaries (Ref. Map Attached)

1. Are paddock boundaries for Paddocks A, B, C (see map) same as in 1977?

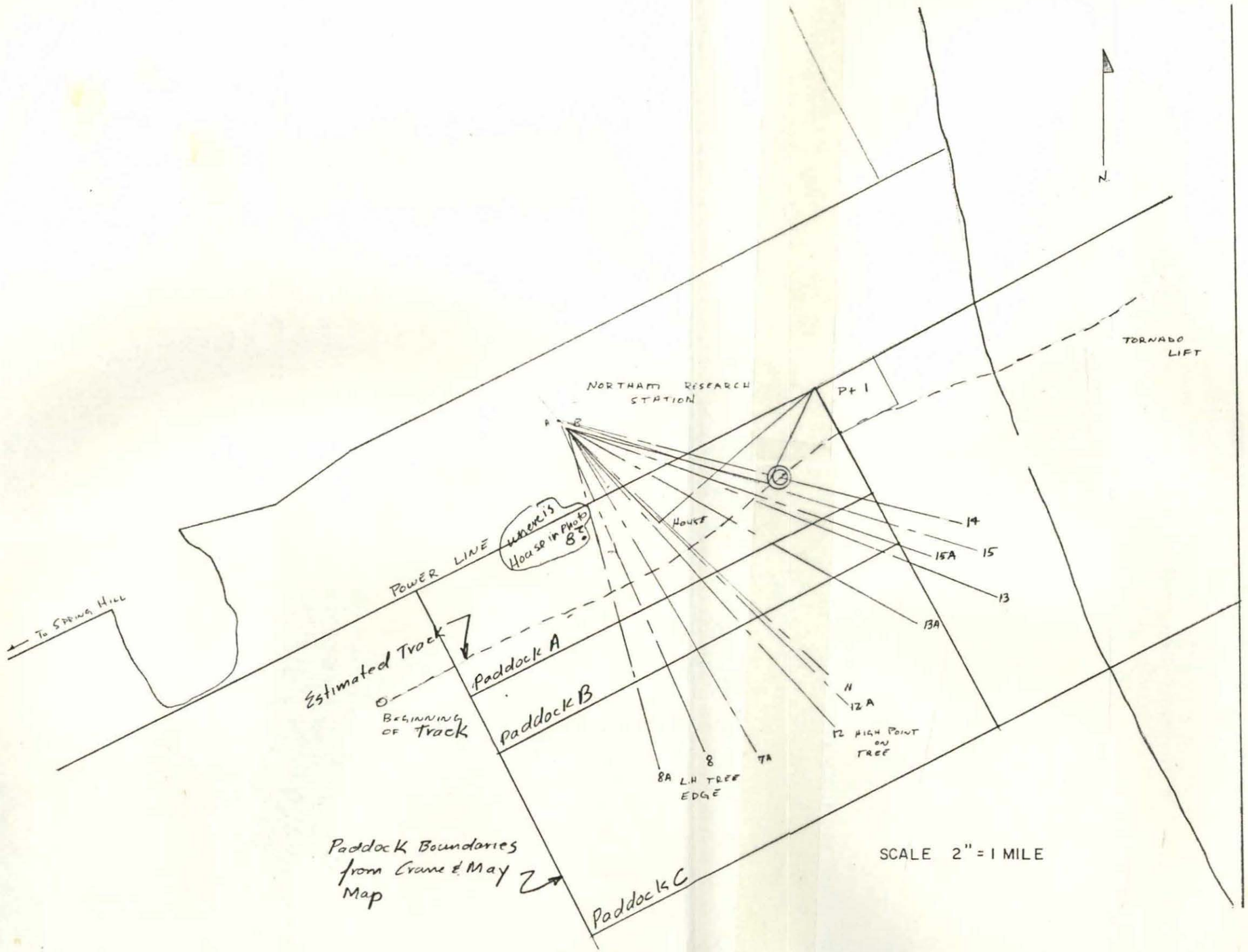
2. Were paddocks subdivided; if so, how?

3. Can the status of each paddock in December 1977 be established, i.e., plowed or in pasture.

4. In photos 11A, 12A, 13A the base of the tornado appears to be close to the boundary between two paddocks. Can you indicate this boundary on the map? (As you can see, we are having difficulty establishing how far behind the Rodgers' house the tornado passed.)

5. A refined map of paddock boundaries and fencing, corrected to December 1977, would be helpful.

6. Was your path estimate based on ground marks, landmark reference, or other means? Could the path have been in Paddock B? (see map)



	NORTHAM TORNADO	WORK SHEET TTU/IDR 7/7/79 RB/JM

TEXAS TECH UNIVERSITY
Institute for Disaster Research
P. O. Box 4089 · Lubbock, Texas 79409 · 806/742-3476

December 22, 1978

Mr. Alan Scott
Bureau of Meteorology
Post Office Box 6070
Perth, W.A. 6000
AUSTRALIA

Dear Alan:

I have submitted the enclosed draft manuscript for presentation at the Fifth International Conference on Wind Engineering to be held in Fort Collins, Colorado, 8-13 July 1979. Should the paper be accepted, I will have an opportunity to make changes and revisions prior to its appearing as a preprint.

I am sending copies of the manuscript to several of my colleagues in Australia for comment. I would be pleased if you would review the paper and offer suggestions which may seem appropriate. My only constraint is one of length. The final copy must be twenty pages or less.

We continue to enjoy the sharing of our Australian adventure with professional and personal friends. Best personal regards.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.
Director

pb
Enclosure

AS:KG

217

45/38

Mr J May
Department of Agriculture
Jarrah Road
SOUTH PERTH WA 6151

Dear Jim

... Please find enclosed copies of the original maps which you and Colin Crane supplied to us.

The dashed track on one of them is approximately correct so presumably any sampling could be done approximately 250 metres to the south or southeast of the Rodgers' house. This should give a reasonable sample of the soil that was lifted into the tornado if the soil type is fairly uniform.

Yours sincerely

al.

(A SCOTT)

19 July 1979

TEXAS TECH UNIVERSITY
Institute for Disaster Research
P. O. Box 4089 · Lubbock, Texas 79409 · 806/742-3523

WESTERN AUSTRALIA 150
1829 - 1979

May 18, 1979

Messrs. C.J. Crane and P.J. May
Northam Research Station
P.O. Box 354
Northam, W.A. 6401
AUSTRALIA

Gentlemen:

Your photographs of the Northam Tornado continue to generate great interest within the meteorological community in the U.S. I would like to bring you up to date on my activities in this regard, and ask you for additional favors.

A paper on Australian tornadoes has been accepted for presentation at the 11th Conference on Severe Local Storms (Kansas City, October 2-5th). The paper will include the Northam Tornado as one of three case studies. In addition, my colleague in Atmospheric Sciences, Dr. Richard Peterson, is presenting a paper on "dusty vortices" in which he will treat the Northam Tornado as an example. With this start, Richard Peterson and I have committed to developing a more comprehensive paper on Australian tornadoes for submission to the Bulletin of the American Meteorological Society.

Beyond the specific papers mentioned above, Dr. Peterson and I are developing a detailed case study of the Northam event itself. We have noted two interesting features of the vortex. First, early views in the sequence show as many as five concentric "shells" in the dust pattern (see especially Photographs 7a, 8). Secondly, the vortex seems to go through a transition toward a more turbulent base as it passed over the open field (Photographs 11a, 13a, 15a).

With regard to the "shell" pattern, Dr. Peterson has noted similarities between this structure and waterspout vortices. A paper by Kangieser (Mon. Wea. Rev., 82, 147-152) addresses the hollow structure of waterspout tubes. The model advanced by Kangieser recognizes a balance between centrifugal forces and radial inflow acting on individual (in his case) water

particles. If this model is applicable to the Northam Tornado, then perhaps the shells observed are the result of segregation of particles according to size and density.

This brings me to my additional request. To pursue possible explanations of the observed vortex structure we would like to have a particle size analysis for the soil in the paddock over which the tornado passed. Preliminary calculations indicate that, for the model to be applicable, particle sizes down to the micron range would have to be present. We would also like to have an analysis of the mineralogy by particle size. In any event, we thought it possible that you could conduct such an analysis for us, assuming you have sieves and a hydrometer. Alternatively, you could ship us about 500 gms of the soil and we would make the analysis (We can pay shipping costs).

I am sending copies of this letter to both Robert Lourensz in Melbourne and Alan Scott in Perth for their information. They may recall that similar shells are discernible in the photographs of the Port Hedland Tornado (17 December 1975).

We have received Alan Scott's letter of April 11 which contains photograph orientation information. We sincerely appreciate his and your efforts in assembling these data. We are currently working with these data to establish basic vortex dimensions. I am also in contact with Dr. Joe Golden of NOAA who has received some data on the Northam event from Robert Lourensz.

I am trying very hard to arrange a trip to Perth for the Conference on Tropical Cyclones in November. Should I be successful, I will endeavor to arrange a trip to Northam to meet both of you.

Thank you, again, for your continued assistance.

Very sincerely yours,

Joseph E. Minor, P.E.
Director

RD for information

cl. 29/5

cc: Mr. Alan Scott
Mr. Robert Lourensz

AS:KG

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45/38

Mr C Crane and Mr P J May
c/- Northam Research Station
PO Box 354
NORTHAM WA 6401

Dear Sirs

... Please find enclosed a photocopy of a draft paper prepared by Joe Minor for presentation at the Fifth International Conference on Wind Engineering at Fort Collins, Colorado, 8-13 July 1979. Being photocopies of photocopies the photos have reproduced poorly but the paper may give you some idea of the use to which your photos are being put.

The recent measurements we made have produced a satisfactorily consistent set of data which we have forwarded to Joe Minor and also to Joseph Golden.

Yours sincerely

(A SCOTT)

19 April 1979

45/38

Dr J E Minor
Texas Tech University
Institute for Disaster Research
PO Box 4089
LUBBOCK
TEXAS 79409
USA

Dear Joe

At last we have managed to revisit Northam and assemble a set of measurements which will hopefully be adequate for your purposes.

The measurements have been related to the power pole separations and orientation and are reasonably consistent. Unfortunately the only map of the area leaves a lot to be desired in that it contains no details of buildings, windmills etc so our survey is essentially tied to the map by the bearings from the entrance to the Rodgers' property (E on map) to the Rodgers' farmhouse and the fallen trees.

You will notice that the locations of the trees, house and camera positions are in quite reasonable agreement with the original sketches provided by Crane and May.

In your letter of 14 August 1978 you asked for notations regarding areas of grass cover and ploughed fields. The whole of the Rodgers' property over which the tornado passed would seem to have been planted with wheat during the previous winter and harvested in the early summer leaving only a wheat stubble which may have been grazed before the tornado occurred. The paddock between the house and power line appears to have a similar amount of stubble to that present when we visited it in January. The paddock behind that is far barer in the photos.than it was during our recent visits. The winter of 1977 was very dry and wheat crops were significantly reduced so grazing of sheep may have reduced the stubble covering quickly. It is not usual for ploughing to occur until late March or April in this area. The Rodgers were absent during both of our visits.

According to Colin Crane there were no obvious ground marks after the passage of the tornado. Photo 16A was taken by Jim May who did not inspect the path of the tornado so this photo probably does not relate to the tornado.

.../2

Joseph Golden has asked through our Head Office for copies of any survey details so I will send him a copy of the data enclosed. He has also sought permission in the last week to publish several of the Northam photos.

I have read with interest the paper you have prepared for the Fort Collins Conference. I do not think the data I have enclosed will warrant any significant changes. In Figure 6 the relation between the cameras, house and poles is slightly different from that indicated. In Table 1 the following entries need corrections:

17 June 1842	Bunbury WA
15 July 1964	Mandurah WA
10 August 1964	Numurkah VIC

This paper could arouse the interest of a few engineers if published locally.

The Tropical Cyclone Workshop I attended at James Cook was very informative. The visit by the Stormfury team proved very successful from an operational point of view though the situation regarding a future visit will not be known for some time. I was pleased to meet a number of people whom you would know well - John Oliver, Kevin Stark, Hugh Trollope. I missed George Walker at the time as he and John Oliver rushed off to Mackay to inspect cyclone damage etc but George called into our office last week during a break in an engineering conference he was attending here.

My apologies for the extreme delay in providing this data. Please let me know if any further questions arise.

Yours sincerely

as.

(ALAN SCOTT)

11 April 1979

NOTES REGARDING MEASUREMENTS ETC

(a) Bearings to the galvanized sheds which appear in photos 11A, 12A, 13A and 11 were to the highest point of the left hand gable end.

(b) The bearing of the farmhouse between these sheds was that of the highest point of the galvanized roof.

(c) The left hand shed is 31 ft wide by 61 ft long by 20 ft high with the right hand end obscured by a tree.
The right hand shed is 24 ft wide by 62 ft long by 20 ft high.

(d) Jim May is standing in the right foreground of photo 11 near the position from which later photos in the A series were taken. Jim May's position (camera B) seems to have varied over some 30-40 ft as is partly evident in photos 11A, 12A, 13A and 15A.

(e) The heights of two of the distant power poles was calculated from theodolite measurements made at a distance of 75 ft from the base of each pole.

(f) The power pole in the foreground of a number of photos has a calculated height of 32.5 ft to the top of the centre insulator. The calculated height between the top of the centre insulator and the bottom of the white plate on this pole is 26.4 ft.

(g) The distances between this pole and the position of camera A, the large tree and one of the camera B positions were measured.

(h) The distances between the three distant power poles was measured. A small correction was applied to the measured distance between the centre and left hand pole to account for the 4^{0} ground slope between them.

(i) In photo 13A the tornado is moving towards a belt of trees. A gap in this belt is evident after the tornado passed in photos 14, 15 and 15A. This is the location of photos 19, 20 and 21.

(j) As many measurements or calculated distances as possible have been related to the baseline formed by the three power poles along the line $063^{0}/243^{0}$ which parallels the boundary fence between the Rodgers' property and the Research Station.

(k) On the enclosed scale drawings dashed lines have been used to indicate bearings which do not close with other measurements.

(l) All bearings are degrees true and distances are in feet.

(m) The published map scale is two inches equals one mile.

DETAILS OF SELECTED PHOTOGRAPHS

Photo	
7A	Picture centre ~149°
8A	Insulator (right hand) 139° Tree Edge (left hand) 164.5°
10A	Picture centre~149.7° Tornado base 144.7°
12A	Picture centre ~134°
13A	Picture centre ~118.8°
15A	Picture centre ~109° Distant power pole in picture centre 120.9° Angular Height of this pole -2.4° to -1.0° = 1.4°

Photo

8 Picture centre ~ 155.5°
Tornado base ~ 152.4°

11 Picture centre ~ 132.7°
Pole in foreground 130.2°
Distance from camera to large tree ~ 151 ft
Distance from camera to pole in foreground ~ 504 ft
Pole in left distance 122° Height 56.5 ft

12 Tree top (tallest part) ~ 137.5°

13 Picture centre ~ 111.6°
Pole 112.1° Height 58 ft

14 Picture centre ~ 104.3°

15 Picture centre ~ 106°
Pole 112.1° Height 58 ft

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BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 11/4/79

TO Physical Research Melbourne ATTENTION Mr R Lawrence

YOUR REF:

FROM Special Services Perth.

OUR REF: 45/38

SUBJECT Nathan Tornado Data for J Golden

Dear Bob,

Please find enclosed a copy of the data which I have sent to Joe Minor in respect of the Nathan tornado of 21 Dec 1977. I think it will serve his purposes & hopefully those of Joseph Golden. Golden asked for an estimate of the cloud base. Unfortunately this is not easily made. At 3pm at Nathan PO. the temp was 38° & the dew point 10°. This would suggest a base of about 8000-9000 ft which seems rather higher than the cloud in the photos. Estimates made by some of

SIGNATURE	PRINTED NAME	APPOINTMENT
A Scott	A Scott	Met 3

FILE COPY

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE / /

TO

ATTENTION Mr R Lawrence.

YOUR REF:

FROM

OUR REF: 45/38

SUBJECT

our observers vary from 3000 - 5000 ft. The only way of obtaining something meaningful seems to be by using photogrammetric techniques on any photos 7 & 8 where the distance to the tornado is known approximately. The orientations is not far from the vertical.

Please let me know if Joe Golden wants anything further.

Regards

Alan S.

SIGNATURE	PRINTED NAME	APPOINTMENT
A Smith	A Smith	Met 3

FILE COPY

206

45/38 Scott

Government Astronomer
Astronomical Observatory
Walnut Road
BICKLEY WA 6076

Dear Sir

... Attached is a report concerning a meteorite received at our Head Office Melbourne.

It is being forwarded for your information and possible attention. The observer has not been contacted by this office in respect to this observation.

Yours faithfully

(D R WALKER)
for Regional Director

12 March 1979

cc File 009771

AS:KG

AND THE ENVIRONMENT

208

45/38

Mr G A Hume
UFO Research Group
216 Lawrence Street
BEDFORD WA 6052

Dear Mr Hume

The photograph you forwarded does not appear to show any object which could be recognised as part of a balloon train. The normal balloon train released from Ceduna consists of a balloon and aluminium foil radar target. During the daylight saving period this would be released at about 8.30 am daylight saving time (2200 GMT) which is well after dawn. Balloons normally burst after 60-90 minutes at an altitude of 50000-70000 feet (15000-21000 m).

I am not able to offer any alternative meteorological explanation of the object in this photograph.

Yours sincerely

(A SCOTT)
for Regional Director

14 March 1979

45/38
SCE 077

PERTH OBSERVATORY

BICKLEY, WESTERN AUSTRALIA, 6076.

With the Compliments

of the

Government Astronomer

AUSTRALIA

DEPARTMENT OF MINERALS AND ENERGY
BUREAU OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS

With the Compliments of

MUNDARING
GEOPHYSICAL OBSERVATORY

MUNDARING, WESTERN AUSTRALIA 6073

TELEPHONE: 95 1555, 95 1030
TELEX 93876
TELEGRAMS: BUROMIN, PERTH

~~1504.~~
204

RECEIVED
MAR 9 09 26 '79
BUREAU OF METEOROLOGY WA

PERTH UFO RESEARCH GROUP

PERTH OBSERVATORY
-7 MAR 1979
BICKLEY 6076
WESTERN AUSTRALIA

216 Lawrence St
BEDFORD W.A. 6052
28/2/79

Director,
Meteorology.
Bickley.

The enclosed photo is an enlargement from not much bigger than a dot of an object photographed at Ceduna Dec. 1977. It was passed into us for assessment and we think you might be able to say definitely whether it is indeed a photo of the equipment trailed by weather balloons keeping in mind that the correct colour should be brownish yellow as it was reflecting the sun after dawn (We were given a negative enlargement). The sightee + photographers' wife is positive its movements were not those of a weather balloon but we suppose they can act strangely at times

Yours Sincerely Geo. A. HUME (SKITTLES)

P.S ENV. ENC FOR REPLY AND RETURN OF PHOTO.

PERTH UFO RESEARCH GROUP NEWS LETTER

February
1979.

EDITOR: S.E.Harper, P.O. Box 92, NORTH PERTH. W.A. 6006. Tel. 322-6694.

Our previous Meeting held in January, brought to a close our activities for Year 1978-79 and a very large number of Members and Friends were in attendance to again hear Mr. Max. Richardson relate his unusual experiences in the Marble Bar region. Several slides of more or less well-known suspected U.F.O's were shown and newcomers to the Group were given the opportunity of catching up on the past UFO scene.

Reports continue to be phoned thru' to Geo. Hume on Tel. No. 271 6604 and so far this year we appear to be experiencing a period of greater activity than for some time. A feature of U.F.O. reports is the fluctuating number of calls received and, whilst it is very difficult to interpret trends, so-called flaps do occur. So, please don't neglect to report your sighting to george, yours may be the report that leads to the solving of the mysterious U.F.O. As usual the Sighting Register will be available for perusal during our next Meeting. Your comments (and any suggestions or solutions) are always welcome and your interest in sightings generally is some small measure of reward for the amount of work put into keeping our records up to date.

The Group makes some effort to keep in the public eye and on Saturday, 3rd. February last we took part in a Float Parade at Balga in connection with the 150 Yearscelebrations. Our thanks are due to a staunch band of workers who assisted our project, namely George Hume, who provided and drove the vehicle, Chris. Whiteside who made sure that our models were prevented from taking off and becoming Flying Objects, M/s. Lil. Culshaw who assisted in decorating the float and M/s. Pauline Culshaw who decorated the float with her presence as a 'Space Girl'. The comparatively high wind provided some problems and if you have any doubts as to the aerodynamic qualities of our U.F.O. models, just ask Chris - he'll be able to give you first hand knowledge. Although we failed to win a prize for our entry we did gain a lot of experience and will be able to take part in any further parades with some chance of earning the acclaim of the judges. A disappointing feature of the whole day was the complete absence of any Members who may possibly been unaware that we were taking part. One Member however, Mr. Laurie Campbell took part in the parade and, as a silver-suited Spaceman, looked the part and delighted the kids. Our next feature will be the Hyde Park Festival on the longweek-end of 3rd, 4th, 5th.,March next when we will again have a manned display. You have been informed so don't say you disn't know - just come along and lend your support. Your presence is all we ask of you - of course, if you feel that you would like to help just remember that 'one volunteer is worth ten pressed man' and let us know that you are available.

Our February Meeting will be the Annual General Meeting and will be held at 8 o'clock P.M.on Thursday, 8th. February at 14 Aberdeen Street, Perth when new Officers will be elected and you will all have your chance to voice your approval (or otherwise) as to the activities of the Group. Please make sure that you are present and remember that only FINANCIAL MEMBERS are eligible to vote or speak. The A.G.M. will be followed by a talk by Mr. Chris. Chiteside, so you can be assured of a full evening of entertainment. Appended overleaf is the Agenda for the A.G.M. and the Chairman's Report and we hope that by circulating this we will bring Members up-to-date on what the Group is doing.

Perth U.F.O. Research Group - ANNUAL GENERAL MEETING - Agenda. 8 Feb.'79.

1. Minutes of previous Annual General Meeting.
2. Business arising from previous minutes.
3. Amendments to the Constitution.
4. Election of Honorary Life Member.
5. Chairman's Report and Financial Statement.
6. Election of Office Bearers - President
   2 Vice Presidents.
   Secretary & Assistant.
   Treasurer & Assistant.
   Correspondence Secretary & Asst.
   committee Members (2)
7. General Business.
   Appointment of Librarian, Publicity Officer, Newsletter Editor.

Chairman's Report.

Ladies and Gentlemen,

According to the Constitution of the Group we aim to examine, investigate, study, discuss and evaluate such subjects as we decide upon from time to time and so far, we have certainly achieved our objects; we also aim to arrange displays and exhibitions and this we also did throughout the past year and currnetly have plans for the immediate future, we edit a Newsletter more or less regularly but, although we are, I'm sure, quite prepared to extend a warm welcome to any friendly space traveller, such an occasion has not (yet) arisen. Therefore, in terms of the Constitution, I am able to report to you that we have carried out our duties as well as we are able, but I am somewhat hesitant to say to you that we have had a successful year. To date we are still unable to positively identify the U.F.O. so we are not reporting unqualified success - a good year but we still have work to do and I trust that the Group will continue in its task and perhaps, eventually solve the mystery of U.F.O's.

Our Meetings have been held regularly and your Committee has endeavoured to provide interesting activities and Speakers throughout the year. Attendances have been gratifying and seem to be on the increase and new members are joining throughout at each meeting. The subjects discussed have been wide and varied ranging from personal experience reports to pyramid power and psychic explanations.

On several occasions we have organised social functions such as Star Watch Barbecue Nights, Picture Outings etc, and these have all proved to be most enjoyable. However, there is a somewhat disappointing lack of interest from the bulk of the membership.

The Group took part in Exhibitions at Hyde Park, Elizabethan VillageArmadale and entered a float in the recent parade at Balcatta and much valuable publicity was obtained. Such activities result in membership enquiries and keep the Group in the public eye as an active body.

The Library has been kept up to date and we still maintain a well balanced selection of books and magazines. I would like to thank personally those generous people, members and others who so kindly donated material for our use.

Throughout the year Supper has been served and is a very welcome item on any agenda and I thank the ladies of the Social Committee who have looked after our needs, so well.

Your Committee has worked well throughout the year, the individual members have co-operated well with one another in a most harmonious manner and I know all Members will wish to join with me in thanking them for their efforts. The thanks of the Group are due to Mr. Chris hiteside for providing a venue for the Committee to meet and the supper is appreciated too !

Financially, we have enjoyed a successful year, finishing with a surplus of over $263, the details of such surplus are available to those who desire more information. In conclusion I thank each and every one of you for your personal support and efforts throughout the year.

Stanley E. Harper (Chairman)

45/38

Dr J E Minor
Director
Texas Tech University
Institute for Disaster Research
PO Box 4089
Lubbock Texas 79409
U S A

Dear Joe

Many thanks for the copy of the NOAA Technical Memorandum on the Tornado. I hope to read it thoroughly in the near future.

My apologies for the delay in forwarding some data to you from Northam. We did in fact visit the Agricultural Research Station on 19 January, however the quality of the results we obtained leaves something to be desired so I have refrained from passing them to you. We were somewhat pressed for time and so used a magnetic compass to make some of the measurements but this seems to have been a mistake. Next time we will use the power line as a baseline and make the angular measurements relative to this with a measured baseline between three of the power poles. Having been through the exercise I think we can make the requisite measurements in a day.

Our last trip was the only successful one out of five or six previous attempts all of which were abandoned because of the non-availability of a vehicle.

About the same time that we visited Northam I was invited to go to James Cook University to a Workshop on Tropical Cyclones (28 February - 2 March) which is being held while the Stormfury Project team is visiting Australia. The need to prepare a paper has been a restriction on a further visit to Northam before then but having received last week a copy of your draft paper I would like to be able to forward some consistent measurements with any comments on the paper in the second half of March.

I hope this will be satisfactory.

Yours sincerely

(A SCOTT)

20 February 1979

45/38 A. Scott

RD

ADDITIONAL REMARKS ON WEATHER OR PHENOMENA

STATION NARNDEE MONTH DECEMBER

DATE	REMARKS
2/12/78	U.F.O Sighted by Michael Fogarty and friend near Penryn Turnoff from Great Northern Highway at approx 0230 hrs. Time taken was of a bright white light seen behind the clouds in East. Light gradually faded over period of approx 3 seconds
	Note in back of December 1978 Field Book received From Narndee 007-067.
	MRS. R. A. FOGARTY, NARNDEE STATION, PAYNES FIND, VIA. WUBIN. W.A. 6612.

RECEIVED JAN 5 09 1 8 '79 BUREAU OF METEOROLOGY W.A.

END OF MONTH REMINDERS AND NOTES ON COMMON FAULTS

1. Leave blank pages when no observations are made.
2. Empty rain gauge at 0900 or when the reading exceeds 20 millimetres
3. Enter in column 71-73 "Amount since previous obs." the amount of rain which has fallen since your previous reading of the gauge.
4. Always forward forms F.68, Rainfall Return (and F.184 Evaporation returns, if applicable) in the same envelope as the field book.
5. Enter under 'Progress Total since 0900' the total of rain measured from the previous 0900 up to the present reading.
6. Take care to enter all the appropriate figures for maximum, minimum and terrestrial minimum thermometers.
7. Remember that column 78 refers to low cloud.
8. Hold this book until you make your 0900 observation on the first of next month when you will read the maximum thermometer before touching and enter the reading in this book.

200

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 29/11/78

TO Physical Research Sect Melbourne ATTENTION Mr R Lawrence

YOUR REF:

FROM Special Services W.A.

OUR REF: 45/38

SUBJECT Nathan Tornado Photos

Bob,

Please find enclosed postcard size copies of the prints of the Nathan tornado. They are in fact prints of prints. We recently discovered that Pacific offer this service at 80c/copy. It is very useful when the negative is not available or not readily available. The amount of degradation from the original print seems negligable.

The cost of $16-80 has been paid.

At this stage I do not know when we will be able to take out any later cyclone tracks for you. Hopefully some one else will do it. Regards.

SIGNATURE	PRINTED NAME	APPOINTMENT
A Scott	A Scott	Met 3.

FILE COPY

October 1974

TEXAS TECH UNIVERSITY
Institute for Disaster Research
P. O. Box 4089 · Lubbock, Texas 79409 · 806/742-1231
806/742-3523

September 22, 1978

Mr. Alan Scott
Bureau of Meteorology
P.O. Box 6070
Perth, W.A. 6000
Australia

Dear Alan:

I have arrived home following my six month visit to Australia. Before facing the volume of work that confronts me here, I wanted to get off a note of thanks to my friends in Australia who made my visit profitable and enjoyable.

My family and I will long remember the hospitality of Australians and the good experiences in your beautiful country. I have gained much from my association with Australian geographers, engineers, meteorologists, and others who helped with my activites.

Please remain in contact and let me know if I can assist in any manner. Should you travel to the United States, we would be very pleased to hear from you.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.
Director

dg

R.D. for information
DAA 10/10/78, Thanks for your kind words, Alan.

AS:KG

198

45/38

Australian American Educational
Foundation
PO Box 1559
CANBERRA CITY ACT 2601

Attention : Mrs B Madelly

Dear Madam

Please find enclosed a receipt for $8.00 paid by Dr J E Minor, Fulbright Senior Scholar, for photographs of a tornado at Port Hedland.

Yours faithfully

as

(A SCOTT)
for Regional Director

12 September 1978

AS:HB

197

45/38

Mrs W Walker
PO Box 111
DERBY WA 6728

Dear Mrs Walker

The phenomenon you observed may be related to the passage of a satellite, however because we have no knowledge of whether this was the case, I have forwarded your letter to the Government Astronomer at Bickley. I hope he will be able to offer you a satisfactory solution.

Yours sincerely

(A SCOTT)
for REGIONAL DIRECTOR

11 September 1978

AS:HB

196

45/38

Government Astronomer
Astronomical Observatory
Walnut Road
BICKLEY WA 6076

Dear Sir

... The enclosed letter was received in this office, but I have passed it to you in the hope that you may be able to advise Mrs Walker.

There is no evidence that the observation could be associated with the release of a pilot balloon from our Derby office approximately one hour earlier than the observation time.

Yours faithfully

(A SCOTT)
for REGIONAL DIRECTOR

11 September 1978

195

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND

POST OFFICE, JAMES COOK UNIVERSITY, QLD 4811 TELEPHONES: Douglas 793711; Pimlico 792193; TELEX: AA77009

a1819

5-9-78

Alan-

I received your letter of 31-8 with the Port Hedland tornado photographs. Thanks again for very prompt assistance. Enclosed is a cheque for $8.

Since I will be gone from here on 9-9, send the receipt to:

Australian-American Educational Foundation
P.O. BOX 1559
Canberra City A.C.T. 2601
ATTN: Mrs. B. Madelley

Please mark the receipt: Port Hedland Tornado Photos

Bob Southern gave an excellent talk today. I showed the Northam Tornado photographs and had many questions on tornadoes. It is an excellent meeting with more than 100 in attendance.

I will look forward to hearing from you when I ~~rest~~ return to the US. Thanks for your willingness to follow-up on my questions.

Sincerely,

Joe

a1819

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name Dr J.E. Minor

Address Australian - American Educational Foundation
P.O. Box 1559
Canberra City A.C.T. 2601
attention Mrs B Madelley

Details of Request 10 colour prints of Pat Hedland tornado.

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

Grade of Officer		$	¢
.....	..... hours @ ..... per hour =		
	..... hours @ ..... per hour =		
	Materials 10 colour prints @ $0.80 copy	8	00
	Other Expenses (inc. data processing) =		
Overhead Costs	(120% of Direct Costs) if applicable =		
	TOTAL CHARGE =	$ 8	00

Costs computed by A Salt 8/9/78

A Salt .....
(Section Leader)

Recommendation (if any)

Confirmed

K Lynch .....
(Supervising Meteorologist)
8/9/78

(Waiver action, if applicable)

.....
(Regional Director)
...../...../.....

Client advised ...../...../.....

.....
(Accounts Clerk)

Receipt No. AE 364654

193

P.O. Box 111,
Darlg. 6728
31st August 1978

The Officer in Charge,
Dept. of Meteorology,
231, Adelaide Terrace,
Perth.

SMSS — our balloon + lantern
pls reply

Dear Sir,

Last night, very shortly after 8 pm, my husband & I watched an orange coloured object move across the sky.

We first noticed it when it was almost directly overhead. After a few seconds, it faded away - we thought it was gone. But it reappeared just as brightly & we watched it travel in a direction we thought would be just east of north. We were not able to see it to the horizon as there was a house obscuring our vision.

It had a very beautiful orange coloured sparkling tail. We watched it for perhaps 20 seconds - it is difficult to say.

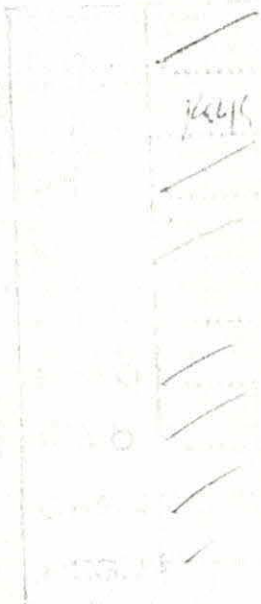
A minute or so after, the tail fell from

Kununurra appeared coming in for a landing at Derby. Perhaps they also reported this.

Several years ago we reported a sighting of a glowing object to your office & were advised that it was a man made satellite re entering the earth's atmosphere. That was visible for only a short time travelled (or appeared to!) a very short distance in the sky before disappearing.

We would be interested to hear what you would think we saw last night - also if there were any other reports of it.

Yours sincerely,
(Mrs) Winifred M. Walker



AS:KG

191

45/38

Dr J E Minor
c/- Department of Geography
James Cook University
Post Office
JAMES COOK UNIVERSITY QLD 4811

Dear Joe

... Please find enclosed duplicate copies of 10 photographs taken during the Port Hedland tornado. The cost of processing was $8.00. I believe our accounts section have sent you a receipt for the $26.67 you paid for the colour enlargements.

The quality of the photos taken at Port Hedland seems to have been maintained fairly well in the duplicates, there being only a slight loss of detail. I have numbered the photos with the same numbers that appear on the originals though I do not know what significance these have since at least three photographers were involved. One sequence taken by Russel Thams, an observer who is currently stationed in this Office, has been marked in time order a, b, c, d. If it is useful we should be able to determine the order of the groups of photos taken by the other people.

I have not taken any action regarding photo 16a as I am hopeful that I may visit the Northam Research Station in the next month. This will give me an opportunity to take some of the measurements you have outlined, find out the contents of this photo and borrow the negative if necessary.

Bob Southern rang this morning and I realized afterwards you will no doubt see him next week.

I hope your visit has been enjoyable and profitable. After 15 September I will direct correspondence to your Lubbock address.

Yours sincerely

A.

(A SCOTT)
for Regional Director

31 August 1978

AS:KG

190

45/53

Sgt A R Bridle and Cpl R Smoothy
No. 3 Telecom Unit
RAAF Base
PEARCE WA 6085

Dear Sirs

Thank you for the descriptions and diagrams of the phenomena you observed to the northeast of the Pearce RAAF Base at about 1400 16 August 1978.

Your description and diagrams are consistent with the early stages of development of a tornado. In this case the development did not proceed no doubt because the meteorological conditions were not entirely suitable.

Most but not all tornadoes develop out of the bases of cumulonimbus (thunderstorm) cloud. In this case the cumulus cloud does not seem to have developed to this extent at the time you observed it.

When full development of a tornado occurs the rotating finger-like funnel you observed extends to ground level and the high speeds and low pressures generated can cause devastating damage along a path which is usually less than several hundred metres in width.

Tornadoes have not been observed very often in this State so any observations which add to our knowledge of their frequency of occurrence and the conditions under which they have occurred are very welcome.

Yours faithfully

(A SCOTT)
for Regional Director

31 August 1978

45/53

189

A55891
SGT BRIDLE A.R.
NO 3 TELECOM UNIT
RAAF BASE PEARCE

20 August 1978

Bureau of Meteorology
PERTH

Dear Sir,

After a phone call to the weather bureau I was requested to write the following letter.

At approximately 1400-10 hours on Wednesday the 16th August 1978, whilst driving to Pearce along the road adjacent to the railway line west of the RAAF Base I noticed a strange cloud formation. It consisted of a long cylindrical tube of some 300-500 feet in length and maybe 50 - 100 thick protuding from the bottom of a rather large cumulus cloud. I drew it to the attention of 3 other people travelling in the car with me and all observed it for some time.

Some 5 minutes later the tube developed a long whip like tail extending downwards to about 1½ times the length of the main tube. This tail was similar to the vortex developed by an aircrafts wing tip under nigh angles of attack. The tail was also moving in a shakelike fashion, though rather slowly. This lasted for about 3 - 5 minutes and then very rapidly dissapated. The tube then collapsed back into the cloud and was gone within about a minute.

On arrival at the unit I watched the cloud for several more minutes and saw a white line developing across the cloud somewhat similar to the tail of the original sighting, but this soon dissapated. No photos were taken.

This phenomenon was observed by another member of our unit travelling towards Pearce from Wanneroo. We both agree that the big cloud was situated approximately 1 - 2 miles to the North East of the Base.

Both the other observer and myself are qualified glider pilots of some 7 or 8 years experience each. Neither of us has ever observed this type of cloud formation before.

Attached is a statement by the other observer glider pilot, and a drawing of the cloud done by myself.

Hoping this will be of some interest to you.

Yours Faithfully

A.R. Bridle

A.R. BRIDLE

R.D.	.....
SUP M.	14/9/78
P.T.O.	—
M.S.S.	.....
M.F.I.	—
R.M.O.	—
I.A.	—
OBS. 4	—
REG.	—

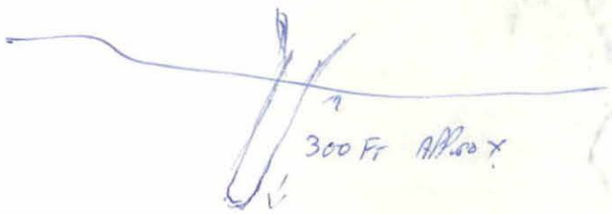
SMSS Pls ack and comment
Possible tornado?
23/8

16 AUG 78

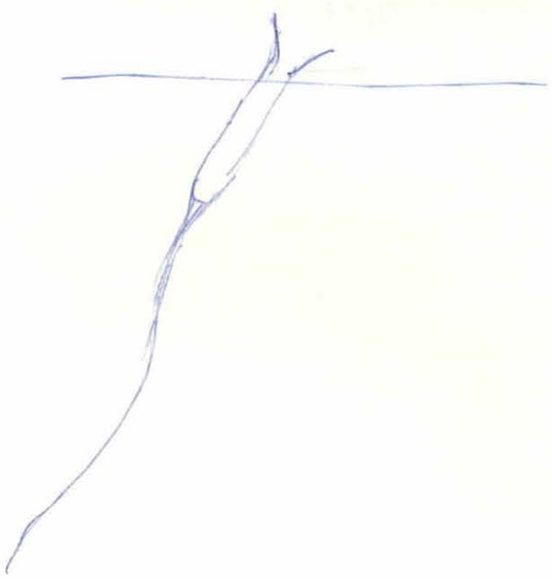
A55891
SGT BRIDLE
3TU
PEARCE

FIRST SIGHTING

1600 - 10
Aprox
16 aug 78

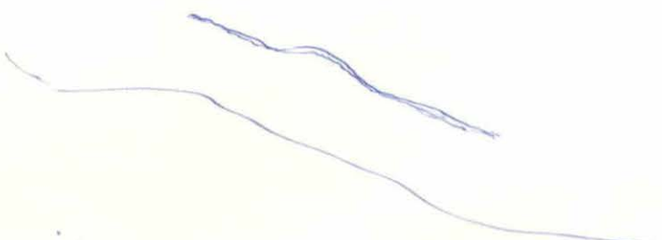


1610 - 15
Aprox



1615 - 20

AFTER COLLAPSING



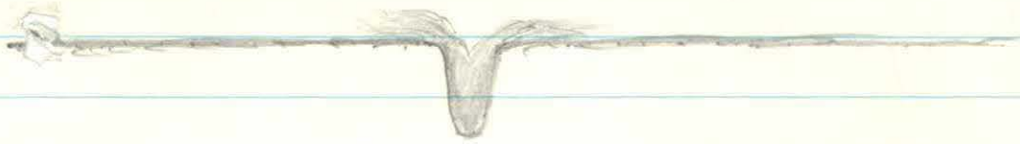
LATER OBSERVATION

about the same size
as the original ~~tot~~ tail.

RBridle

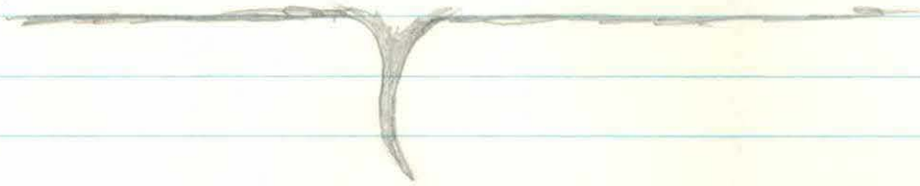
A17292 187
CPL R SMOOTHY
3 TELU
RAAF PEARCE
17 AUG 78

APPROX 1410 HRS.



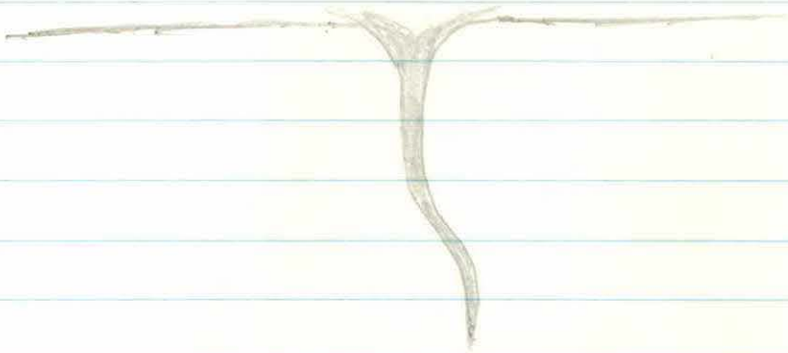
AT FIRST SIGHTING, SOMEWHAT UNSPECTACULAR, LIKE A FINGER PROTRUDING FROM THE FLAT BASED CLOUD. CLOUD AND "FINGER" VERY BLACK COLOURED, WITH LIGHTER COLOURED CLOUD FUNNELING DOWN INTO IT. REMAINED UNCHANGED IN SHAPE FOR AT LEAST FIVE MINUTES. LENGTH OF "FINGER" DIFFICULT TO JUDGE, AS CLOUD WAS SITUATED APPROX 1-2 MILES NORTH-EAST OF BULLSBROOK, I WAS IN A CAR TRAVELLING TOWARDS BULLSBROOK FROM WANNEROO.

APPROX 1415 HRS



CHANGED SHAPE TO A "RATS TAIL", AND VARIED ~~[illegible]~~ LENGTH AND CURVE SLIGHTLY OVER THE NEXT FIVE MINUTES.

APPROX 1420 HRS.



CHANGED RAPIDLY, TRIPLEING IN LENGTH, BEFORE DISSIPATING SUDDENLY, LEAVING NO TRACE.
MAXIMUM LENGTH COULD HAVE BEEN ANYWHERE BETWEEN 500 AND 1000 FEET.

R E Smoothy

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND

POST OFFICE, JAMES COOK UNIVERSITY, QLD. 4811 TELEPHONES: Douglas 79 3711; Pimlico 79 2193; TELEX: AA47009

DEPARTMENT OF CIVIL AND SYSTEMS ENGINEERING

14th August, 1978.

Mr. Alan Scott,
Bureau of Meteorology,
P.O. Box 6070,
PERTH W.A. 6000.

Dear Alan,

Thank you for your prompt and thorough attention to the Western Australia tornado events. The photographs of the Northam Tornado arrived in good condition on 7th August. I am in communication with Messrs. Crane and May and will respect their wishes regarding photograph credits. A cheque for the amount of $26.67 was forwarded to your attention on 11th August.

Many tornado event evaluations have been made without adequate ground surveys. Should you be able to contribute some data from the scene it would be helpful. Basically, I need angles and distances to physical features which can be seen in photographs, and to several known points along the tornado path. If it is inconvenient to actually chain the distances, estimates from stadia readings or from pacing would be adequate. Your theodolite may possibly have stadia crosshairs.

On a scale map of the immediate area, the following data would be useful:

(1) location of each camera (the two cameras seem to have been some distance apart).

(2) distances to and angles between known points on the tornado path.

(3) distances and angle reference to objects in the photographs:

- (a) the pole in the distance in the left portion of Photo 11.
- (b) the pole in the centre of Photo 13.
- (c) the pole in the distance to the right of centre in Photo 13a.
- (d) the damaged trees in Photo 15a .
- (e) the metal building to the left of the house in Photos 11a, 12a, 13a, 11.

(4) Dimensions of the objects in a,b,c,e, (above).

(5) Notations regarding areas of grass cover and ploughed fields.

../2

I am also interested in Photo No. 16a which is crossed on my contact print. Is the dark area an area of tornado damaged grass? Ground marks may be important. I must have neglected to ask if there were ground marks left in the ploughed or grassy areas traversed by the tornado. I will mention this to Messrs. Crane and May.

Your suggestion regarding the Port Hedland photographs seems reasonable. I would like to examine 3" x 5" prints if they can be obtained easily.

Your continued response to my requests is appreciated. The care with which you and Messrs. Crane and May prepared the data and photograph keys reflects good scientific methodology. I know that this takes time, and I am grateful for this. I would like to have taken the time to do some field work myself; may be this will be possible at a later date.

I continue to be excited about the possible contributions which these photographs offer. Thanks, again, for your interest and help.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.,
Fulbright Senior Scholar.

JEM/nmcp.

184.

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND

POST OFFICE, JAMES COOK UNIVERSITY, QLD. 4811 TELEPHONES: Douglas 79 3711; Pimlico 79 2193; TELEX: AA47009

11-8-78

Alan –

I received the photographs last week. They are in good condition. A cheque in the amount of 26^{67}_{-} is enclosed.

Your suggestion on the Port Hedland photographs is reasonable. I would like to see the 3½ × 5 colour prints, if they can be conveniently made.

I am writing some instructions for data from the Northam site, should you have an opportunity to visit there with a theodolite.

Thanks, again, for your help

Joe Minor

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No.

Client Name Dr T.E. Munn

Address c/- Department of Geography
James Cook University
Post Office
James Cook University Qld 4811

Details of Request

21 13 x 18 cm colour enlargements.

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

Grade of Officer		$	¢
.....	..... hours @ ..... per hour =		
	..... hours @ ..... per hour =		
	Materials	26.	67
	Other Expenses (inc. data processing) =		
Overhead Costs	(120% of Direct Costs) if applicable =		
	TOTAL CHARGE	$ 26.	67

Costs computed by 14/8/78

.....
(Section Leader)

Recommendation (if any)

Confirmed

K. Lynch
.....
(Supervising Meteorologist)
14/8/78

(Waiver action, if applicable)

.....
(Regional Director)
...../...../.....

Client advised ...../...../.....

.....
(Accounts Clerk)

received $26.67
AE364596
14/8/78.

ANS:PAH

182

45/38

Dr J E Minor
C/o Department of Geography
James Cook University
Post Office
JAMES COOK UNIVERSITY QLD 4811

Dear Joe

Please find enclosed 5" x 7" copies of the negatives taken by Messrs Crane and May and two copies of contact prints made in this office. The negatives for which no enlargements were made have been crossed on one copy.

will forward later to avoid delay.

Our Debit Note for $26.67 is also enclosed. We think Kodak made a mistake in their calculations so the photos cost somewhat less than the $2.00 per copy quoted, unless they detect the error and debit us a further amount. If you direct your payment through me to the Collector of Public Monies I will ensure that we forward a receipt to you.

Also enclosed are a few copies of the tornado tracks supplied by Messrs Crane and May. Because the copies are of original photocopies the quality is rather poor. I think the track relating to the photos taken by Mr Crane relates better to the house marked.

I may combine a visit to Muresk Agricultural College (SSW of the Research Station on the maps) with a visit to the Research Station in the next month or two. If so, we can take a theodolite and measure the angular separation of some of the identifiable landmarks on the photos and measure the height of the prominent power pole in the centre foreground on one photo. If there are any other simple measurements that we could make with a pilot balloon theodolite (accuracy 0.1°) please let me know.

Messrs Crane and May have advised me that they would prefer to have joint credit for the use of any of their photos with credit being in the form "Mr P J May and Mr C J Crane of Northam".

The colour photos of the Port Hedland tornado have been returned to Messrs Mauger and Ball from our Head Office. Enclosed with them was a set of black and white prints made in our Head Office. These show an obvious loss of detail.

We have examined the possibility of obtaining colour prints from the original colour prints and find that this can be done. Same size copies 3" x 5" cost 80 cents

.../2

and 5" x 7" enlargements are $2.70 at Pacific Film and $5.85 at Kodak. The same size copies are made locally but enlargements in Sydney or Melbourne. There are about 6 or 7 photos available. As it now seems unlikely that the negatives will be found this may be a suitable alternative. If you agree I suggest that we obtain copies for you at the original size (3" x 5") and let you examine these before considering any enlargements.

Yours faithfully

(A SCOTT)
for Regional Director

3 August 1978

Encls:

ANS:PAH

180

xxxxxxxxxxxxxxxxxxxxxxxxx

45/38(180)

Mr C Crane and Mr P J May
C/o Northam Research Station
P O Box 354
NORTHAM WA 6401

Dear Sirs

Many thanks for the loan of your negatives which are enclosed.

Yours faithfully

(A SCOTT)
for Regional Director

3 August 1978

Encls: as stated

45/38

Mr C Crane and Mr P J May
C/o Northam Research Station
P O Box 354
NORTHAM WA 6401

Dear Sirs

Please find enclosed a hand written copy of the Eye Witness Report which I compiled from your photos and information you gave me by phone.

I feel a copy of this may be useful when you answer the questions posed by Dr Minor in his letter of 7 July.

Thank you for the loan of the negatives which arrived on 11 July and are being processed by Kodak.

Yours faithfully

(A SCOTT)
for Regional Director

13 July 1978

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND

POST OFFICE, JAMES COOK UNIVERSITY, QLD. 4811 TELEPHONES: Douglas 79 3711; Pimlico 79 2193; TELEX: AA47009

DEPARTMENT OF CIVIL AND SYSTEMS ENGINEERING

7th July, 1978.

Mr. A. Scott,
Bureau of Meteorology,
P.O. Box 6070,
PERTH, W.A. 6000.

Dear Alan,

Thank you for your continued efforts on my behalf relative to the Northam and Port Hedland tornado events. You and others have been very gracious in assisting me.

As you will note in the enclosed letter to Messrs. Crane and May, I have provided the assurances they require regarding use of their photographs. I will look forward to communicating with them.

I heard from Mel McKenzie-Murray in Port Hedland regarding the Port Hedland tornado photographs. Mel thinks that the original photographs are slides, but no one has seen them lately. Bob Southern had at least one slide of the Port Hedland tornado when he visited me in Lubbock, so he may be able to provide a clue as to the location of the originals.

As to the Northam tornado photographs, I will make payment to whomever you designate as soon as you know the total charge. The $2.00 rate is acceptable and I understand that there are about 18 photographs. I will need a receipt of some kind. Also, I hope you can see that the photographs are numbered according to the key on the map accompanying the eyewitness report.

I am excited about the possibilities that these events offer for our tornado research. Thank you again for your assistance. I will be in Australia until September 15, so there should be no urgency in the processing of the photographs.

Very sincerely yours,

Joseph E. Minor, P.E.,
Fulbright Senior Scholar.

Encl.

COPY

177

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND

POST OFFICE, JAMES COOK UNIVERSITY, QLD. 4811 TELEPHONES : Douglas 79 3711; Pimlico 79 2193, TELEX : AA47009

DEPARTMENT OF CIVIL AND SYSTEMS ENGINEERING

7th July, 1978.

Mr. C. Crane,
Mr. P.J. May,
Northam Research Station,
P.O. Box 354,
Northam, W.A. 6401.

Gentlemen,

Mr. A. Scott of the Bureau of Meteorology has provided me with your names as the individuals who witnessed and photographed the tornado event which occurred near Northam on 21 December 1977. The photographs are remarkable, rivalling the best tornado photographs available in the U.S. Also, I was very pleased to receive a copy of the excellent eyewitness report which contains much of the information which I would like to have for my work on tornadoes.

I am an Associate Professor of Civil Engineering at Texas Tech University in Lubbock, Texas, U.S.A. I direct a programme of research in tornado phenomenology which has as an objective the delineation of tornado effects which affect buildings (see brochure enclosed). You may be aware that certain types of buildings in the U.S. must be constructed to withstand the tornado (nuclear power plants, emergency operating centres, shelters in schools). Hence, you can see why I am interested in your photographs.

The clarity of the tornado/ground interface is very good, and may be useful to us in our tornado modelling work and in understanding the near-ground windfield. We employ photogrammetric analysis in defining such things as funnel diameter, wind inflow angle, helix angle for upward motion, structure of core, and boundary layer geometry.

Mr. Scott informed me that he has transmitted to you my requests for copies of the photographs and permission to publish selected photographs in scientific journals. In connection with these requests I can provide the following assurances:

(1) I will receive no financial gain from use or publication of the photographs.

(2) I will give you full credit in any publication which employs one or more of the photographs.

(3) I will not permit anyone else ~~or~~ to publish the photographs without first gaining your permission.

(4) I will acknowledge your special efforts in making scientific observations of this event.

As noted above, I have the eyewitness report which you prepared for the Bureau of Meteorology. I would like to have the following additional information and commentary, and if possible;

../2

(1) Camera data: Were there two cameras, or one camera with a zoom lens? Please provide focal length of lens or lenses employed for close-up and distance shots.

(2) Noise: Additional commentary on noise. I am interested in your comment that there was no noise until the tornado hit the trees. Other than the thunder which you reported, was there no roar at all? This is somewhat unique and may be important as there are, almost invariably, reports of noise with tornadoes.

(3) Wind conditions at camera location: When the tornado was in progress did you experience winds at the camera location? Estimate their strength and direction (difficult to stand, no wind, etc; blowing toward tornado, laterally with respect to tornado, etc.)

(4) Other phenomena: Describe other phenomena which you were conscious of: ears popping, gust front, temperature change, strange phenomena.

Your assistance in providing objective scientific observations is appreciated. Strangely enough, we have very few records of tornado events with reliable scientific observations. Thus, your input on this event is potentially very valuable. I had hoped at one time to return to W.A. to visit the site and speak with you personally, but it looks as if that will not be possible. I will return to the U.S. on September 15. After that date I can be reached at:

Institute for Disaster Research,
Texas Tech University,
P.O. Box 4089,
Lubbock, Texas 79409,
U.S.A.

I will look forward to communicating further with you regarding this event. My associations with people in Western Australia have been especially cordial and productive. Thank you, again, for your assistance. Please inform me if I can provide additional information or assist you in any manner.

Very sincerely yours,

JEM

Joseph E. Minor, P.E.,
Fulbright Senior Scholar.

Encl.
c.c.: Mr. A. Scott.

C. J. CRANE
P.O. BOX 354
NORTHAM. 6401.

YOUR REF. 45/38. 10th JULY 78.

MR. A. SCOTT.
FOR REGIONAL DIRECTOR.
BUREAU OF METEOROLOGY.

Dear Sir,

Please find enclosed negatives of photographs of the tornado a Northam taken by Mr May and myself. as requested for Dr J.E MINOR. I have discussed the question of credit for the photographs with Mr May and we decided that joint credit would be easiest for everyone concerned. This would be as:- MR P.J. MAY + MR C.J. CRANE of NORTHAM.

If you get in touch with me when you have finished ~~with~~ with these negatives I will get my mother to call in and pick them up from your office. If I can be of further assistance please do not hesitate to ask.

Yours sincerely
C. J. Crane.

AS:HB

174

45/38(174)

Dr J E Minor
C/- Geography Department
James Cook University of North Queensland
Post Office
JAMES COOK UNIVERSITY QLD 4811

Dear Dr Minor

I contacted Colin Crane in Northam about a week ago, and he agreed to forward the tornado negatives to me, though they have not yet arrived. The 18 x 13cm (7 x 5 inch) photos cost about $2.00 each and Kodak have quoted a fortnight to process.

Messrs Crane and May will probably agree to a request to allow publication of several of the photographs provided they are assured that publication will not result in a financial gain to you. I have mentioned to them that publication in the internationally known meteorological magazines usually costs the author or his employer through page charges. They have not to date sought any financial gain nor do they seem particularly keen to attempt to. I will leave it to you to provide something on this. If you wish to contact them directly their address is:

Northam Research Station,
PO Box 354,
Northam, W.A. 6401.

My attempts to locate the negatives taken by Steve Raynor have proven fruitless so far. No one can recall ever seeing them which makes finding a starting point rather difficult. There are a few avenues still left to explore.

I will let you know later how we get on with the photos, negatives etc.

Yours sincerely

(A SCOTT)
for REGIONAL DIRECTOR WA

30 June 1978

AS:HB

173

45/38

Mr C Crane and Mr P J May
Northam Research Station
PO Box 354
NORTHAM WA 6401

Dear Sirs

In early May, Dr J.E. Minor, Director of the Disaster Research Institute at Texas Tech. University visited this office. He was on a tour of Australia while holding a Fulbright Senior Scholarship. During most of his Australian visit, he is based at James Cook University of North Queensland, where he will undertake disaster research oriented to the Australian situation.

Dr Minor was particularly impressed by your photos of the Northam tornado. He has now written to ask if it is possible for him to obtain 7 x 5 inch copies of all of the photographs. If you are agreeable to his having these photographs, I would like to suggest that the easiest way to go about this might be for this office to borrow the negatives from you again, have the enlargements made and then return them to you. Kodak have indicated that the processing time would be about 14 days. Please suggest any other arrangement which might be suitable.

Dr Minor has also sought "permission to publish a selected photograph or two to illustrate some general aspects of tornado structure as they may pertain to buildings. Full credit will be given". Because of the implications I will seek from Dr Minor some clarification of the likely publication and whether any financial benefit would accrue to him. This would seem unlikely in the case of any of the internationally known meteorological journals with which I am familiar as the charges for publication are usually $20-$40 per page.

Should you give permission for publication of one or two photographs you will need to make a decision as to the form of acknowledgement, that is whether the individual photographer should receive credit or whether you be jointly mentioned.

.../2

The Superintendent of the Physical Research Section in the Bureau was very impressed by the set of your photos which we recently forwarded to him and has asked that a short contribution including several photographs be prepared for submission to Australian Meteorological Magazine. I will contact you later regarding this.

Yours faithfully

(A SCOTT)
for REGIONAL DIRECTOR

30 June 1978

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND

POST OFFICE, JAMES COOK UNIVERSITY, QLD 4811 TELEPHONES: Douglas 793711; Pimlico 792193; TELEX: AA77009

DEPARTMENT OF GEOGRAPHY
Professor J. Oliver, B.A., Ph.D.,
F.R. Met. S., F.R.G.S.

jem:dc

15 June 1978

Mr Alan Scott,
Bureau of Meteorology,
P.O. Box 6070,
PERTH. W.A. 6000

Dear Alan,

The meeting in Perth with you, Kevin Lynch and others on the staff has proven to be the most productive visit of my trip with regard to information on tornadoes. I wish to thank you and the staff for their time and assistance.

I have been studying my copies of the Northam tornado photographs and find them to be very interesting and potentially valuable to our work. The structure of the funnel near the cloud and the geometry of the vortex near the ground, as reflected in the dust cloud, are easily discernible in these photographs. As you know, I am a structural engineer with an interest in the character of near-ground tornadic windfields.

I would like to follow through on the offer you made to assist me in gaining additional information on this event. Specifically, I would like to have the following (I will remunerate you, the Bureau, or others for any expenses incurred):

(1) Color prints of each photograph, preferably 5 in. by 7 in. (approximately) or larger.
(2) Contact prints from the negatives so I can get the photographs into proper sequence and identified with each of the two cameras.
(3) Data on distance from the cameras to the vortex (a simple map of the area noting camera locations, tornado track, and other terrain features such as trees would be desirable).
(4) Other eyewitness data: cloud information, presence of rain and/or hail, life time of vortex, noise, other impressions.
(5) Estimated time from first to last photograph.

I realise that you will have to contact the gentlemen at Northam who took the photographs. If you prefer, I can communicate with them directly on data details. The critical thing is, of course, the negatives, which I'm sure they won't want to release. Hence, any assistance you can provide in securing the prints for me will be appreciated. Also, I don't want to usurp any plans to publish a paper on the event, but I would like to have permission to publish a selected photograph or two to illustrate some general aspects of tornado structure as they may pertain to buildings. Full credit will be given.

..2

170

Mr Alan Scott,
Bureau of Meteorology
PERTH. WA

15 June 1978

On another topic, all enquiries into the Port Hedland tornado event lead back to you. Mel McKenzie-Murray said that he thought that Steve Raynor in Brisbane had the negatives. Mr Raynor told David Shivas in Brisbane that everything had been sent to Perth. Here, again, I would like to locate the negatives so that I can obtain original prints for study. I'm sure you have noticed the very distinct collar cloud in the photographs. This classic formation is typical of U.S. tornadoes as well. The Ball and Mauger report will be helpful, too, when you locate it. Again, any expenses you incur will be covered.

The balance of my trip was informative as Mel McKenzie-Murray was helpful and I caught Professor Gray's lecture in Darwin. Ward Rooney and Rex Falls were also accommodating. The meteorological community in Australia has been very helpful to me. It has been a great pleasure to meet so many of them.

Please let me know if I can assist you in any manner. I will look forward to hearing from you. Thank you for your willingness to assist.

Very sincerely yours,

Joe

Joseph E. Minor, P.E.
Fulbright Senior Scholar

P.S. Your letter of 13 June arrived while this letter was being typed. The information you sent answers essentially all of the questions asked about the Northam tornado. Apparently, the photographs have been numbered and keyed to the map. I would, of course, like to have copies of the photographs numbered according to the map. Should I contact Messrs Crane and May, or would you be willing to undertake this task for me?

ANS:PAH

30/20

Dr J E Minor
C/o Department of Geography
James Cook University
QUEENSLAND 4811

Dear Dr Minor

Please find enclosed photocopies of some of the data available for the tornado near Northam WA on 21 December 1977.

The synoptic situation is reasonably evident from the data enclosed. Maximum temperatures on the afternoon of 21 December were 40°C at Northam, 39°C at Cunderdin and 38°C at York. The high surface temperatures, low level convergence and an unstable atmosphere combined to cause the development of thunderstorms over a wide area of the SW of the state (see rainfall map) during the latter part of the afternoon and into the evening. Low level convergence was mainly evident in the layer below 7000 ft. Middle and upper level flow suggests the general thunderstorm motion was probably towards a direction between ESE and SE.

Also enclosed is a copy of the report by R S Mauger and M R Ball "An Observation of a Tornado in the Vicinity of South Hedland on 17 December 1975".

Should you have any further questions regarding either of these events please contact me.

I hope your visit to Australia is an enjoyable and profitable one.

Yours faithfully

AS.

(A SCOTT)
for Regional Director

13 June 1978

Encls: As stated

ANS:PAH

168

70/86

Director of Meteorology

Attention STPR

TORNADO OF 21 DECEMBER 1977 NEAR NORTHAM WA

... Please find enclosed a partial set of photographs relating to this tornado and a completed Form 65/803 and related maps etc. The remainder of the photographs necessary to complete the set were forwarded to PRO for possible inclusion in the annual report. If the photographs are not required we would appreciate their return.

The synoptic situation is reasonably evident from the data enclosed. Maximum temperatures on the afternoon of 21 December 1977 were 40°C at Northam, 39°C at Cunderdin and 38°C at York. The high surface temperatures, low level convergence and an unstable atmosphere combined to cause the development of thunderstorms over a wide area of the SW of the state (see rainfall map) during the latter part of the afternoon and into the evening. Convergence was evident mainly in the layer below 7000 ft. Middle and upper level flow suggests the general thunderstorm motion was probably towards a direction between ESE and SE.

The set of photographs were taken by two officers of the Northam Agricultural Research Station Mr C Crane and Mr P J May. One was occasionally using a telephoto lense. The photographs have been placed in what seems to be an approximate time sequence.

This set of photographs is probably unique for an Australian tornado. If consideration is given to reproduction or publication I feel that as a matter of courtesy the photographers permission should be sought beforehand.

al.

(A SCOTT)
for Regional Director WA

12 June 1978

Northam Tornado
21 December 1977

Copy ? Form 65/803 report on this tornado placed on file 70/86

166

BILL

Kings Rocks
Hyden
Western Australia
29th May 1978

The Regional Director
Bureau of Meteorology
Perth

Dear Sir

On Friday May 27th, at 8.50 pm a dull orange object was seen east of here, low on the horizon, travelling from North to South. Faster than a plane, but slower than a Meteorite. No sound was heard. It appeared several times larger than a star and had a long orange tail. It would have been observed for probably 1½ to 2 minutes during which it moved from a point NE of here, to disappear either in cloud or below the horizon, at a point SSW. It was momentarily obscured by cloud a couple of times.

It was first seen by my son, who was driving a tractor, about four miles away. He called my husband and I on a two-way radio, and we were able to observe the latter part of its flight.

About three or four weeks ago, our son and two school children saw a similar object, moving in the opposite direction in about the same part of the sky, at dusk.

Your comments would be much appreciated.

Yours faithfully

Mrs J.E. Meeking

Copy forwarded
OIC. Pearce for RAAF
7/6/78

AS:KG

125

45/38

Mr C Crane and Mr P May
Northam Research Station
PO Box 354
NORTHAM WA 6401

Dear Sirs

... Please find enclosed the copies of the photographs and the negatives which you kindly loaned us. We have taken two copies of each photograph of interest. I believe the State Emergency Services have had colour slides made.

May I thank you again for the loan of your photographs and negatives and apologise for the inordinately long period they have been away from you.

Yours faithfully

(A SCOTT)
for Regional Director

17 April 1978

AS:KG

164

45/38

Director of Meteorology

Attention : PRO (Mr R Brewster)

ANNUAL REPORT

... Please find enclosed several photographs of a tornado which occurred about 8 km southeast of the Northam townsite on the afternoon of 21 December 1977.

No damage to property was reported though several large trees were flattened. The path of the tornado was about 6 km long.

The photographs were taken from colour negatives loaned by two officers at the Northam Research Station operated by the State Department of Agriculture.

We would appreciate the return of any photographs not needed.

(A SCOTT)
for Regional Director WA

11 April 1978

45/38

163

DEPARTMENT OF SCIENCE

BUREAU OF METEOROLOGY
Regional Office W.A. 127 Wellington St Perth
Telephone: 3259299 Area Code 09. Telegrams: ADMINMET Perth. Telex: AA93286.

POSTAL ADDRESS: REGIONAL DIRECTOR, BUREAU OF METEOROLOGY, P.O. BOX 6070, PERTH, HAY ST EAST, W.A. 6000

IN REPLY PLEASE QUOTE 45/38 (150)

The Officer in Charge
Police Station
NORTHAM WA 6401

Dear Sir

On 21 December 1977 a tornado was observed in the Northam area and a report in the West Australian of the following day suggested that some Police Officers had observed the tornado.

I would be grateful if any of your staff are able to assist by defining the approximate path of the tornado. A photocopy of a map of the Northam district is enclosed.

Any subsequent reports of damage would also be useful.

I have also sought assistance in defining the tornado's path from Mr P May of the Department of Agriculture in Northam who has sent us several photographs.

Thanking you for any assistance you may offer.

Yours faithfully

(A SCOTT)
for Regional Director

23 January 1978

Mr. SCOTT.

Please find attached hereto report of Constable DARKE.

Sgt.1/c 2467
C.R.PARRY.
Officer-in-Charge.
Northam. 14/3/1978.

Sergeant HAWKES,

SUBJECT: Attached file dealing with Tornado sighted by staff at this station, including myself on 21st December, 1977.

1. I have to report that whilst on afternoon relief on December 21st, 1977, a Tornado was sighted by myself and other staff at this station. The Tornado appeared to be roughly in the direction of York township.

2. In order to get a closer look at the Tornado, I joined Constable ABBOTT of Northam R.T.P. in a traffic vehicle and patrolled towards its location. As we neared Carter Road, approximately 15 kilometres along the Northam-York Road, we saw evidence of the route the Tornado had taken, in stubble and other herbage strewn across the road and entangled in the S.E.C. overhead wires. We turned left into Carter Road and followed this for approximately 3-4 kilometres but by the time we reached the now static location of the Tornado, it had dissipated into a mere dust pall. It appeared suspended from about 60 metres above ground.

3. I have drawn on the attached, duplicate maps the path taken by the Tornado as apparent from my inquiries.

4. I heard vague rumour regarding damage resulting from the Tornado on the following day, but this was not substantiated by any reports to, or observations by staff at this centre.

5. Inquiries by Mr SCOTT's department with the various property insurance groups might reveal damage reports unknown to Police.

Submitted, hoping to have been of some assistance.

B. E. Darke

B. E. DARKE
PC 1/c 4116

Northam Station.
March 14, 1978.


Goomalling
Wattening
Beeoording
CULHAM
Jennacubbine
Wongamine
NORTHAM
KARRABIN HILL
MT ANDERSON
WONGAMINE
Chitibin
Jennapullin
Toodyay
NOCKDOMINIE
MT PLEASANT
Southern Brook
CLEAR HILL
IRON KNOB
Irishtown
CROWS NEST
Jurendine
MT DICK
Mortlock River
Katrine
Mallabine
GRASS VALLEY
FIVE MILE HILL
NOONDEENING HILL
GREAT EASTERN HIGHWAY
Grass Valley
Meenaar
MT OMMANNEY
Northam
MEENAAR
BOBAKINE
MONDAY HILL
HALE
Clackline
Spencers Brook
Spring Hill
Mokine
Baker's Hill
QUELLINGTON
Quellington
CALJIE HILL
LEMMAHNS HILL
MT MACKIE
MT OMMANIE
RAGGED ROCK HILL
BOONARING HILL
RED KNOB
BAKEWELL
POISON HILL
Maiebilling
GORIS HILL
York
MT BROWN
NEEDLING
MT OBSERVATION
1ST SIGHTED FROM STATION
DISSIPATED HERE
CARTER'S ROAD

160

DEPARTMENT OF SCIENCE

Bureau of Meteorology

NOTE FOR FILE

PIAWANING STORM 14 FEBRUARY 1978

Inspection of damage to the properties listed below was made on 16/2/78:

"Wye Wye" Mr & Mrs Spencer
"Rathnally" Mr & Mrs Robinson
Both properties approx. 15 km east of Piawaning on Wongan Hills Road.

Observation of damage to buildings, fences and trees (not over excessive) indicated the cause to be severe down draughts from strong thunderstorm activity in the area during the early afternoon.

Local property owners reported the storm's approach from the Northwest and it is apparent from observed damage that the strong winds struck from the Northeast.

Reported conditions at time of storm and later damage inspection did not indicate passage of tornado.

(W B LINTHORNE)
OBSERVER GRADE 3
SPECIAL SERVICES

a/ 28/2

Photographs on
Folio 159
sent
to
Director Archives STPR
(See Folio 184)

158

AS:KG

45/38

Mr C Crane
Northam Research Station
PO Box 354
NORTHAM WA 6401

Dear Mr Crane

Thank you very much for the loan of the photographs and negatives taken by Mr May and yourself. Unfortunately because of some bungling within this Office they only arrived on my desk last Friday.

The prime reason for writing to you at this time is to apologise for the fact that some further delay will occur before we will be able to return your negatives and photographs.

Yours sincerely

as.

(A SCOTT)
for Regional Director

27 February 1978

45/38
OBS4
Mod4

NORTHAM RES. STN.
BOX 354 NORTHAM.
6th FEB 1978

YOUR REFERENCE 45/38 (149).

THE REGIONAL DIRECTOR.
BUREAU OF METEOROLOGY.

Dear Sir,

Please find enclosed photographs and negatives of the tornadic storm in Northam on the 21st DEC 1977.

Unfortunately negatives Nos 7,8,9 have been marked at some time during processing. Negatives Nos 16, 17 were of the top cone of the tornado in its final stage and were very indistinct and probably worthless

If you require any further information do not hesitate to contact either JIM PLAY or myself.

Both of us would appreciate the early return of our photographs + negatives

Yours Sincerely

Colin Crane.

156

Dept. of Agriculture
Northam, W.A. 6401

16/1/79

The Director.
Bureau of Meteorology.
Perth. W.A.

re. Cyclonic storm. Northam - 21/12/77.

Attached are two photographs of the cyclonic storm that occurred south of Northam on 21/12/77. I have forwarded them in case they are of interest to you for records or any other purposes.

If they are of interest to some other organisation but not to you then could you forward them on please. If they are of no interest I would appreciate their return.

Mr. Colin Crane & I have several other photographs of the storm, some taken with a telephoto lens that you could borrow if you are interested. (We have 35 mm. Kodak negatives which might suit you better than the small prints.

Hoping that these photos are of some value.

P. F. May


Bolgart
Walrenning
Beggoording
CULHAM
DEWARS POOL
SOORDLE
LUNNS LANDING
MT ANDERSON
Toodyay
NOCKDOMINIE
CLEAR HILL
IRON KNOB
Avon River
Katrine
NOONDEENING HILL
NOODY WELL
NANAMOOLAN
MT OMMANEY
Northam
EAST NORTHAM
LAWNSWOOD
1418 • BOBAKINE
MONDAY HILL
Clackline
GOLDFIELDS HWY
RAILWAY
Bakers Hill
Koojedda
LEMMAHNS HILL
Mokine
Spencers Brook
Spring Hill
TORNADO'S PATH
MT MACKIE
MT OMMANIE
BOONARING HILL
DORIS HILL
MT OBSERVATION
GREAT SOUTHERN HIGHWAY
York
MT BROWN
1499 • BAKEWELL
RED KNOB
POISON HILL
1154 • NEEDLING
Mt Hardey
795 • QUELLINGTON
Quellington
CALVIE
RAGGED ROCK HILL
Malebelling
Avon River
GREAT SOUTHERN RAILWAY
Mortlock River
GREAT EASTERN HIGHWAY
GREAT EASTERN RAILWAY
GOLDFIELDS WATER SUPPLY
Grass Valley
946 • GRASS VALLEY
Mallabine
FIVE MILE HILL
Meenaar
633 • MEENAAR
896 • HALF MILE HILL
MT DICK
938
992 • CROWS NEST
Jurendine
Southern Brook
Irishtown
MT PLEASANT
801 • WONGAMINE
Chitibin
Jennapullin
KAREABIN HILL
973 •
Wongamine
Jennacubbine
GOOMALLING
NORTHAM
Goomalling
1000
1210
1126

Taken from
Northam 40
Sheet 3
Avon Land District.

Scale 2" = 1 mile

N

Photographs taken by R.J. Hogg on 21/12/77

Photographs taken from here (Northam Research Station Office & Buildings)

NORTHAM RESEARCH STATION

Research Station (Dept. of Agriculture)

11A/12 12A/13 13A/14 & 15A/16

Trees through which tornado passed.

House in photographs on Rodgers property.

7A/8 9A/9 9A/10 6A/11

Tornado broke up one in this vicinity

RIVER

Spring Hill

Logues Crossing

Agricultural College (Muresk)

Mt MARY

Broodjahmun Spa

NORTHAM YORK RD

CARTERS RD

Muresk Agricultural College

1072617 yN
31°45'

Taken from Northam 40
Sheet 3
Avon Land Dist.
Scale 2" = 1 mile.

Photographs taken
by C.J. Crane on 21/12/77.

(Photos taken from
Northam Research Station
Office & buildings.)

HALF MILE HILL
899

PT 39

RIVER

BROOK

ROAD

NORTHAM RESEARCH STATION

Research Station
(Dept. of Agriculture)

TORNADO BLEW OUT HERE

TORNADO BEGAN HERE

trees

Hedges

Spring Hill

Logues Crossing

Boodjahmun Spa

CARTERS RD

NORTHAM YORK RD

PRIVATE ROW
MAJOR PIPE LINE

PIPE

BRIDGE

Mt MARY

725 ac

362 ac

1267 ac

715 ac

3988 a

45/38

Cliffs Robe River Iron Associates
PO Box 21
WICKHAM WA 6720

Attention : Mr A R Clark
Superintendent Personnel & Town services

Dear Sir

Thank you for your enquiry, reference ARC/PAB PDL1184 dated 16 January, 1978.

Some consideration was given to the establishment of a weather observing station at Wickham, in approximately 1974. Investigations of possible sites within the townsite were made but none could be classed as practical nor as acceptable because of the poor exposures.

As you may be aware, observations were at one time carried out on a regular basis at Cape Lambert, but this programme was discontinued after Bechtel Pacific ceased operations. At present, the only observations made at Cape Lambert by Cliffs Robe River, are barograph recordings during the cyclone season, and general weather observations whenever a tropical cyclone is in that area.

At Roebourne there is a long established observing station and the distance from Wickham is less than that permitted for official observing points.

Currently there are strict limitations on the expansion of the official observing network which prohibits the opening of new stations. Your suggestion, however, will be noted and be kept in mind when there is to be a revision of the current network.

In the meantime there are several scientific instrument firms which are in the position to supply equipment for a meteorological station, and one representative has acquainted himself with the standard instruments, the exposure required and the general lay-out of an instrument enclosure as used by the Bureau.

The first requirement for an instrument enclosure is a level, open area of land without trees, buildings or permanent obstruction. The "clear zone" should measure 33 metres square. The area can be covered by natural grasses or vegetation providing the latter does not exceed 0.6 metres in height.

To prevent interference with the equipment the enclosure should be fenced with six-line, hand drawn, 12½ gauge, high tensile galvanised steel mesh. The fence must be such that it does not impede the free flow of air nor cause turbulent conditions within the clear area.

...2/

Once these conditions have been established the next phase is the installation of the equipment. The usual basic instruments are dry and wet bulb thermometers, Maximum and minimum dry bulb (and wet bulb if desired), the rain gauge and the wind vane. The wind vane provides only wind direction, speed of the wind is then estimated by eye using the Beaufort scale. There are also hand held ventimeters or the more expensive synchrotac annemometer, which gives wind speed and in the case of the latter instrument, also direction.

There are many other measurements which can be carried out depending on the wishes of the observer and the willingness to invest in equipment. This problem is one which is best resolved by the purchaser and the vendor, but the thermometer screen is a basic necessity along with thermometers and rain gauge.

Should you wish to have further advice please contact this office.

Yours faithfully

(D R WALKER)
for Regional Director WA

25 January 1978

AS:KG

45/38 (150)

The Officer in Charge
Police Station
NORTHAM WA 6401

Dear Sir

On 21 December 1977 a tornado was observed in the Northam area and a report in the West Australian of the following day suggested that some Police Officers had observed the tornado.

I would be grateful if any of your staff are able to assist by defining the approximate path of the tornado. A photocopy of a map of the ... Northam district is enclosed.

Any subsequent reports of damage would also be useful.

I have also sought assistance in defining the tornado's path from Mr P May of the Department of Agriculture in Northam who has sent us several photographs.

Thanking you for any assistance you may offer.

Yours faithfully

(A SCOTT)
for Regional Director

23 January 1978

AS:KG

45/38 (149)

Mr P J May
Department of Agriculture
NORTHAM WA 6401

Dear Mr May

Thank you for bringing to our attention the photographs you took of the tornado near Northam on 21 December 1977. We are most interested because reports of tornadoes in Australia are fairly infrequent but photographs of the quality of yours are very rare. If we are able we would like to borrow the negatives so that we can have some additional copies made. The State Emergency Service have also expressed interest in having some copies made. If we are able to we would very much like to borrow any other negatives which you or Mr Colin Crane are prepared to lend us. We will endeavour to return your photographs and negatives as soon as possible.

... I have enclosed with this letter a map of the Northam area. It would help our documentation of this tornado if you could indicate on the map the approximate path it took during the period you viewed it. I have also written to the Northam Police to seek any details they have of the tornado's path.

Thank you for your assistance.

Yours sincerely

(A SCOTT)
for Regional Director

23 January 1978

15/382

148

Cliffs Robe River Iron Associates

A JOINT VENTURE OF CLIFFS WESTERN AUSTRALIAN MINING CO. PTY. LTD. MITSUI IRON ORE DEVELOPMENT PTY. LTD. MT. ENID IRON CO. PTY. LTD. AND ROBE RIVER LIMITED, RESPONSIBLE ONLY SEVERALLY IN THE PROPORTIONS OF 30%, 30%, 5% AND 35% RESPECTIVELY.

TELEPHONE: 87 1001
CABLES: CLIFFS LAMBERT
TELEX: AA99058
P.O. BOX 21,
WICKHAM, W.A. 6720

16th January, 1978

CAPE LAMBERT OPERATIONS
LAMBERT, W.A. 6719

The Regional Director,
Bureau of Meteorology,
231 Adelaide Terrace,
PERTH.

Dear Sir,

The town of Wickham has been developed over the last six years or so and regrettably, no thought has been given to taking accurate weather recordings.

I should be obliged if you could advise the manner in which we should go about setting up an official - or an unofficial - weather station.

Yours faithfully,
CLIFFS ROBE RIVER IRON ASSOCIATES
Manager per

A.R. CLARK
Superintendent Personnel & Town Services

ARC/PAB
PDL 1184

R.D.	.....
SUP M.	.....
P.T.O.	—
M.S.S.	.....
M.F.I.	.....
R.M.O.	—
R.A.O.	.....
OBS. 4	MM. 27/1
REG.	—

Thermometer screen and wind vane should be available at Cape Lambert.

RECEIVED
19 JAN 1973
B. of M.
PERTH.

MPI
Pls remind CRRIA that they have ocean equipment in store - presume Waters stock the one. Pls leave with me clerks.
23/1

MR Walker,
please discuss
1/2 23/1

TORNADO SKIRTS NORTHAM

NORTHAM: A tornado caused a police alert at Northam before it skirted the town and dissipated late yesterday.

The spiralling pillar of red dust and debris was seen by hundreds of people as it approached the town.

It was first reported to the Northam police by a traffic patrolman, Paul Zegar, of Beverley, who was travelling towards Northam on the York road.

The Northam police set out in the direction of the storm but the tornado crossed the road about 30km from the town and blew out as it headed towards Goomalling. It was not seen in that town.

The tornado was deep red against thick, black thunderclouds.

LITTLE RAIN

One of the policemen who left Northam for the storm area said that the swirling funnel of wind cut through bush and paddocks. It brought little rain.

Power lines along the York road were strewn with debris in the wake of the tornado.

No reports of damage were received last night.

A spokesman for the weather bureau in Perth said that there were more tornadoes in WA than most people realised.

The red colour of the tall pillar could have been due to reflection or refraction of light from the setting sun.

It was probably a tornadic squall associated with thunderstorm activity.

TRUDY ON HER WAY

People living between Cape Leveque and Port Hedland were warned today to listen to radio reports on the progress of Cyclone Trudy.

At 10.30a mthe cyclone was 950km north of Port Hedland and moving west at 22kmh.

A Weather Bureau spokesman said no gales were expected to affect coastal areas in the next 24 hours but it was hard to predict where the cyclone would move to in that time.

Cyclone WA

Cyclone Trudy was still hovering off the North-West coast, but has moved farther out to sea. At 11pm it was 1200km north-north-west of North West Cape and moving west at 30km/h.

45/38

Dept of Agriculture
Northam, WA. 6401
16/1/78

147

The Director,
Bureau of Meteorology,
Perth, W.A.

Re. Tornadic storm - Northam - 21/12/77.

Attached are two photographs of the tornadic storm that occured south of Northam on 21/12/77. I have forwarded them as I feel they are of interest to you for records or any other purposes.

If they are of interest to some other organisation but not to you then could you forward them on please. If they are of no interest I would appreciate their return.

Mr. Colin Crane & I have several other photographs of the storm, some taken with a telephoto lens that you could borrow if you are interested. (We have 35mm. Kodak negatives which might print you better than the small prints.)

Hoping that these photos are of some value.

P. J. May.

SMSS Ms arrange ack. and follow up for other details to enable full description of storm - track etc. damage.
Mch 17/1

20/1

~~276~~
146

MT. NEWMAN MINING CO. PTY. LIMITED

ACTING AS MANAGER ON BEHALF OF MEMBERS OF THE MT. NEWMAN JOINT VENTURE
AMAX IRON ORE CORPORATION, PILBARA IRON LTD. DAMPIER MINING CO. LTD. SELTRUST IRON ORE LTD. MITSUI-C.ITOH IRON PTY. LTD.

TELEPHONE: NEWMAN (091) 75 1511
TELEX: 99554
CABLES: 'NEWMINING' NEWMAN
YOUR REF:

POSTAL ADDRESS:
POST OFFICE
NEWMAN, 6753

OUR REF: GBC:vds.

December 6, 1977.

Regional Director,
Bureau of Meteorology,
P. O. Box 6070,
Hay Street East,
PERTH 6000

Dear Sir,

With our increasing requirement to monitor the climatic and environmental conditions of our Newman Mining Lease, we would like to standardise our recordings in line with the Australian Standards.

Could you advise whether there is an Australian Standard Booklet on climatic and environmental instruments and recordings, or suggest a text which your Department uses? Could you also advise where this booklet can be obtained from.

Yours faithfully,
MT. NEWMAN MINING CO. PTY. LTD.

G. B. CLARK.
GEOLOGIST.

RECEIVED
-7 DEC 1977
B. of M.
PERTH

GAS:KG

145

45/38

Mr G B Clark
Geologist
Mt Newman Mining Co Pty Ltd
Post Office
NEWMAN WA 6753

Dear Sir

With regard to your recent correspondence (your ref. GBC:wds), I have enclosed copies of specifications used by our Department for the siting, building and layout of our installations.

Further information regarding the types of instruments used, operation and maintenance are generally best covered in the Australian Co-Operative Observers Guide which I have taken the liberty of enclosing at the cost of 80c for which an account will be forwarded to you at a later date. We also have a number of other publications that might be of value to you but I would require more details as to the exact nature of the information you require. If the enclosed information does not fully cover your request please feel free to contact our Department for further information.

Yours faithfully

(G A SHERRIFF)
for Regional Director

15 December 1977

DRW:KG

145

45/38

Mr K I Millsteed
Senior Housemaster
Swanleigh
MIDLAND WA 6056

Dear Sir

The Bureau has maintained a close interest in weather studies in schools, particularly those catering for the higher secondary years. Within the limits of the material at our disposal and the expertise available from the staff, every assistance will be given to you for your scheme.

Regrettably, due to the restrictions within which the Bureau must work, it is not possible to establish a climate station at Swanleigh due to the proximity of both the Perth Airport and the Swan Research weather stations.

This situation naturally debars the provisions of equipment, however if the decision is taken to proceed with your plan please do not hesitate to seek the advice of the officers of the Bureau and as previously mentioned every possible assistance will be given.

Yours faithfully

(D R WALKER)
for Regional Director

29 December 1977

45/38 143

Swanleigh

TELEPHONES: 74 1494
74 1635

MIDLAND. W.A. 6056

KIM/HF

RECEIVED
12 DEC 1977
B. of M.
PERTH.

Attention of Mr. Southern,

The Regional Director,
Bureau of Meterology,
127 Wellington Street,
PERTH, W.A. 6000

9th December, 1977.

Dear Sir,

I am writing to enquire if your Bureau can assist us to establish a weather station at Swanleigh, Middle Swan.

Swanleigh is a co-educational boarding establishment, with 350 secondary school students. The advantages we think such a station would provide are:-

1) Educating students in such areas as geography, environmental awareness, seasonal effects, and the inter-relationship between physiographic, botanic and zoological environments.

2) Training in recording techniques, and maintenance of records and statistics.

3) Education towards appreciation of synoptic conditions.

Factors which we feel would justify the establishment of a weather station at Swanleigh are:-

1) Location (approximately half-way between your stations at the Airport, and Swan Research Station).

2) The station would be permanently manned, under the direct supervision of full-time, resident staff.

I hope your Bureau can be of assistance in the establishment of this permanent facility.

Yours sincerely,

K. I. Millsteed

K. I. Millsteed,
Senior Housemaster.

? Swan Res

MFI: Do not think we are justified in setting up station but to recommend progressive [illegible] over a number of years - plus we can give instruction / field books. [illegible] a recorder [illegible] rain gauge. [illegible]

142

45/38 (141)

Miss Martina Meinen
23 Tonbridge Way
THORNLIE WA 6108

Dear Martina

The Bureau does not possess any information on the subject of U.F.O.'s.

On occassions the large Meteorological Balloons have been identified as the source of U.F.O. reports.. Also from time to time the occurrence of rare or unusual optical events, such as mirages for example, have also given rise to such events.

In the press people who belong to associations interested in U.F.O.'s are quoted, and I would suggest you direct your enquiries to one of them.

Yours faithfully

(D R WALKER)
for Regional Director

17 November 1977

45/38

141

Martina Meinen
23 Tonbridge Way
Thornlie 6108

24-10-77

Dear Sir,

I am always trying to get information on U.F.O's, but its sometimes hard because people don't believe in them.

I would appreciate any information you could give me.

Yours Sincerely,
Martina

Grade 5 Room 17

MFI

AS:LP

140

45/38 (138)

Mr D Ferguson
Unexplained Phenomena Investigation
Bureau
PO Box 261
BUNBURY WA 6230

Dear Mr Ferguson

On the mornings of 19 and 20 May inversions were probably present at about 5000 - 7000 feet in the Bunbury area. This is fairly normal during light wind conditions on winter mornings. I do not know what effects, if any, an inversion at this height would have on the appearance of extraterrestrial bodies. It is doubtful that any effect would occur at large elevations to the horizon but some distortion might occur when viewing close to the horizon. No The abnormal meteorological conditions were noted. The Observatory could advise you regarding the position of Venus.

Balloons carrying rectangular shaped aluminium foil targets are released from Perth and Albany Airports at 1.00 a.m., 7.00 a.m., 1.00 p.m., and 7.00 p.m. These carry small torch lights when released in darkness so that they can be seen and aligned with the tracking radar during the first few hundred feet. The balloons usually burst at altitudes of 50,000 - 80,000 feet depending on the type of balloon and nature of flight, that is whether a radio sonde or wind-finding flight. It would be rather rare for balloons from these stations to pass near Bunbury at any altitude.

I hope this answers the questions you have raised.

Yours faithfully

as

(A SCOTT)
for Regional Director

31 May 1977

(137)

UNEXPLAINED PHENOMENA INVESTIGATION BUREAU

P.O. Box 261,
Bunbury,
Western Australia, 6230

25.5.77

The Bureau of Meteorology

Perth.WA

Dear Sirs,

Thank you for the recent reply to our last letter it was most informative and we feel sure will help find the answer to our puzzling report. I now wish to ask some more details of the same type from you and also general information.

Could you provide as much data as possible for Thursday 19.5 and Friday 20.5 77 at Eaton W A or Bunbury if that is your closest office . We are most interested in any possible air disturbances on those mornings that would lead to a distorted image of"Venus".

The sighting was made both days between 9.30a and 12n . The Observatory has labelled it Venus . Witnesses state that when viewed through Binocular -s it seemed to be spinning on an axis and two disc like shapes which seemed to be joined , merged into a ball at intervals? Would Venus be in east or west sky ?

The genral information we seek concerns weather ballonns

1. Which offices release them,how many times daily, to what average altitude do they ascend?. Do any of them ever carry lights or other tracking aids eg strip of foil?

I hope that the above does not trouble you and that we can contact you in future with any similar queiries,

Yours sincerely
Don F Ferguson


RECEIVED
27 MAY 1977
B. of M.
PERTH.

(136)

F 345
(APR. '66)

C.D.O. 9444

BUREAU OF METEOROLOGY

MEMORANDUM

For use between Central, Regional and Field Offices ONLY.
Write or print clearly

DATE 18/5/77

TO D.I.C. Met Office Pearce ATTENTION Mr J Roberts

YOUR REF:

FROM Special Services Perth

OUR REF: 45/38

SUBJECT Unidentified Object.

Dear John,

Attached is a copy of a letter received in Head Office from our rainfall observer at station 010696.

You may wish to pass it to the appropriate R.A.A.F. officer for information.

Regards.

Alan Scott

SIGNATURE	PRINTED NAME	APPOINTMENT
Alan Scott	A. Scott	MET 3 Special Services.

FILE COPY

AS:HB

(135)

45/38(135)

I M Stewart
P O Box 1
PINGARING W A 6357

Dear Sir or Madam

I acknowledge receipt of your letter of 1 May 1977, in which you report spasmodic observations of an object NE of your location.

My enquiries have not established the identify of the object you viewed. I will pass a copy of your letter to the R.A.A.F. at Pearce who record reports of this type.

Yours faithfully

(A N SCOTT)
for REGIONAL DIRECTOR

17 May 1977

KJS:KG

(134)

45/38

Mrs M Redhead
3 Celestine Street
WANNEROO WA 6065

Dear Mrs Redhead

UFO SIGHTING

... Herewith is the report from I M Stewart, Pingaring, on the 1st of May sighting.

Yours sincerely

(K J STEARNE)
for Regional Director

17 May 1977

45/38

DEPARTMENT OF SCIENCE

Bureau of Meteorology

(133)

90/ 010696

Regional Director

W.A.

LETTER FROM OBSERVER AT AMRISTA PARK

The attached letter concerns information from the observer

It is being forwarded to you for information and for any action that you may see fit to take.

for Director of Meteorology

10th MAY 1977

UFO F

(132)

UF

Box 1 P.O.
Pingaring W. A. 6357
1st May 1977

010696

The Director of Meteorology
Melbourne.
Dear Sir,

I wish to report spasmodic observations of an object due NE of our Location.
Between the hours of 7.30 and 8.30 P.M. W.S.T. for approx. the last 6 weeks.

This object, which could be a weather satellite, has red and green lights.

The males observed this through 12x 50 Binoculars and it was quite plainly visible to them; we could see it with the naked eye, but not in so much detail.

During the last few days, due no doubt to the earths movement on it's axis, the object is now some degrees E of N.E.

This might be of no importance to the Bureau, but thought I'd just advise that this object had been noted.

Respectfully

I. M. Stewart

I M. Stewart

probably Venus

M.I.S.S

45/38

(131)

ALL CORRESPONDENCE TO BE ADDRESSED TO:
THE SECRETARY
TELEGRAMS "REMPORT" FREMANTLE W.A.
TELEX: "FREPA" PERTH. AA 92951

1 CLIFF STREET,
FREMANTLE.
WESTERN AUSTRALIA.
P.O. Box 95, Fremantle. 6160
TELEPHONE: 35 3981 35 3801

PLW/SMW

FREMANTLE PORT AUTHORITY

IN REPLY PLEASE QUOTE: 10/14/11

22nd April, 1977.

The Regional Director,
Bureau of Meteorology,
Regional Office W.A.,
127 Wellington Street,
PERTH W A 6000

Dear Sir,

In reply to your letter under reference 45/38 concerning two special wind studies contemplated by your Department we would be pleased to co-operate by making available wind traces for the period 1971-76, as recorded by the Signal Station.

We would suggest you borrow one years records at a time and would be grateful to receive a copy of the results of the research work.

Please contact the Civil Engineer, Mr A. Urquhart, Ext. 232 when you decide to commence the project.

Yours faithfully,

(P.L. Wright)
PORT ENGINEER

a/ 28/4


RECEIVED
20 APR 1977

ANS:KG

(130)

45/38

The Secretary
Fremantle Port Authority
1 Cliff Street
FREMANTLE WA 6160

Attention : Capt Coleman

Dear Sir

This Department is considering undertaking two minor studies both of which are dependent on an input of wind data from a coastal location. The first study requires an assessment of the reduction in wind speed which occurs between coastal and inland locations on the coastal plain and the second involves an examination of the times taken for the sea breeze to penetrate to various inland points on the coastal plain.

We would be grateful if for this purpose we could borrow from your office the Dines Anemograph traces recorded in the Port Authority Control Tower. The total period required would be 1971-76 inclusive but this could be broken into smaller periods to avoid having a large quantity of data out of your office at one time.

Naturally we would arrange to pick up this data and provide safe keeping within this office.

Thanking you for your consideration.

Yours faithfully

(A SCOTT)
for Regional Director

18 April 1977

AS:KG

(129)

45/38 (129)

Mrs J L Ferguson
Secretary
Unexplained Phenomena Investigation
Bureau
PO Box 261
BUNBURY WA 6230

Dear Mrs Ferguson

This Bureau does not have any interest in phenomena such as you have described except where they might be explained in terms of meteorological processes. None of your reports would seem to be related to such processes.

I will forward a copy of your letter to the RAAF Pearce who record this type of information.

Yours faithfully

(A SCOTT)
for Regional Director

5 April 1977

45|38

1

128

UNEXPLAINED PHENOMENA INVESTIGATION BUREAU

P.O. Box 261,
Bunbury,
Western Australia, 6230

29.3.77

Weather Bureau
Box 6070
Hays St.,
East Perth

Dear Sir,
We enclose copie of three recent U.F.O. reports, for your information. Any help you may give us would be welcome.

Our File(Wb 77002)

Date; 26/2/77
Time: 10.15 P.M.
Veiwed for 5 minutes from a house in Withers.
Distance approx 2 or 3 kilometres at 15) elevation. Observer attracted to light as the portion of sky was deviod stars etc. Moon was low towards the west in a crescent shape. Light cloud was scattered across sky. Object was stationary 15/20 seconds then moved across towards town, where we lost it in a haze of lights.
Appeared only as a light source size of a pea at arms length and was blurred. No sound, vapour or other traces were observed. It was orange white and plused occasionally as it moved away. We waited in case it was a plane and it flew back but didn't reappear. We contacted the local aero club but with no response. Flew a level course till sight was lost.

Our File(WB 77006)

Date: 2.2.77 at Bunbury, BackkBeach.
Time: 9 P.M.-9.30 Duration 15 Minutes approx.
Witness was attracted by a brightness of light, then it moved. Moved side to side, up and down, appeared to move then came back towards observer and almost faded out. No clouds at the time. Appeared closer than a star etc. Was bigger than star had fuzzy edges.
Got smaller Disappeared at fast speed. Colour: White to white yellow then yellow orange.

O

HIRIZON

CAR

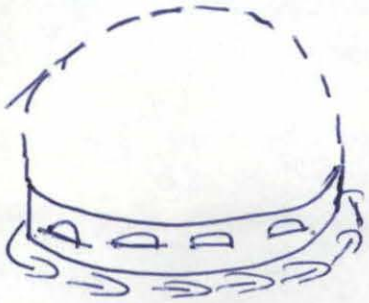
UNEXPLAINED PHENOMENA INVESTIGATION BUREAU

P.O. Box 261,
Bunbury,
Western Australia, 6230

Our File(WB 77007)

U.F.O. Data and Description

Dates: 15,16,17,18, 2.77 Time:8.00 P.M. each night
Perth-Near Airport:
Sketch..



A lights were red and green.
→ ~~top~~ Direction of bases rotation.
top was not visible.

OBJECT SEEN FROM

Hibiscus Drive Woodopine. Moved East to West. About height of Jumbo Jet. Regular first Drew Attention as it moved steadily across sky. The lights seemed to be on bottom constantly rotating. Had nothing on radar, visible ½ hour each night. It produced no sound, vapour ,odour.

Have you any information on the other forms that we sent to you a while ago?

All these cases have been reported on our official report repo rt form. Names of witnessess are available if needed. Any help you can give us will be greatly received.

Yours sincerely
Mrs J.L. Ferguson.
Mrs J.L.Ferguson
Secretary

AS:KG

45/38

Mr J Burt
Texasgulf Aust. Ltd.
Lombard House
251 Adelaide Terrace
PERTH WA 6000

Dear John

The correct reference for Hounam's paper is as follows:

Hounam C E — Climate and Air Conditioning Requirements in Sparsely Occupied Areas of Australia. World Meteorological Organization Tech. Note No. 109, Building Climatology, pp 175-183 1970.

May I once again thank you and your company for the hospitality extended to me during my recent visit. I now have a real picture of the area, something which cannot be deduced from the available maps.

Many thanks for the evaporation data which correlates well with that from Wittenoom over the same period even though the uncorrected monthly totals tend to be fractionally lower.

Yours sincerely

as.

(A SCOTT)

25 March 1977

125

125 - 129.

Report on U.F.O. sighting

Completed and returned

To O.I.C. Mel. Peace.

22/2/77.

45/38

124

MR LINTHORNE

COULD WE HAVE THE USUAL REPORT ON THIS NONSENSE PLEASE, BILL,

John Roberts

(120-123)

Report on published
completed & returned to
O.I.C. Peace 17/3/77

AS:KG

(118)

45/38 (118)

Mrs J L Ferguson
Unexplained Phenomena Investigation
Bureau
PO Box 261
BUNBURY WA 6230

Dear Mrs Ferguson

I have forwarded copies of your letter to the State Government Astronomer at Bickley for comment. He should also be able to provide data about which planets are visible in daylight hours. A copy has also been forwarded to RAAF Base, Pearce, who record such phenomena.

... Please find enclosed a photocopy of an explanation of parhelion (or sundogs).

Temperature inversions occur frequently in the atmosphere usually in the layers within a few hundred metres of the ground and in the layer between about 1000-2000 metres above the ground. They occur when the temperature increases with height in the layer. The different types of mirage are formed when light travelling at low angles to the horizontal is refracted in layers containing strong temperature gradients (see enclosed photocopies). Little or no effect is produced on light beams passing through inversions at angles away from the horizontal.

Yours faithfully

(A SCOTT)
for Regional Director

15 March 1977

AS:KG

(117)

45/38 (117)

Government Astronomer
Observatory
Walnut Road
BICKLEY WA 6076

Dear Sir

... Please find enclosed a copy of a letter received in this office.

I would be grateful if you would communicate directly to the author any information relevant to the second last paragraph in addition to any other comments you may wish to make. In my reply I will enclose a definition of parhelion.

Many thanks.

Yours faithfully

(A SCOTT)
for Regional Director

15 March 1977

AS:KG

45/38 (116)

Officer in Charge
PEARCE WA

Dear John

... Please find enclosed a copy of a letter dealing with U.F.O.'s. I understand you forward such letters to an officer on the Base.

I have forwarded a copy to the Government Astronomer and asked him to provide data relevant to the second last paragraph. I will answer the questions posed in the last paragraph.

Yours sincerely

(A SCOTT)
for Regional Director WA

15 March 1977

45/38

(115)

UNEXPLAINED PHENOMENA INVESTIGATION BUREAU

P.O. Box 261,
Bunbury,
Western Australia, 6230

Perth Weather
Bureau

Dear Sir,
The U.P.I.B. researches among other things U.FO. reports. We have had two recent sightings reported, we pass them on to you for any help you may be able to give us.

No 1 20/2/77 Wellington Dam Near Collie. Seen from :
(1) Dam , By two schoolboys at one sight.
(2) In the area of the dam, by a lawyer
(3) A boat of beach south of Bubury, by two people.

Time 5. p.m. visible for a few seconds.
Descripition

As a distinct white ball, with a bright tail, burst through the heavy cloud, sped down and appeared to land in the south. When last seen disappeared behind a large hill.
It has been suggested that it could have been a meteorite.

No 2 Brunswick Jctn. 4/3/77 11 p.m.
Two boys viewed the object for 10 minutes. It appeared in the north-west sky. A bright ball with a blazing tail, it had a bluish light to the front and was bright than the moon. It appeared to speed up slow down hover and at one stage almost fade away.
Eventually it disappeared tail first leaving an orange glow. They said it was a long way away.

To assist us in future work, could you please advice us which planets are visible during daylight hours, also they positions in the sky.
Have you any infromantion on "Sundogs", tempature in versions and the effects on light. Thank-you very much. Hoped to hear from you soon.

Yours sincerely

Mrs J.L.Ferguson

45/38

114

DEPARTMENT OF SCIENCE

Bureau of Meteorology

25/912

Regional Director,
WESTERN AUSTRALIA

Attention Mr A. Scott.

SUPPLY OF VENTIMETERS

I refer to your memorandum 45/38 dated 11 February, 1977 concerning the request for information from the Bush Fires Board.

Dobbie Instruments, 18 George Street, Sandringham, Vic., 3191 ('phone No. (03) 5988244) have advised me that they are the Australian agents for the instruments in question and suggest that the Bush Fires Board contact them direct.

(D.G. ASHBY)
for Director of Meteorology
14 February, 1977

a1 17/2

Mr de Burg
Bush Fires Board
advised.

11.3

BUREAU OF METEOROLOGY

C.D.O. 9444

F 345
(APR. '66)

MEMORANDUM

For use between Central, Regional and Field Offices ONLY.
Write or print clearly

DATE 11/2/77

TO Supply Subsection Melbourne

ATTENTION MR B Carney

YOUR REF:

FROM Special Services Western Australia.

OUR REF: 45/38

SUBJECT Ventimeter.

The Bush Fires Board in this state wish to purchase for issue to some of their officers and for demonstration & training purposes an instrument similar to the Ventimiter used by this department and manufactured by the Elvo Meter Co. of Sweden. (Ident No.) One advantage of this instrument is the fact that it has a built in compass.

Dobbie Bros used to be the agents for this instrument but their Perth representatives, Henderson Instruments, know nothing of it. Are you able to advise the current Australian agents & if applicable their Perth representatives.

SIGNATURE	PRINTED NAME	APPOINTMENT
A Scott	A. Scott	Met Class 3.

FILE COPY

Folios 112-116
removed - sent
to Mat Pearce.

AMH.
26/1/77

DRW:HB

111

45/38 (109)

Mrs E Buchan-Midgley
P O Box 31
DOODLAKINE W A 6411

Dear Mrs Buchan-Midgley

I have referred your account of the meteorite sighting to the Government Astronomer, Walnut Road, Bickley, W.A. 6076, for his information.

Yours faithfully

(D R WALKER)
for REGIONAL DIRECTOR

5 January 1977

DRW:HB

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

110

45/38 (108)

The Government Astronomer
The Observatory
Walnut Road
BICKLEY W A 6076

Dear Sir

... I am referring the attached letter for your information, and have advised Mrs Buchan-Midgley.

Yours faithfully

(D R WALKER)
for REGIONAL DIRECTOR

5 January 1977

109

107

Mrs E. Buchan-Midgley,
P.O. Box 31,
DOOLAKINE, 6411. W.A.
30th December 1976.

Dept of Meteorology,
Wellington St.,
PERTH. 6000. W.A.

Dear Sirs,

Meteorite Sighting

With reference to your broadcast request for sightings of the meteorite of 21st December 1976. At approximately 9.30p.m. on the night in question I was seated in our home facing our North window. The object in the sky surprised me and at first I thought it would land in a nearby paddock. However as there was no subsequent fire visible I decided that it must be much further away. Out of interest my husband marked the glass of the window at my instruction so that we might take a bearing in daylight.

I hope that the enclosed sketch plan is of some use to you in locating the meteorite.

We live on the property of I.R. & J.H. Reedy 'Kinvara' BAANDEE.

Yours faithfully,

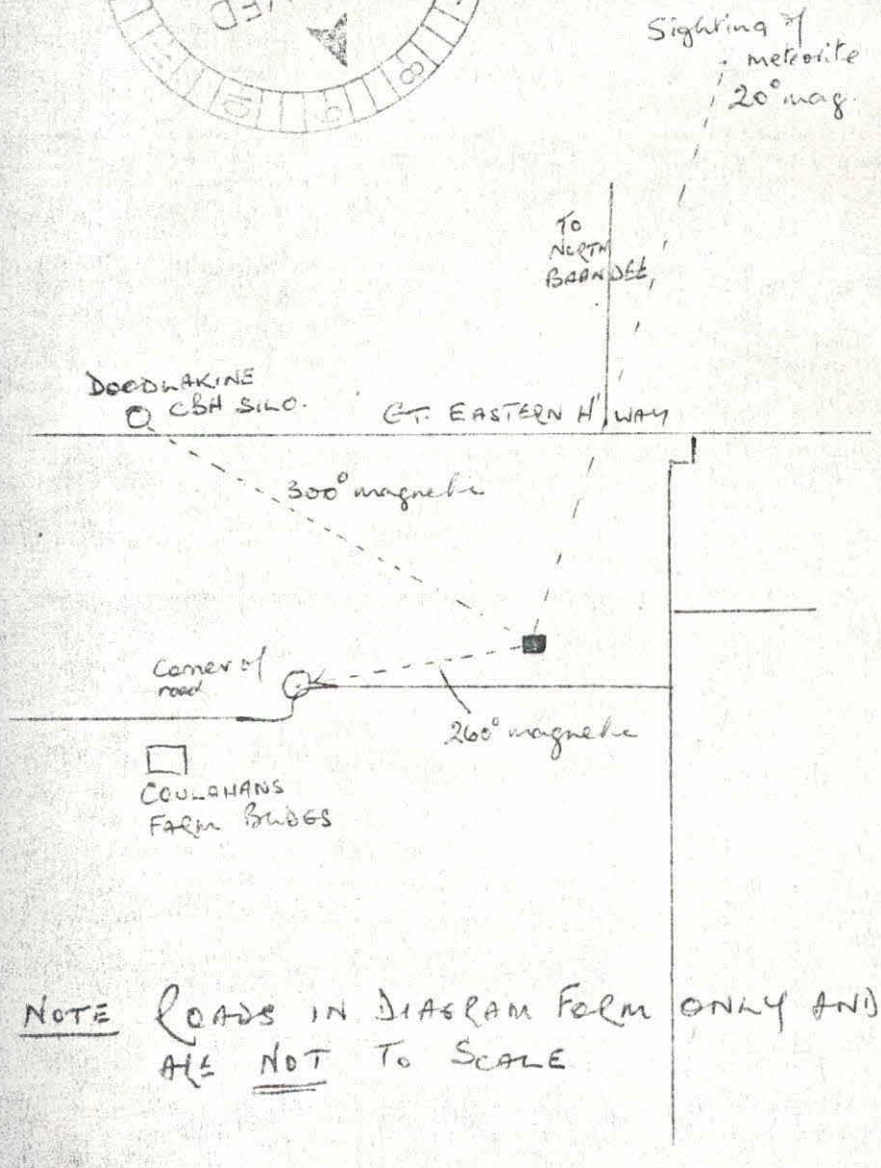
Mrs J Buchan Midgley

RP

MF

108

0.5/38



NOTE ROADS IN DIAGRAM FORM ONLY AND ARE NOT TO SCALE

Reported by Chas Holman

At Hammersly Golf Course
1·12·76. 0830.

In open fairway. Well clear of any trees.

Drove off with No 2 wood.
Ball travelled approx 120m & was at approx 18m high.
Bright flash (white haze - approx 1m diam)
Ball then descended 10m in front of Mr. Holman slightly to his left.

No noise, ball definitely identified as his own, no marks on it.
One other person there who was not watching flight of ball but who saw the return of the ball - other golfer was not making a shot at the time.

Conditions - calm - fine

no other golfers in sight on the course.

RLS:KG

106

RAAF file re no UFO 45/38.

Officer Commanding
RAAF Base
PEARCE WA 6085

UFO SIGHTING

... Attached is a copy of a report by one of my meteorological observing staff located at Kalgoorlie in respect to his sighting of an unidentified object, and related telephone reports.

(R L SOUTHERN)
REGIONAL DIRECTOR

23 December 1976

105

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE 17/12/76

TO REGIONAL DIRECTOR ATTENTION OIC SPECIAL SERVICES

YOUR REF:

FROM M. WINTERBOURNE KALGOORLIE M.O.

OUR REF: 40/2

SUBJECT U.F.O. SIGHTINGS ON 16.12.76

The first sighting was at 1225 WST 16.12.76. The object past from the N.E. to the S.W. passing just south of the overhead possition. It was white in color , glowing and fuzzy at the edgesand slightly pulsating. Shape was as a rugby ball and size about half that of a 5 cent piece if held at arms length . The object took 10 to 12 seconds in it's full trajectory. When it was about 50 deg elevation in the south west it seemed to stop for about 5 seconds, then it seemed to just disolve in the same spot.

At 1.30 Wst I received a phone call from Mr Dave Bower of the Scotia Mine near Kalgoorlie, saying that he had a strange object in the sky which was hardly moving. He gave me the bearings, but I failed to locate it at that time.

At 2.45 WST when going outside to do the 3PM obs one of the objects as described in the 1225 sighting, flashed across the sky from east to west . I lost sight of it before it reached the western horizon due to its diminishing size. Time of transit again about only 12 seconds.

After another call from Scotia, I made another attempt to locate their object in the theodolite and this time found it at 1630 WST. This looked about five times the size that a 350 g ballon lookes like at 100 mb. It was drifting slowly

SIGNATURE	PRINTED NAME	APPOINTMENT

BUREAU OF METEOROLOGY F 345 104

MEMORANDUM

For use between Head, Regional and Field Offices ONLY. Write or print clearly.

DATE / /

TO ATTENTION

YOUR REF:

FROM

OUR REF: 40/2

SUBJECT

westwards. In my opinion this could have been one of those American research balloons that circle the earth many times .

This was disapointing for me as it left my two high speed sightings unconfirmed by another witness. While the slow moving object could probably be confirmed to be ~~one of these research balloons , I cant think of any~~ expanation for the high speed sightings on account of the huge speed involved. i.e. Horizon to horizon is about 80km time taken 12 secs= 24000 km/hr

This matter has received somewhat unwarrented local publicity. No official comments to the Media have been made.

G McDonald
A/OIC
17/12/76.

SIGNATURE	PRINTED NAME	APPOINTMENT
M Winterbourne	WINTERBOURNE	OBS GR2

ANS:PAH

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

104

45/38

Mr R E Black
Department of Physics
WA Institute of Technology
Hayman Road
SOUTH BENTLEY WA 6102

Dear Ron

Thank you for your letter informing us of your involvement in the study of the Peel Inlet/Harvey Estuary System.

Our current commitments and budgeting and staff restraints preclude our becoming involved however we are attempting wherever possible to obtain as much reliable wind data as becomes available. Consequently I have asked Mr Alan Scott of our Special Services Section to contact you to discuss the format etc of your wind data and whether we may later obtain copies of it.

We would of course be interested in any reports on the hydrometeorology of the area which follow from the study.

Yours sincerely

(R L SOUTHERN)
REGIONAL DIRECTOR

4 August 1976

Mr Scott: For Info. & reply if appropriate.

102

Hayman Road
South Bentley 6102
Telephone 68 5511
Telex AA 92983

Department of Physics

Western Australian Institute of Technology

File No.: REB:DH
Reply to: Mr. R.E. Black.
Your Ref.:

26th July, 1976.

Mr. R. Southern,
Director,
W.A. Regional Office,
Bureau of Meteorology,
127 Wellington Street,
PERTH, 6000. Western Australia.

Dear Bob,

Warren Walker and I have recently received a grant from the Department of Conservation and the Environment for year 1 of a three year study of the hydrological and hydrometeorological inputs to the Peel Inlet/ Harvey Estuary system.

This will involve regular monitoring of a number of meteorological variables and we propose to establish a climatological station on private property at Point Grey. This will consist of (at least) a pluviometer, pan evaporimeter, Woeffle anemometer, thermograph, hygrograph, barograph, and other minor instruments. The station will be visited weekly (on Fridays) and both hourly and daily data will be extracted from the instruments.

The site and instrumentation will be made to conform in all respects to Bureau standards. Therefore, if you are able to make use of any of this data, or would like to be involved in the programme in any way, please do not hesitate to let me know.

Yours sincerely,

Ron Black

R.E. Black,
Senior Lecturer in Hydrology,
DEPARTMENT OF PHYSICS.

ANS:PAH

(8(

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

45/38(101)

Mr P Flanigan
22 Manton Crescent
HAMERSLEY WA 6022

Dear Mr Flanigan

A similar report of this phenomenon has been brought to my attention. My brief attampt to find an explanation was not completely satisfying but did nevertheless offer a plausible solution.

On the weekend of 12-13 June 1976 two acrobatic aircraft were operating from Jandakot and I believe that at least one operated from Perth Airport on the Sunday. This type of aircraft would seem to have the ability to lay a circular smoke trail of relatively small diameter. The subsequent movement and gradual dissipation of this smoke ring was consistent with the winds and stability of the lower atmosphere.

I cannot confirm that one of these aircraft did in fact lay a smoke trail but it is difficult to conveive of any naturally occurring phenomena which could produce such a ring.

Hoping this may be of some help.

Yours faithfully

(A N SCOTT)
for Regional Director

21 June 1976

45/38

100

22 Manton Ct
Hamersley 6022
16/6/76

The Director
Bureau of Meteorology
Dear Sir,

I am writing to report the sighting of one of the most unusual atmospheric phenomenon (if that is what it was) that I have ever seen.

On Sunday 13th June at approximately 5.40 p.m. my wife and I with our 2 young children were driving along Odin Rd, Balcatta, heading north just past North Beach Rd. On our right we spotted what a black ring in the sky. We stopped the car (as did quite a lot of other motorists) and observed it for about 5 minutes.

It moved from from the east, almost directly overhead and then continued in a westerly direction to slowly disappear into the hazy clouds.

When overhead it was almost perfectly circular although later it seemed to assume an ovoid shape.

Its diameter appeared to be between 2 and 3 times that of the full moon. This increased as it moved west. ~~[illegible]~~.

The thickness of the ~~[illegible]~~ ring was, I estimate about $\frac{1}{10}$th the total diameter.

The height was difficult to gauge — it did appear to be rising as it passed over. It was certainly below the cloud level until the end when it appeared to enter the clouds and to break up at the same time.

There was a great deal of smoke and haze about at that time of the evening.

My best guess is that it was a gigantic smoke ring that had somehow been formed perhaps at a temporary break in the inversion layer.

That it was composed of vapour became fairly obvious near the end when its edges became

blurred and its tight shape became distorted.

There was no wind at all at the time at ground level, nor did the clouds appear to be moving. Yet this ring must have moved several miles in just a few minutes.

If you have any further information on this phenomenon or can explain it how it could have occurred, I would be very interested to hear.

Yours sincerely

Peter Flanigan

WBL:PAH

97

45/38

Mr S Slee
P O Box 177
BUSSELTON WA 6280

Dear Sir

Your letter of 3rd June 1967 has been forwarded to the State Government Astronomer Bickley for information.

Yours faithfully

(W B LINTHORNE)
for Regional Director

18 June 1976

WBL:PAH

45/38

The Government Astronomer
The Observatory
Walnut Road
BICKLEY WA 6076

Dear Sir

The photocopy of a letter received by this office is forwarded for your information.

Yours faithfully

(W B LINTHORNE)
for Regional Director

18 June 1976

45/38

54 95

P O Box 177
Busselton W A 6280
3-6-67

Regional Director
Bureau of Meteorology

Dear Sir

On the night of 29th May at 11-55 P.M. I saw what appeared to be a meteorite or some space object enter the earths atmosphere and then fall straight to earth. After the flare up which attracted my attention it fell straight to earth as a black object lit up by an occasional flame. The sky was clear and cloudless and I took particular notice where it entered the tree line and where I was standing. I later took a compass bearing between the two spots and they were 20° East of South. The land on this side of my property is 'State Forest' and had the fire spotter plane been travelling over each day I would have asked them to investigate the area.

Never the less I thought you might be interested in this interesting sighting.

Yours truly

L Allee

P.S. I am a rainfall observer.

Phone. Yoongarillup. 533930

45/38

(94)

5 Barndie Way
WANNEROO. 6065.

4th May 1976.

Attention Mr. T. Tate.
Bureau of Meteorology,
231 Adelaide Terrace,
PERTH. W.A. 6000.

Dear Mr. Tate,

May I take this opportunity to thank you for offering to come and speak to the U.F.O. Group.

This letter is mainly to confirm all the details for the Meeting. The date will be 10th June 1976, at 14 Aberdeen Street, Perth. The hall that we use is that of the Temperance Society. The Meeting usually starts at 8 o'clock but if you could arrive a little earlier it would give us time to finalize any last minute details.

I would appreciate it very much if you would give me a ring on Tuesday, just to confirm that you will be able to attend. My phone number at work is 468061 (9-5) and my home number is 912799 (after 5.30)

Looking forward to hearing from you on Tuesday.

Yours faithfully,

E. M. Audsley
Eileen Audsley (Mrs.)

COMMONWEALTH BUREAU OF METEOROLOGY
DEPARTMENT OF THE INTERIOR

S6

ISSUE NOTE № 27158

ISSUED TO TECHNICAL SCHOOL.

ADDRESS LEEDERVILLE.

Requisition No

ITEMS LISTED BELOW ARE FORWARDED FOR* PERMANENT LOAN.

* Give reasons for issue A. CHAPMAN.

Ident No	Description	Qty	Serial Number and/or Remarks
5142.	SERGEN LARGE.	1.	
	(PART WORN).		

Insert address of Issuing Store/Office

ISSUING OFFICER S. Goldsmith

DESIGNATION

DATE 22/3/1976.

STORES CERTIFICATE 27158.

"I certify that above items have been entered in,

† { "Items issued for repairs" register Folio No.....
{ "Items issued on loan" register Folio No. Cancelled

...../...../19.....

† Delete whichever inapplicable

STORES LEDGER KEEPER

DUPLICATE:- To Stores Ledger Clerk.

RM72/20448

May 1972

23/18

93

Leederville Technical College

Richmond Street Leederville Western Australia 6007

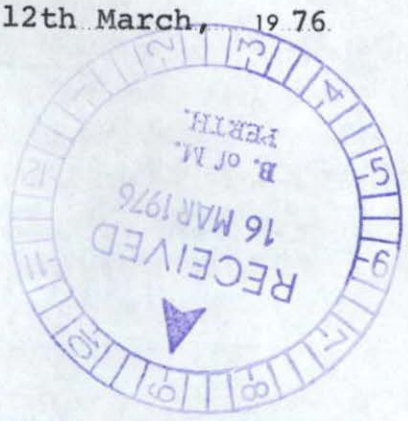
Telephone 24 5433

EE/VT

In replying please quote E2/76

12th March, 1976

Regional Director,
Bureau of Meteorology,
126 Wellington Street,
PERTH. W.A. 6000.



(Through Principal)

Dear Sir,

Many thanks for your letter of the 17th February, 1976, the information enclosed in that letter was most useful.

I noted your reference to the unserviceable Stevenson Screens in store and on behalf of this College request that one be donated to us. Our Carpentry and Joinery Department could carry out any repairs to put it in working order.

If this request is granted perhaps you could let us know what transport arrangements will be necessary for us to collect the screen.

Thanking you in anticipation.

Yours faithfully,

E Evans

E.Evans,
Senior Lecturer,
Social Studies.

DISPOSAL OF U/S SCREEN TO COLLEGE APPROVED JSM.

MF1.

OBS4(NT)

R.A. Cotton,
Principal.

P/A

(22)

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name PACMINEX PTY LTD

Address 6 BEACONSFIELD AVENUE
Midvale W.A. 6056

Details of Request

Photocopies of Davis anemograph charts from Pearce for 6/12/75 to 29/1/76

Charging Principle Applicable (see Chapter 78)

DIRECT COSTS + OVERHEADS + MATERIALS

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	CA 3	0.5 hours @ $5.50 per hour =	2.75
		..... hours @ ..... per hour =	
		Materials 54 photocopies @ 20	10.80
Overhead Costs	Includes cost of returning charts to Pearce.	Other Expenses (inc. data processing) =	
		(120% of Direct Costs) if applicable postage =	1.40
		TOTAL CHARGE	$ 14.95

Costs computed by 5/3/76

.....
(Section Leader)

Recommendation (if any)

Confirmed

.....
(Supervising Meteorologist)

...../...../....

(Waiver action, if applicable)

.....
(Regional Director)

...../...../....

Client advised ~~8/3/76~~ DAN 22509
9/3/76
D.AN 22509

.....
(Accounts Clerk)

HJL:PAH

(91)

Mr C Thorman
Department of English & Social Studies
Leederville Technical College
Richmond Street
Leederville W A 6007

Attention : Mr R William

Dear Sir

Referring to your correspondence E2, of 2 February 1976, I am enclosing
... attached, photocopies of the layout of a standard instrument enclosure as used by the Bureau of Meteorology, and also the placement of the thermometers in the Stevenson Screen.

... I am also enclosing free of charge one Australian Co-operative Observers Guide which I am sure contains all the relative information that you should require.

Almost all of the instruments necessary can be purchased from the Henderson Instrument Company, Hay Street Subiaco. The costliest item is probably the Stevenson Screen (Approx $500.00). This bureau has several unserviceable screens in store which could possibly be put into working order by your carpentry school. One of these units could possibly be donated to the college on request.

Hoping this satisfies some of your queries, please do not hesitate to write or phone if further information is required.

Yours faithfully

(H J LANGDON)
for Regional Director

12 February 1976

(2) The thermometers should be so arranged that all parts of their scales can be read without the necessity of moving any one of them or of viewing them from an angle.

(3) The maximum and minimum thermometers should be arranged so that strong winds cannot shake them. Jolting will lead to a displacement of the mercury column or index.

THERMOMETERS IN SCREEN.

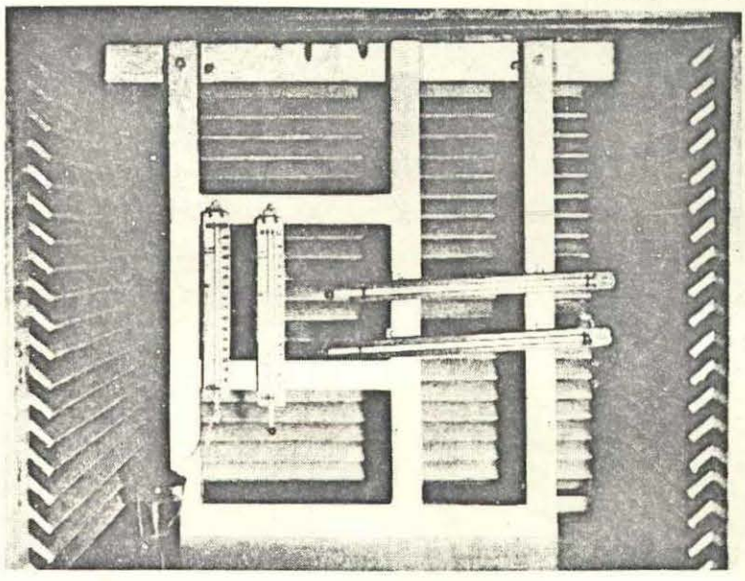


FIG. 3.

At some stations, such as lighthouses, which are subject to very high winds, vibration has been reduced by attaching rubber buffers to the mountings.

The thermograph and hygrograph should be suspended from the roof or otherwise placed so as to allow ready access to the thermometers.

Terrestrial Minimum Thermometer.

The reading of this thermometer indicates the minimum temperature of the air at the surface of the ground and it serves to denote the occurrence of frost. Injury to the tissues of growing plants is not caused until the temperature has fallen considerably below the freezing point of water (32°F.). A "ground" frost is regarded as having occurred when the thermometer on the grass has fallen to 30°F. or below. If the instrument is read to tenths of a degree the limit is 30.4°F.

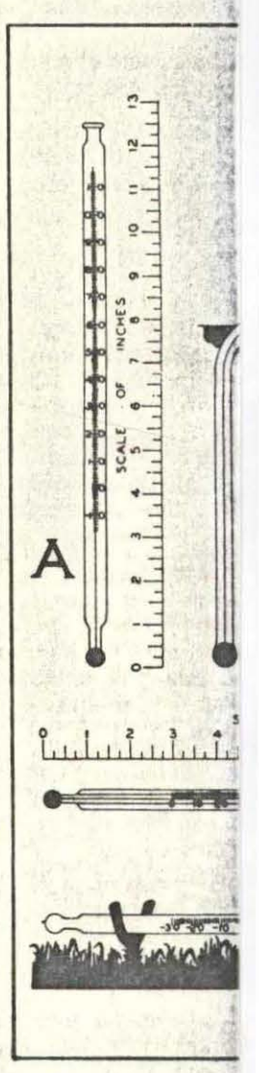
The plot on which
with short grass 1 inch
be supported on two V-
ing the tips of the blad

The proximity of w

It should be noted t
of protecting cage is u
underneath or on top o

Earth Thermometers.

The temperature of
means of thermometers



45/38

89

Leederville Technical College

Richmond Street Leederville Western Australia 6007

Telephone 24 5433

In replying please quote

E2

February 2, 19 76

Regional Director,
Bureau of Meteorology,
127 Wellington Street,
PERTH, W.A. 6000

Dear Sir,

We intend setting up a small weather recording station at this College and would welcome any advice from you regarding the selection of instruments, their placement, reading recording etc.

As a Stevenson Screen will be needed, we would also be grateful for your advice as to the most economical way in which the College could acquire one.

We look forward to your early reply.

Yours R. William

1 OBSERVERS GUIDE
1 RAINFALL "
1 S/S SCREEN

C. THORMAN,
Head of Department
English and Social Studies.

RECEIVED
-3 FEB 1976
B. of M.
PERTH.

M' LANGDON

MF1

OBS4NT

THIS IS 'CARDIES' TERRITORY.
PLEASE ADVISE THEM ON SETTING UP A STATION, AND WHERE THEY CAN PROCURE EQUIPMENT. I DON'T THINK WE CAN HIRE A S/SCREEN.
PERHAPS THEY WOULD LIKE PLANS OF THE SIMPLE SCREEN AND MAKE IT THEMSELVES?

JSM
3/2

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name PACMINEX PTY LTD

Address 6 BEACONSFIELD AVENUE
MIDVALE
W.A. 6056

Details of Request Photocopies of Dines Anemograph charts from Perth Met Office
0900 9/11/75 - 0900 1/12/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
		..... hours @ ..... per hour =	
		Materials 21 photocopies @ 15c	3.15
		Other Expenses (inc. data processing) =	.40
Overhead Costs		(120% of Direct Costs) if applicable =	
		TOTAL CHARGE =	$3.55

Costs computed by ASatt 8/1/76

ASatt
..... (Section Leader)

Recommendation (if any)

Confirmed

..... (Supervising Meteorologist)
...../...../....

(Waiver action, if applicable)

..... (Regional Director)
...../...../....

Client advised ...../...../....

D.A.N. 22462 pp 9/1/76.

..... (Accounts Clerk)

(88)

Enc. 88 Transferred to file 55/30

JBW

27/10/75

87

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name PACMINEX PTY LTD

Address 6 BEACONSFIELD AVENUE
MIDVALE
W.A. 6056

Details of Request

Photocopies of Dines anemograph charts from Perth Met Office
0900 11/8/75 to 0900 4/9/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
	.....	..... hours @ ..... per hour =	
		Materials 23 photocopies @ 15c	3.45
		Postage	.40
		Other Expenses (inc. data processing) = Postage to obtain from Perth	2.20
Overhead Costs		(120% of Direct Costs) if applicable =	
		TOTAL CHARGE =	$6.05

Costs computed by ..... A Swift 25/9/75

..... A Swift .....
(Section Leader)

Recommendation (if any)

Confirmed

.....
(Supervising Meteorologist)
...../...../....

(Waiver action, if applicable)

.....
(Regional Director)
...../...../....

Client advised 26/9/75

DAN N° 19167

..... L R Thomas .....
A/ (Accounts Clerk)

86

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name . PACMINEX PTY LTD

Address 6 BEACONSFIELD AVENUE
MIDVALE W.A. 6056

Details of Request

Photo copies of Dines anemograph charts from Pearce Met Office
0900 13/7/75 to 0900 11/8/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
	.....	..... hours @ ..... per hour =	
		Materials 29 photocopies @ 15 cents	4.35
		postage	.33
		Other Expenses (inc. data processing) = postage to/from Pearce	1.26
Overhead Costs		(120% of Direct Costs) if applicable =	
		TOTAL CHARGE	$5.94

Costs computed by 15/8/75

.....
(Section Leader)

Recommendation (if any)

Confirmed

.....
(Supervising Meteorologist)
...../...../....

(Waiver action, if applicable)

.....
(Regional Director)
...../...../....

Client advised 18/8/75

D.A.N. 19141

.....
(Accounts Clerk)

Bill Sampson -

85

45/38

WARFC AA92697
WEATHER AA99085
FOR INFO MET 3
RFDS STATION REPORTS MUCCAN, BAMBOO SPRINGS AND COONGAN STATIONS ALL REPORTED A STRONG EARTH TREMOR OCCURED APPROX 2225Z. DURATION UP TO ONE MINUTE.
WHR HEDLAND
250043

passed to Obs Mudarie 95-1030

25/7/75.

M

84

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name . PACMINEX PTY LTD

Address 6 BEACONSFIELD AVENUE
MIDVALE 6056

Details of Request

Photocopies of Davis Anemograph charts from Perth Met Office
0900 18/6/75 to 0900 13/7/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
		..... hours @ ..... per hour =	
		Materials 25 photocopies @ 15 cents	3.75
		Postage	.33
		Other Expenses (inc. data processing) =	
		Postage to/from Perth	
Overhead Costs		(120% of Direct Costs) if applicable =	1.26
		TOTAL CHARGE =	5.34

Costs computed by 27/7/75

.....
(Section Leader)

Recommendation (if any)

Confirmed

.....
(Supervising Meteorologist)
...../...../....

(Waiver action, if applicable)

.....
(Regional Director)
...../...../....

Client advised 28/7/75

.....
(Accounts Clerk)

3.
DAN 19120

83

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name . MACMINEX PTY LTD

Address 6 BEACONSFIELD AV
MIDVALE 6056

Details of Request

Photocopies of Dines anemograph Traces from Pearce for Period 23/5/75 - 17/6/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
		..... hours @ ..... per hour =	
		Materials 26 Photocopies	3-90
		Postage	33
		Other Expenses (inc. data processing) =	
		Postage to/from Pearce	
Overhead Costs		(120% of Direct Costs) if applicable =	1-26
		TOTAL CHARGE =	5-49

Costs computed by ..... A Scott 27/6/75

A Scott
(Section Leader)

Recommendation (if any)

Confirmed

K. Lynch
(Supervising Meteorologist)
27/6/75

(Waiver action, if applicable)

.....
(Regional Director)
...../...../....

Client advised 28/7/75

.....
(Accounts Clerk)

~~28/7/75~~

DAN 19120.

AS/JV

82

AND CONSUMER AFFAIRS

45/38 (82)

19th June, 1975.

Mrs. S.V. Quarrell,
R.M.B. 592,
KOJONUP. W.A. 6395.

Dear Mrs. Quarrell,

The Bureau of Meteorology does not have any expertise in the field of astronomy or related areas. I have therefore taken the liberty of forwarding your letter to the State Government Observatory at Bickley with a request that they seek an answer to your question.

My own impression is that the object you saw was a satellite which was tumbling along its path and thus regularly reflecting sunlight from its different faces.

Yours faithfully,

(A. SCOTT)
for Regional Director

Original sent to
State Government Astronomical
Observatory
Bickley.

80

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name . PACMINEX PTY LTD

Address 6 BEACONSFIELD AVENUE
MIDVALE W.A. 6056

Details of Request

Photocopies of Dimis anemograph traces from Pearce for period 28/4/75 to 23/5/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
		..... hours @ ..... per hour =	
		Materials 25 photocopies @ 15c	3.75
		Postage	.33
		Other Expenses (inc. data processing) = Postage to/from Pearce	1.26
Overhead Costs		(120% of Direct Costs) if applicable =	
		TOTAL CHARGE	$5.34

Costs computed by ..... A Scott 28/5/75

A Scott
.....
(Section Leader)

Recommendation (if any)

Confirmed

K. Lynch
.....
(Supervising Meteorologist)
28/2/75

(Waiver action, if applicable)

.....
(Regional Director)
...../...../....

Client advised 30/5/75

.....
(Accounts Clerk)

COSTING SCHEDULE

(Administrative Handbook, Chapter 78)

Job Request File No. 45/38

Client Name . MCMINEX Pty Ltd

Address 6 BEACONSFIELD AV
MIDVALE 6056

Details of Request

Photo copies of Dines anemograph traces from Pearce for period 5/4 - 28/4/75

Charging Principle Applicable (see Chapter 78)

Estimates of Cost

	Grade of Officer		$ c
Direct Costs	.....	..... hours @ ..... per hour =	
		..... hours @ ..... per hour =	
		Materials 24 Photocopies	3-60
		Other Expenses (inc. data processing) Postage	33
Overhead Costs		(120% of Direct Costs) if applicable Postage to/from Pearce	1-26
		TOTAL CHARGE =	5-19

Costs computed by 19/5/75

.....
(Section Leader)

Recommendation (if any)

Confirmed

K Lynch
.....
(Supervising Meteorologist)
19/5/75

(Waiver action, if applicable)

.....
(Regional Director)
...../...../....

Client advised 20/5/75

.....
(Accounts Clerk)

DAN 19043

ANS:KG

78

45/38

16th May, 1975.

Mr. Black,
Pacminex Pty Ltd,
6 Beaconsfield Avenue,
MIDVALE. W.A. 6056

Dear Mr. Black,

Please find enclosed photocopies of anemograph traces from Pearce covering the period 5-28 April 1975.

We will forward an account for these in due course.

Yours faithfully,

(A. N. SCOTT)
for Regional Director.

ANS:KG

77

45/38

14th May, 1975.

The Managing Director,
Pacminex Pty Ltd,
Box 221 Royal Exchange,
SYDNEY. N.S.W. 2000

Attention: Mr. J. C. Yager

Dear Sir,

Muchea Bauxite Alumina Project
Meteorological Data

We are interested to hear that your Woelfle Anemometer is now installed at Muchea and performing satisfactorily. We have offered your Perth Office the benefit of whatever limited expertise we have acquired with these instruments.

Mr. Black of your Perth Office and I have discussed and mutually agreed that he will, on receipt of the chart from Muchea, request me to supply him with copies of the relevant Dines Anemograph charts. He will forward these with the Woelfle chart to you. Payment for the cost of photocopies will be made from Perth.

With regard to assigning stability categories to the wind traces from Muchea, might I suggest that initially you consider using the empirically deduced classification set out on the appended table. This classification was derived from the traces produced by the Woelfle Anemometers we had at Coogee, just north of Kwinana. Whether modification is required to the classification may only be assessed from the type of recordings you obtain at the site and the corresponding stability data from Perth Airport.

It may be worthwhile to compare, particularly during the summer months, the Muchea recordings with those we obtain from the single Woelfle we are maintaining at Coogee. Such a comparison may more readily highlight significant differences between the recordings.

The best use that we can make of Perth Airport stability data is to assume that it is representative of the coastal plain except where other observable phenomena imply a difference between areas. Such a difference would occur when a sea breeze had commenced on the coast but not inland.

.../2

Again there may be some benefit to be derived from a comparison of the Muchea and Perth Airport wind data simply because the relative wind climatology of the two sites are unknown. Please advise whether you desire to undertake such a comparison. A decision can naturally be left for some considerable time as the records from Perth Airport remain in this region and are thus readily accessible. Alternatively you could compare the first few months of the Muchea data with Perth Airport and then make a decision as to whether a full comparison is justified.

Yours faithfully,

(A. N. SCOTT)
for Regional Director.

75

PACMINEX PTY. LIMITED

15-19 BENT STREET
BOX 221 ROYAL EXCHANGE
SYDNEY 2000 AUSTRALIA
CABLE "PACMINEX" SYDNEY
TELEX AA20285
TELEPHONE 2 0515

PACMINEX

JCY:PR

22nd April, 1975.

45/38

The Regional Director,
Bureau of Meteorology,
127 Wellington Street,
PERTH. W.A. 6000

Attention Mr. A.N. Scott
Your Ref. 45/38

Dear Sir,

MUCHEA BAUXITE ALUMINA PROJECT
METEOROLOGICAL DATA

Referring to recent discussions with our Mr. Yager, we have now installed the Woelfle recorder at Muchea. After some initial difficulties with the first chart, a second chart was installed on the 5/4/75. As this appears to be operating satisfactorily, we should have our first complete chart early in May.

We would like to obtain a correlation between the wind speed and direction data at Muchea and Pearce, where the Dines Anemometer apparently operates on a 7 day basis. Would if be possible for us to borrow the daily charts for this instrument corresponding to the first 28 days of the Woelfle? We could photo copy the charts and return them. Mr. H. Black of our Perth office will be looking after the instrument at Muchea and will contact you regarding the charts from Pearce.

We understand you would be discussing with Mrs. MacNicol the possible correlation of inversion data from Guildford with the wind data from Muchea. If you consider this is worthwhile perhaps we could obtain the Guildford data for the same period. We would also like to have your comments on the best method of assigning stability categories, in view of the limited data available from the Muchea site.

Thank you for your assistance in this matter and we look forward to hearing from you.

Yours faithfully,

R.N. Selman
Managing Director

Harold Black
Pacminex
Perth.

45/38

74

PACMINEX PTY. LIMITED

5-19 BENT STREET
BOX 221 ROYAL EXCHANGE
SYDNEY 2000 AUSTRALIA
CABLE "PACMINEX" SYDNEY
TELEX AA20285
TELEPHONE 2 0515

PACMINEX

JCY:PR

7th March, 1975.

The Regional Director,
Bureau of Meteorology,
127 Wellington Street,
PERTH. W.A. 6000.

Attention Mr. A.N. Scott
Your Ref. 45/38

Dear Sir,

MUCHEA BAUXITE ALUMINA PROJECT
METEOROLOGICAL DATA

Referring to our letter of 30th January, 1975 Mr. Yager now plans to be in Perth on Monday morning, 17th March. He would like to call on Mr. Scott say at 10 a.m. and arrange a visit to the Muchea site and also the Pearce Air Base for Tuesday, 18th March.

If there is any difficulty with this arrangement, perhaps you could telephone our Perth office at 74.3488 and arrange for them to send a telex message to Mr. Yager.

Thanking you.

Yours faithfully,

R.N. Selman
Managing Director.

ok 17/3

Mr Tate

ABR Please file 73

ASTHMA FOUNDATION OF WESTERN AUSTRALIA INCORPORATED

Patron: Sir THOMAS WARDLE

JDH/bac.

c/- Princess Margaret Hospital for Children,
Department of Child Health,
Box D. 184, G.P.O.
PERTH.
Western Australia. 6001.

24th January, 1975.

Mr. R. Southern,
The Director,
Metropolitan Meteorological Bureau,
Wellington Street, (127)
PERTH. 6000.

Dear Mr. Southern,

The pollen counting which the Asthma Foundation has co-ordinated over the last two years has revealed no significant increase in pollen numbers during the winter period. From the end of next week therefore we wish to discontinue this monitorring service and wish to recommence it on the 4th August 1975 before the spring starts.

I would like to thank you and your workers both in Perth and at the Airport for their help in this matter and I would be most grateful if we could call on you to restart the pollen counts again from the 4th August, 1975.

Regards,

Yours sincerely,

JOHN D. HOBDAY. MD FRCP (Edin) DCH
President,
Asthma Foundation of W.A. Incorporated.

Mr Tate

Please arrange.

Mr Linthorne + Mr Booth will come abs on Fri 31/1/75 JS.

45/38

72

PACMINEX PTY. LIMITED

15-19 BENT STREET
BOX 221 ROYAL EXCHANGE
SYDNEY 2000 AUSTRALIA
CABLE "PACMINEX" SYDNEY
TELEX AA20285
TELEPHONE 2 0515

JCY:PR

30th January, 1975.

The Regional Director,
Bureau of Meteorology,
127 Wellington Street,
PERTH. W.A. 6000.

Attention Mr. A.N. Scott
Your Ref. 45/38

Dear Sir,

MUCHEA BAUXITE ALUMINA PROJECT
METEOROLOGICAL DATA

Thank you for your letter of 15th January and for your offer of assistance in selecting a site for the anemometer. As you have set up several of the Woelfle instruments you may be able to suggest a contractor who could provide and erect the power type pole, and also provide the steel hand holds, a safety belt and the mounting flange. Otherwise we will ask our Perth representative, Mr. S.D. Black to make suitable arrangements. In case you wish to contact him, the address is - Lot 6, Beaconsfield Avenue, Midvale, Phone 743488.

Providing the instrument arrives in Perth as promised on 21st February, Mr. Yager is planning to visit Perth on either 3rd and 4th March or 10th and 11th March. We would much appreciate if you could accompany him to the Muchea site. After the position of the instrument is finalised, we can then have it erected.

We have written to the Commander of the Pearce Air Base and he has no objection to our erecting the instrument at the site indicated. We would also like to visit the base to discuss the weather readings taken there. As we understand that the officers responsible are employed by the Bureau of Meteorology, perhaps you would also be good enough to arrange this.

We are very grateful for your assistance in this matter and will let you know as soon as definite arrangements can be made.

Yours faithfully,

R.N. Selman
Managing Director.

Notified Met Pearce 10/2/75 at.

SEC recommended RIDOLFO to erect pole. advised PACMINEX 10/2/75 at.

AS:KG

71

45/38

15th January, 1975.

The Managing Director,
Pacminex Pty. Ltd.,
Box 221 Royal Exchange,
SYDNEY. N.S.W. 2000

Attention: Mr. J. C. Yager

Dear Sir,

Muchea Bauxite Alumina Project
Meteorological Data

I will be happy to make available members of my staff to provide advice regarding selection of an anemometer site at Muchea. The proposed location seems to fulfil the normal requirements for such a site though this may need to be confirmed by inspection.

The standard height for anemometer mounting is 10 metres, however, provided the exposure is adequate this could be reduced to 6 - 7 metres without much significant effect. We have successfully operated five Woelfle type anemometers for 14 months while having them mounted on the top of power type poles at heights of 7 - 8 metres. Steel spike hand holds were provided on the poles from about 3 metres above ground level to prevent unauthorised access. Climbing of the pole was commenced from the roof of a Land Rover type vehicle though a suitable ladder could have been used. The person performing the chart changing wore a safety belt which also allowed the use of both hands while carrying out this task.

As an alternative four inch galvanized pipe or something similar with welded hand holds could prove adequate if suitably mounted.

Our Woelfle type instruments have been mounted on short lengths of 2 inch galvanized pipe screwed into a flange which was then fixed with coach bolts to the top of the post.

A further benefit to be had from the use of the heavier type post mounting over lighter mountings is a reduction in the effect of vibration on the instrument.

.../2

Should you require any further information before late February Mr. A. N. Scott of my Department should be able to assist.

Yours faithfully,

(R. L. SOUTHERN)
REGIONAL DIRECTOR

69

PACMINEX PTY. LIMITED

15-19 BENT STREET
BOX 221 ROYAL EXCHANGE
SYDNEY 2000 AUSTRALIA
CABLE "PACMINEX" SYDNEY
TELEX AA20285
TELEPHONE 2 0515

8th January, 1975

Your ref:
Our ref: JY/pp

The Regional Director,
Bureau of Meteorology,
127 Wellington Street,
PERTH.W.A. 6000.

Dear Mr. Southern,

MUCHEA BAUXITE ALUMINA PROJECT

METEOROLOGICAL DATA

We have decided to establish a simple meteorological data gethering station on the proposed plant site for Muchea project early in 1975. Following on previous contacts we have had with you and your staff, we would like to obtain assistance with the selection of the most appropriate site to establish a station. In conjunction with data from Pearce airbase, this will assist us in the location of the boiler station and alumina kilns, if the construction of the plant does proceed in the future.

We have placed orders for the following equipment which we expect to be available by February 21st:-

One Woelfle wind direction and speed recorder with 31 day chart and mechanical drive.

A contour plan of the plant site area is enclosed, together with an outline of the plant area and our proposed access route. We would consider the point marked as possibly the most appropriate, and would appreciate your comments. A final selection can be pinpointed by a visit to the site. We wish to obtain clearances from Lands Department and the RAAF beforehand, and would appreciate your early comments. We anticipate discussions with your staff in Perth and on site late in February 1975.

Most of the site consists of a generally flat sand plain having an elevation between 70 and 80 metres and sloping gently to the north east. Highly leached coarse siliceous sands (Bassendean Dune System) support only low open Banksia scrubland on the site. This consists mainly of banksia trees (up to 7 metres high) scattered in varying densities with a ground cover of many types of shrubs and wild flowers.

R/D

.../2

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Your Department in Sydney advise that the standard height for the wind direction instrument is 10 metres above ground level. This could cause us some difficulty in erection and maintainence in this location. We would appreciate your advice on the minimum acceptable height for the instrument, and if possible a mounting system you have found satisfactory.

The Pacminex officer who will be supervising the installation will be Mr. J. C. Yager, who works on air pollution matters within our environmental group. Would you please mark any correspondence for his attention.

We look forward to hearing from you.

Yours faithfully,

Karl Selman

R. N. Selman

Managing Director.

Mr Scott: Please draft a letter for my signature. Discuss with T. Tate RNS. 13/1/87


RECEIVED
13 JAN 1975
B. of M.
PERTH.

THIS ITEM HAS BEEN DIGITISED IN SECTIONS

THIS ITEM HAS BEEN DIGITISED IN SECTIONS

POSA

AREA

NATURAL GAS PIPELINE

WIND ROSE

REFINERY SITE

DRAIN

SCALE 1:25000

PART OF LANDS DEPT MAPS 2035 II SE
2035 II SW
2034 I NE
2034 I NW

1 MILE = 2·5 INCHES
1 KM = 4 CM

L S P O S A

A R E A

NATURAL GAS PIPELINE

WIND RECORDER

REFINERY SITE

Brook

Chandala

BERGALA

Rocky

Drain

BM MG4 53.39

BM MG3 52.25

1966

DEPT MAPS 2035 II SE
2035 II SW
2034 I NE
2034 I NW

= 2·5 INCHES
KM = 4 CM

10/5009

10/5008

10/5010

SCALE 1:25000

PART OF LANDS DEPT MAPS 2035 II SE
2035 II SW
2034 I NE
2034 I NW

1 MILE = 2·5 INCHES
1 KM = 4 CM

REFINERY SITE

A 10/5007

10/5008

10/5009

WIND RECORDER

REFINERY SITE

ALE 1:25000

LANDS DEPT MAPS 2035 II SE
2035 II SW
2034 I NE
2034 I NW

1 MILE = 2·53 INCHES
1 KM = 4 CM

BERGALA

MUCHE

MUCHEA

Rocky

Drain

Drain

Subject

17

original to
forward to
Dr. Pensioner?
W. A. Museum
28/5

U.F.O.
45/38

14. Festing St
Albany 6330.
18.5.74 W.A.

Dear Sir

In West Aust paper Tues 14th I noticed references to meteors & a request that any one knowing details of fallen ones to give details to your department in hopes that any spectacular ones may be recovered. In 1898, or 99, while living in Denmark W.A. with my parents on Millars C/o ~~mill~~ Timber mills, my eldest Brother was firing on a log line engine, hauling timber to the saw mills, came in late 9 pm, while having his evening meal, a long loud roar passed over town & then a loud explosion was heard. & my brother said there goes the engines boiler, he & my father rushed out & the town was lit up brighter than a full moon lit night. when my father & Brother returned. they reported it was a large meteor passing over. & night shift workers saw it plainly as also timber cutters at Scotsdale landing; all considered it fell approx 7 miles east of Denmark, the following Sunday a group of log cutters explored the area around the site, but no sign of its passage or landing was found. in 1913 a man living in Denmark. went Kangarooing with his dog one Sun am. & failed to return at evening but the dog came in, showing evidence of fear & distress. & had come out of some distressing experience, early Monday men went out

& search the area where the man had gone. 7 miles East but found no trace of him. later years. a Mr Wally Morley took up farming in that district & my brother with others visiting Mr Morley's farm went exploring some heavy bush & timbered part of it & came across what my brother described as a large crater. full of black water, they measured it was deep & threw a stone in, & by the small splash & ripples. guessed it was very deep & produced a fine cord & tied a a stone on & although a long cord. could not plumb bottom, the older generation assumed it could be where the meteor fell, it was in that direction & about 4 miles East of Clermont. Mr W Morley is dead. but his brother Ted lives in Clermont & could give directions to any one wishing to visit the farm & my Brother D.C. Hamilton of 2 Solomon St Mosman, N.S. could give details of the find & approx length & road used. This is all the details I know or can provide. I have spoken to others about it many times. hoping it could be taken up & if possible the meteor recovered. to be of historical interest. yours sincerely.

Lilian A. E. Shields.

PS

The reference to Kangaroo shooter & dog. the dog appeared to have been in some water & had difficulty in getting out. when searchers tried to get him to go with them, he showed fear & spitiness & refused to be taken with them. L.A.S.

4438

65

DAVID BOYD
THOMPSONS Rd.,
LYNDHURST,
Victoria,
3975.

Dear Sir,

Recently I started to equip a small weather station for a scout project. I am building most of the equipment my self. I have built a wet + dry bulb thermometer, a hair hygrograph, and a maximum thermometer. I am having trouble with the calibrating and the sumerizing of the readings from the above mentioned. Could you please advise me on what to do.

Yours Faithfully
David Boyd.
(DAVID BOYD).

copy to Melbourne

Coastal Pollution and Corrosion of Distribution and Transmission Power Lines in Western Australia

F. Edmondson, B.Sc. (Eng.) M.I.E. Aust., M.I.E.E. (London)

This paper was presented to a meeting of the Electrical and Electronics Engineering Branch in June, 1973.

The log of Commander Francois Pelsaert whose vessel 'Batavia' ran aground on Houtman's Abrolhos, June, 1629, reads as follows:—

> 'On 12th June at noon we came close along the land with a south-east wind, but could find no means to get near the land owing to the violent surf; we found the coast falling off very steeply, without any foreland or inlets, such as other lands are found to have; in short it seemed to us a barren accursed earth without leafage or grass.'

Taken from: J. E. Heeres, **The part borne by the Dutch in the discovery of Australia, 1606-1765.** (Lond., 1899).

Our welcome sea breeze in the summer months brings with it many problems for the engineer.

The study of wind blown salt and its effect on insulators, paint, various metals including the severe and rapid corrosion of conductors, provides scope for the field engineer, the design engineer, the theorist and the painstaking laboratory engineer. The problems therefore are very interesting and bring together a wide variety of people.

I will commence by outlining the climatic and geographic conditions which prevail in the areas where we have real problems and then I shall deal with the specific nature of each type of problem.

Climate, for this purpose, has to be broken into rainfall, wind velocities, wind direction, duration of on-shore winds (particularly in summer), humidity, temperature, evaporation, dews or fogs. In any locality all these factors play an important part in bringing about an end result of failure, destruction or no failures. Also with salt problems, seasonal variations such as a drought or even an extended dry period may produce very disastrous results. This has happened in the summer 1972-73.

The first observation about the climate along our very long, exposed coastline is the fact that we have in the south west corner, a very high rainfall tapering off to a spasmodic, cyclonic or thunderstorm area and then finally, in the extreme north, a very high summer rainfall area.

However, the spread of the rain and how it falls is also important. Take Geraldton and Esperance for example. (See Fig. 1). Both of these areas have a similar total annual rainfall but in most years Esperance receives rain in all months, whereas Geraldton may be totally devoid of rain between October and April. This difference has a big bearing on pollution flashovers and corrosion in the two areas. The regular rain at Esperance helps to keep the insulators clean, whereas the lack of regular rain at Geraldton allows the salt to build up. Geraldton also has other factors which increase the hazards in this area. I am going to use the word 'Geraldton' to denote a very large area rather than a place.

Perhaps the next most important factor is the 'sea breeze' itself. By examination of wind row patterns we see that Geraldton has a very strong south westerly during the summer months. Again by comparison the 3.00 p.m. wind row at Esperance is not nearly so strong during the summer months nor is it confined to a regular on-shore breeze.

Wind row patterns do not unfortunately show duration.

At Geraldton we have installed two anenometers to record the wind run miles. That is, we record the amount of wind passing a given point for a period of one month. We have recorded over 13,000 wind run miles in a month whereas at Esperance only 6,000-7,000, averaging about 6,000. By contrast we find that the summer wind run miles for Geraldton are very high, averaging about 10,000 or a steady wind velocity of $\frac{10,000}{30 \times 24}$ = 14 m.p.h. for a thirty day month. However, there are hours in the night when little or no wind blows. This means that the daily wind velocity needs to be very high and consistant to compensate. This is in fact the case, gusts are recorded up to 35 m.p.h. and the steady is 20-30 m.p.h.

At this point in the development of the climatic factors I will digress to illustrate and emphasize the potent effect of wind and high velocities. Wind blowing over an ocean reaches a velocity where "white horses" are formed. That is the tops of waves tend to be 'blown off'. At this velocity the air is able to support and, in fact, carry particles; the particle size varies with the velocity. We therefore have at this critical velocity the beginning of our troubles, the wave tops are broken. water particles are generated and they are also then capable of being air-borne.

This critical velocity is usually about 15-20 m.p.h. hence, as the Geraldton waters are subject to very much higher velocities, we have a large amount of salt being carried into suspension.

Now geographically our coast line is very open, the Abrolhos, Garden, Carnac and Rottnest being the only off-shore islands. Hence we can say that practically all of our coast except for some protection by Cape Naturaliste, is subject to the waves of a very big ocean.

Therefore, under strong wind conditions the waves are large and the breaking of the waves on beaches or rocks throws up large quantities of salt spray into the air. If this salt spray can then be caught in a strong wind we now have an addition to the salt already in suspension.

This then is the major key to our coastal salt problems, we do have strong winds, and open water.

We now turn to some more climatic conditions which have a further influence on corrosion and pollutive conditions.

In the warmer areas north of Perth the atmosphere, in addition to picking up water and salt particles, has the additional property of absorbing and carrying more water vapour. This means that a very 'damp' atmosphere daily moves in over the coast and then one night the wind ceases to blow, the land breeze fails to generate and so we get a still air condition. Immediately when this happens the humidity rises and often heavy dews or even fogs form, because of the very saturated air cooling during the night. This damp condition or dew then brings about an electrolyte on surfaces where salt has been deposited. From meteorological fall out records we also know that dews and rain do in fact carry salt.

This of course is the ideal situation for corrosion and pollution failures.

We have now established the fact that the climatic conditions which we have along our coast are ideal for corrosion and pollution failures. But this is not all, there are some other factors which add to our plight.

Generally speaking we have a very low lying, coastal sandy plain. Vegetation, especially over the Greenough flats and the Chapman Valley, is very sparse and in fact dust frequently blows in great long plumes from paddocks. This ground dust is salt laden, generally well under 1%, and so the dust also carries salt onto insulators and metals. The dust allows water to stay on surfaces without running off, and it also tends by capillary action to draw moisture into fine openings and so cause rusting or corrosion.

To summarise our adverse climatic and geographic conditions we have—

i) little or no washing rains;
ii) low coastal plains with little or no trees;
iii) ideal conditions for high humidities, dews and fogs at night;
iv) very strong on-shore winds, which are very consistent;
v) a very large ocean to generate large waves;
vi) a coastline with no off-shore islands to break down the wave size;
vii) because of low rainfalls and lack of vegetation the soils and ground dusts also contain salt;
viii) dusts aid pollution and corrosion failures.

I have not dealt with the Pilbara area where on-shore winds are not as significant, and in addition we have tidal effects which tend to lessen the worries. But generally the salt, dust, ore dusts and dews give this area a fairly high degree of adverse conditions but not as bad as the Geraldton area in my opinion.

CONDUCTOR CORROSION IN WESTERN AUSTRALIA

The corrosion of seven strand steel cored aluminium conductor has been observed in Western Australia over a number of years. Corrosion to date has been limited to conductors which are located very close to the coast or in coastal plain country. The sizes mainly effected have been 6/1/.093 and 6/1.118 with galvanised steel centres. Though as time goes on the penetration inland is increasing in certain localities.

The first failure was observed by a private company at Sharks Bay. Because this conductor was located very close to salt ponds it was thought at the time that the conditions were very extreme and, therefore, no real significance was attached to the failures, in spite of the fact that the conductor had only been in service for approximately two years.

Then another report of conductor corrosion came from another private company at Lancelin. This conductor had in four years deteriorated into an alarming state. An inspection of this conductor early in 1972 revealed some interesting points, which are as follows:—

1. Conductors at right angles or near right angles to the prevailing southerly on-shore winds were corroded, whereas conductors which were generally 'in line' with the prevailing winds showed few signs of corrosion.

2. It was quite apparent by the regular spacing of corrosion that vibration or oscillation of the conductors produced the most corrosion at the node points.

3. Oscillation as distinct from true vibration had caused corrosion in bays where discs were used, no doubt the discs caused a flip-flop action in the conductor under the strong winds which are very prevalent.

4. The same conductor had been used for both H.T. and L.T. and in

general the H.T. was in a far worse condition. Possibly the high voltage is able to attract more salt in the ironised damp atmosphere.

Soon after observations at Lancelin were made, the Denmark line, which had been in service for approximately sixteen years, was then found to be in a very bad state.

Here again the regular spacing of the corrosion points along the bays clearly indicated a vibrational effect. Calculations of the node distance of a vibrating conductor of 6/1/.118 and 7/7/.093 sizes clearly show the node distances lie within the observed distances of the regular intervals of the conductor corrosion, i.e. between 6" and 10".

The bays which were worst effected were those transversing open flat country with no tree cover and those adjacent to running disc angles. In some cases corrosion existed in sections of bays where fires were known to have been. Timber belts protected the conductor by absorbing salt and breaking up the lamina flow of the wind.

Later during 1972 severe corrosion was observed at Dongara — Denison and Greenough, more pronounced corrosion was noticed again near the coast and at right angles to the prevailing winds. This has taken only 3-4 summers to reach such a condition.

However, two interesting cases of corrosion were found further inland which are as follows:—

1. Just south of Walkaway, for approximately eight bays, the conductor on the east side is strung with about 8"-10" less sag than the other two conductors. This conductor is corroded at regular intervals for all of the eight bays, whereas the other conductors were in good condition at the time of observations. The other two conductors are now corroding so that tightness only speeds up the corrosion rate.
2. On the Moresby Range a short section of the running earth — an S.C.A. conductor — was corroded on one side of a fence and not on the other. The phase conductors at this point appear to be in good condition. A possible explanation of this could be that at some time a local grass fire had burnt to the firebreak along the fence. The heat of the fire had run out the grease, which had accelerated the corrosion.
3. Rottnest is now in trouble as its entire H.T. system is badly corroded.

Also during 1972 very rapid corrosion was observed at Cowaramup Bay and Prevelly Park, this again is very close to the coast and subject to direct salt spray. The corrosion so far recorded above has always been the electrolytic action of the zinc and aluminium in a salt electrolyte. Once the zinc is eaten away, the next phase is an electrolytic action between the steel and aluminium. At this stage the aluminium can quickly be reduced to a white powder with all or some of the strands actually parting. At advanced stages many strands do part. A recent thesis mentioned that conductor abrasion takes place at the node points. If this is so, then abrasion at the node points would first work the grease away from this point, then if further abrasion took place, perhaps the zinc could be rubbed, being a very thin coating, completely away, leaving the steel and aluminium in contact. To me this seems more logical than the other theory of electrolytic action between the zinc and aluminium first taking place. Probably both actions take place one aiding the other.

The initial observation of the corrosion is the bulging of the conductor as the corrosion starts from the inside.

Another form of corrosion has been observed at Utakarra, this is the external pitting of the aluminium strands. This pitting has been caused by iron ore dusts blowing onto the conductor from nearby ore trains. We now expect many more failures from this in the Pilbara region. This pitting is aided by salt.

Generally with a low rainfall and high temperatures, corrosion takes

place in a very short time. That is, under 10" at Sharks Bay and 10"-15" between Geraldton and Lancelin and up to 40"-60" near Denmark (the longest time). This shows that with greater rainfall the salt is washed away and so the corrosion takes longer. However, what is not known is that in the heavy rainfall areas, whether a drought year may allow sufficient salt to build up and cause an acceleration of the corrosion in that one year. Prevelly Park and Cowaramup Bay could be an example of this.

During light rain and light winds when conductors are vibrating water remains on the conductors at the node positions. It is, therefore, probable that salt could be washed to the node points and over a period of time with evaporation the salt would tend to collect at the node points.

CONCLUSIONS FOR CONDUCTOR EROSIONS

To summarise the observations to date we have:—

1. Corrosion generally starts at the node points and light rain tends to collect water at the node points.
2. Temperature, either high ambients or local fires assists in the running out of grease, which in turn aids corrosion.
3. High conductor tension increases the corrosion rate. In towns where conductors are not 'sagged', the tensions are generally higher hence we find corrosion even with short spans.
4. Conductor running parallel to the prevailing winds deteriorates slower than those at right angles to the prevailing winds.
5. From the calculations of node points it is quite apparent that the conductors are vibrating at high wind speeds.
6. Samples taken of conductors which have been in service for many years at Kojonup, Nungarin, show that although in some cases the grease has run out, there is no sign of corrosion as yet. That is inland conditions so far have been immune to this type of failure.

POLLUTION FAILURES:

The remainder of this paper is in no way intended to cover all aspects of pollution failures, however, from my own observations I believe that the conducting glazed insulator gives the most satisfactory performance, from three points of view, namely visual arcing, noise and reduction in actual flashovers. However, as yet we have only had two summers of service with the test insulators. The life of the glaze in our extremely hot conditions has yet to be proved.

Much has been written about pollution failures, and most of which has been written in good faith and could be considered as true statements. However, I firmly believe that the combined work of the Australian Pollution Panel of the E.S.A.A. will show why true statements for one area are not true statements for another. I believe that some of the difficulties in understanding this problem arises from engineers accepting an authoritative statement and applying its logic to a different set of environmental conditions. Hence my initial emphasis on describing some of our geographic and meteorological conditions. This is vital if you wish to understand any pollution failure.

It is a known fact that a very large insulator company produces true statements regarding pollution performance of insulators. The statements are true and I do not dispute them at all, what I do say is that where no washing rains exist, then the philosophies must be bent to accommodate this situation. For example the Pollution Panel of Australia has shown that the standard disc, the deep fog bowl and the open aerodynamic give about an equal performance on some coasts. Hence the article which is the cheapest or has given good results will be used. The real answer is that with a regular washing rain most insulators do perform well.

However, where there is no washing rain a shape that gives a minimum of turbulance to the air flow tends to have the least amount of salt deposited on it. If you can minimise the amount of salt deposited then there is progress but it does not say that failure is prevented, what we do say is that the frequency and probability of failure is lessened. That is if fortnightly washing is reduced to twice in a summer season this is a big step forward. Probably the most outstanding example of the message I wish to convey is the spiral insulator shape. Some years ago these were proclaimed as the last word in insulator design to prevent pollution flashovers. They were tried in our dry climates and did not give the claimed performance simply because the spiral relies on rain to clean the insulators, when no rain falls no cleaning results and hence flashovers took place. We still have spiral insulation in service but mainly away from the coast.

Under most laboratory experiments the open aerodynamic disc insulator does not perform well. This is admitted and to be expected. The point is that under the particular experiment to which this comment applies, all insulators were dipped in an equal concentration of contaminant equally all over the surface at the same rate. Therefore to apply laboratory results to field conditions is not correct. For those of you who wish to really understand this problem you must be prepared to go out at night and see for yourself.

Briefly I would like to describe the tests which we are conducting in Geraldton. The most important is a single phase 132 kV test bay in which a number of 132 kV insulators are monitored with milliamp surge counters. Though we suffer from lack of instrumentation and fault power. This, I believe, to be the most worthwhile test which we are conducting. Firstly it gives people an opportunity of visually seeing the difference in performance of the different types of insulators and secondly it gives the accurate measurement of surge counts which means that some definite quantitive figures can be given to the different types of insulators. The degree of activity can also be gauged by an experienced observer. A very active insulator visually may not be passing currents in excess of 150 milliamps. At the test bay each insulator is fitted with a counter which records in steps surges over 100 milliamps, over 150 milliamps and over 200 milliamps. The counts for some insulators run into several thousand per month. The value of open aerodynamic sheds with a good shed gap spacing can be demonstrated, on a numerical count basis.

We also have a number of different types of insulators on the 33 kV system which have been supplied by manufacturers for testing. These can be only visually observed or wait until a failure occurs. This is a fairly standard type of field test to attempt to assess the real value of any particular insulator but I am always reluctant to compare performances when the sample is one and not in the same location.

POLLUTION CONDITIONS:

For West Australian conditions I am convinced that the open aerodynamic shaped insulation is the type that we should be using coupled with adequate shed gap spacing. This is my opinion for vertical insulation. However, for horizontal insulation very little sensible work has been done anywhere in the world. It is my contention — unproven — that a horizontal line post should have shed shapes which are sinusoidal in shape to take care of the fact that a horizontal insulator can be placed in an infinite number of positions relative to a steady prevailing wind, whereas a vertical insulator has no infinite possible variations. Some American insulators are shaped this way and I have a few under test.

However, from a true engineering point of view I wish to state that the environmental conditions are so severe that the insulation of high voltage lines north of Perth are such that it is the Commission's most expensive unsolved problem. The reason for this statement is that the area extends in a widening taper from Perth where it is only a quarter

to half a mile from the coast, to twenty miles at Northampton. This means that with all coastal towns we will always have noise and radio interference problems even with our best aerodynamic line post insulation. Aerodynamic discs with 5.4" shed gap spacing will give a better performance, but we will be running into tower height problems and right of way problems if we use discs. Washing and greasing methods are expensive and men become tired of this very monotonous work.

WASHING:

Washing of insulators alive is a common practice throughout Australia. The techniques should only be used by trained personnel and even then flashovers can occur in high winds when washing insulators. Poor washing can often lead to flashovers. There are many authentic cases of insulators which have flashed over within two weeks of washing or cleaning, and this is the age old problem of human nature — we all get tired of repeating a monotonous job!

Bad washing often produces a ridge on the side away from the nozzle. I have seen a distinct line of mud down one side of an insulator and the flashover marks were straight down this line.

Detergent cleaning is not recommended.

GREASING:

Silicone greasing lasts for two to three seasons and is cleaned off with chlorothene. The cleaning off is most essential in my opinion. This has been effective and necessary at Geraldton because of both problems of conductor corrosion and insulation, we have not been able to re-insulate at a rate fast enough, and now with the conductor problem re-insulation is useless until the conductor is replaced.

But it must be remembered that the cost per pole for the silicone grease when sprayed on is of the order of $6.00 for 33 kV so that if you are thinking of a thirty disc string at 330 kV it is $180 per string.

Grease thickness is important, thin grease fails quickly and thick grease put on by hand can saturate down one face.

PLASTICS UNDER SALTY CONDITIONS:

I think two points are worth mentioning.

One is the use of a plastic sleeve over the conductor at a point of support. This method of reducing flashover works well for perhaps one summer, then the salt builds up and takes place and the rapidity with which the tracking lanes are burnt into the plastic is incredible. So this method is not advocated.

NEOPRENE AND P.V.C.

Conductor corrosion of both aluminium and copper has been observed when the neoprene or P.V.C. does not exclude the ingress of moisture. That is sleeved P.V.C. conductor will corrode, and certain suspension units and bundled conductor spacers will corrode the conductor at the open ends.

If the conductor is covered it must be sealed. If the sealing is broken due to the use of earth sticks or new connection re-sealing is essential.

Under adverse conditions, tracking lanes can be burnt into P.V.C. insulation even on low tension systems.

BI-METAL CONNECTIONS:

There are so many examples of this type of failure under salty conditions that I believe it is only worth stating that great care is necessary when this type of connection or joint has to be done.

Complete waterproof sealing is necessary either by high melting point greases or by the wrap or type of waterproof plastic seals.

Other failures occur at the hinge points of blade isolators.

A twisted aluminium-copper joint recovered from Esperance failed to pass current under test and once the joint was broken it fell to a white powder.

LIGHTNING ARRESTOR FAILURES DUE TO CORROSION:

One reputable manufacturer of arrestors produced a very good arrestor, however in our W.A. conditions the failure rate has been to all intents and purposes 100%.

The reason is that the seals have been a thin tinned copper diaphragm.

The salt laden atmospheres have been able to collect salt in a small dish at the top of the arrestors and fairly rapidly the diaphragm has corroded completely through. The result was a direct ingress of moisture with, at an appropriate time, a substantial explosion.

Other failures have occurred through external leakage currents heating the porcelains and causing cracks, which in time causes the arrestor to explode.

Two part arrestors also fail more easily under polluted conditions than single porcelains.

POLE TOP FIRES:

The subject of pole top fires is well documented, and probably the best treatise is a very old paper by Professor Prentice, and it will be treated fully in the proposed Pollution Guide to be published by E.S.A.A.

Pole top fires are prevalent in the coastal environment but they are also occurring in inland areas well away from the coast. There is a basic similarity between pollution flashovers in that a dry period followed by light rain at the middle to end of the summer period usually produces a spate of pole fires. Basically pole top fires away from the coast fall into the following categories:—

1. Ineffective maintenance, i.e. wood to wood and wood to metal joints are not tight and the contact area is in consequence reduced.
2. A particular structure with a design weakness.
3. Faulty insulation or that damaged by rifle fire or lightning.
4. Uplift on suspension strings can cause poor metal to wood contact.
5. Vibration on conductors can cause nuts to become loose and again poor contact results.

By contrast, near the coast the designs of all structures should be closely supervised to ensure the following points:—

1. Maintenance is carried out regularly.
2. Greater insulation is provided.
3. Phase bonding or, in other words, all wood to wood and wood to metal joints are tight and in some cases conducting greases or paints should be added, or better a positive metallic joint is provided.
4. Minimise short lengths of timber in circuit, i.e. 2"-3".
5. Keep construction simple by minimising wood to metal contacts and add insulation where this is not possible.

DESIGN OF SUBSTATIONS, TRANSMISSION & DISTRIBUTION LINES IN CORROSIVE AND HEAVY POLLUTIVE AREAS:

In the spoken paper one photograph was shown illustrating the very adverse effect of drainage from conductors or structures.

The salt laden water runs along a conductor, sometimes a vertical down lead, and may drip onto an insulator or bushing in such a manner as to cause a very concentrated deposition of salt. Tower and substation structures can frequently run water onto the insulators, which carries with it the soluble salts.

The best method is to check this point and to observe the effects during light rain and then take the necessary steps to run water or drops away from the insulators.

PAINTED STEEL SURFACES IN CORROSIVE ATMOSPHERES:

I am in no way qualified to talk on this subject but I have seen so many rusty articles that I believe my comments are worthwhile.

Firstly the best specification written and proven for painting is worthless if the application techniques are not rigidly controlled.

Secondly the best specification and best control techniques are also worthless if the article is transported to the site with a chaffing chain or rope around it, or it is badly packed with another article rubbing against or on it during transport.

Thirdly, a good paint specification may be proven by field tests on a 'one off' but when applied to mass production the care necessary for good application is almost impossible to achieve. These three points, if you really think about the problem, are almost axiomatic but my own impressions are that many paint failures can be attributed to these causes. Salt laden coastal atmospheres soon find the paint's weakness.

The type of failures from the three causes can be illustrated as follows, the first case can often be seen at the tops or bottoms of a fairly large article and the painting action is when the wrist holding the paint spray gun turns outwards at the top and bottom of each vertical stroke. This produces thin areas at the top and bottom. The second type of failure is obvious but it has some important ramifications which are:—

Frequently when a damaged article arrives at a store, the Storeman tells an 'odd job man' to touch up the article. My comment here is that I have frequently seen examples of the touch up paint being ineffective and, worse still, has actually caused the good paint to fail. This is because the 'touch up' paint is incompatible to the original paint. I believe that stringent control of touching up is necessary and only paints and methods should be used as recommended by the original paint manufacturer. There are also problems with mass produced articles which are spray or flood painted, where the same paint does not exist in a suitable form for hand brush painting. Specifically we have found that good sand blasting and degreasing, followed by zinc enriched paints for transformers, have given excellent service, and the failures are generally due to lack of film thickness from one of the abovementioned reasons.

Transformers do offer a challenge to paints because of their irregular surfaces — particularly the radiators, and because they are objects which are truly exposed to the elements and, in addition, they can be very hot when the ambient temperature is low, or they can become exceedingly hot when the ambient temperature is very high. Temperatures we have recorded of transformers at Karratha make folly of most transformer specifications. The painted surfaces must withstand all of these temperature changes.

In addition, a transformer during winter may be fully loaded and very hot, and then a shower of rain causes a very rapid temperature change on the thin paint surfaces.

I acknowledge the quality of muli-pack epoxy paints, micaceous paints and other trade names and their uses but production line painting and subsequent touching up makes some of these paints difficult to use when you are dealing with articles for an area from Kununurra to Esperance.

One interesting point worth mentioning occurs with transformers, and that is local heating or cooling can be brought about by the internal oil flows. If a cool area on the tank is formed it becomes an area where evaporation of moisture takes the longest and I have seen rusty football shapes which I believe could only have occurred for this reason.

Of course the question of fully, hot dipped galvanising must be raised, and in fact every possible article which can be hot dipped galvanised is treated in this way for supply authority uses. But big articles which are subject to distortion are difficult to galvanise. Experiments with galvanised radiators and galvanised tanks have produced some expensive and humorous results, though techniques have been developed in Japan and in Eastern Australia to cope. The technique is elaborate and expensive but it can be done. At present local galvanisers are being questioned in the correct methods to see if they can in fact cope.

CORROSION WITH LEAKAGE CURRENTS:

Where even minor arcing can take place, usually at the junction of metal and porcelain, corrosion will also take place.

Two simple illustrations can be given.

1. The swelling of the pin in disc insulators.
2. The pitting of transformer tanks around the bushing gaskets.

The swelling of pins in disc insulators is well documented and it appears to have been reduced by increasing the diameter of the first ridge on the underside of the skirts.

However, the pitting adjacent to gaskets of transformer bushings produces heavy rust stain marks down the transformer which are frequently mistaken as oil leaks. At least when seen from the ground.

Some supply authorities have specified with some success the use of conducting paints over the gasket and onto a small section of the porcelain. The endeavour is to provide a continuous metallic path rather than a broken path across the gasket.

DETERMINATION OF SALT CONTENT OF THE ATMOSPHERE:

Because the amount of salt carried in the air is largely wind blown, and not falling conditions as in the case of chimney dusts simply falling to the ground or being blown some distance away, efforts were made to determine how much salt would be collected on a vertical face.

At first flat sheets of blotting paper were tried at different heights from 10 to 30 feet from the ground. These sheets were positioned to face generally the prevailing winds. However, the results did not appear to be accurate and a wind vane was used with a target on it. Approximately 3 times more salt was recorded. Hence this method was thought to be more realistic. Various forms of cylinders are also being used and these will be compared with wind vanes in the same localities during the following summers.

The graph shows an indication of how the salt distribution occurs from the coast inland. The graph indicates clearly that with no washing rain the inland areas produce very adverse results in say 4 months, as opposed to 2 weeks right on the coast.

Figures and graphs produced by other authorities for annual salt fallout are of little value to the supply authority engineers because they do not show the severity due to the summer months, and the readings are generally taken from horizontal gauges placed near the ground.

SALINITY OF SOILS:

It is outside the scope of this paper to go into the salinity of soils, soil testing and the pH value of soils.

But the fact remains that ground dusts can be very saline and the effects produced, particularly from the pollution and pole top fire aspect, are very important. Firstly there are many authorities and people working on saline soils mainly for agricultural purposes or for water storage problems. We therefore find that there are many papers and studies by C.S.I.R.O. soil scientists, Department of Agriculture of W.A., and also the

Public Works' Department of W.A. All of whom have contributed information and are still studying these problems.

Few studies correlate the information in a form that could be easily used by a supply authority engineer. Nor are stulies taken at the localities when a supply authority engineer would like a study to be undertaken. I myself have taken many random dust samples, but without the ability to take the enormous number of samples to obtain a true picture over a large area, I can only say generally that salt exists at these particular localities.

However, one paper by C.S.I.R.O. workers at Tintintarra in South Australia is important as it shows the monthly variations of salt right at the surface rises as high as 4-5% in summer. These very high figures have also been found at a Department of Agriculture test plot north of Meckering where salinity has been recorded at 5% right at the surface.

These figures are most important because if, for example, stock moves across such an area and a pole is located also near such an area, then the possibility of a pole fire would be great and yet the presence of salt may not be obvious, particularly to personnel who repair the fault.

Bringing this soil study more closely to the coast I believe that Carnarvon has this problem to a very great extent. In a wildflower article I have read it points to species of plant living in low lying, tidal flats area south of Carnarvon as being capable of living in high saline soils. The saline dust problem in Carnarvon is probably more responsible for the failures in Carnarvon than wind borne salt.

PLANT:

My only advice is to endeavour to wash and clean plant regularly.

CONCLUSION:

I have endeavoured to show that our very long coastline, which is surrounded by large seas, can produce very adverse results.

In addition, we have no high mountains to induce rainfall, we have low, sandy, coastal plain with sparse vegetation, which gives rise to salt laden dust. We have strong on-shore winds.

In short we appear to have every climatic and geographic condition to aid corrosion and pollution failures. We really have no sensible scale to compare or evaluate this with other parts of the world and it is, therefore, very difficult to convince other engineers of our plight.

It is useless for example to try to get engineers from other states or countries to comprehend the significance of no rain at all say between March and the following January as in the Pilbara.

The principal object of the paper is to show that whilst most of our coastline may be regarded as having a salt problem similar to other parts of Australia or the world we have, in addition, a number of factors which widen out this affected area as we proceed north, say from Yanchep to Northampton.

ACKNOWLEDGEMENTS:

1. General Manager of the State Electricity Commission of Western Australia for permission to present this paper.
2. Mr. G. Mackey and Mr. R. Southern, Perth Meteorological Bureau.

REFERENCES:

1. E.S.A.A. Pollution Panel.
2. Salt Movement in Bare Saline Soils — S. T. Smith and T. C. Stoneman.
3. The Major Ions in Western Australian Rainwaters — R. J. Hington.
4. Australian Soils with Saline and Sodic Properties — by K. R. Northcote and J. K. M. Shene. C.S.I.R.O. Publication No. 27.

45/38

58

OUR REF . FE:CJ . . . . . .

YOUR REF . . . . . .

TELEGRAPHIC & CABLE ADDRESS:
STATELECOM – PERTH
TELEX: 92674

ADDRESS ALL CORRESPONDENCE TO
BOX L 921, G.P.O., PERTH, 6001

THE STATE ELECTRICITY COMMISSION
OF WESTERN AUSTRALIA

132 MURRAY STREET, PERTH, WESTERN AUSTRALIA
TELEPHONE 25 0561

29th August, 1973.

Mr. R.L. Southern,
Regional Director,
G.P.O. Box 6070,
PERTH, W.A. 6001.

Dear Mr. Southern,

Many thanks for your interest in Salt Collection.

The tube method would appear to be satisfactory providing the tube is very short otherwise a 'friction' would be set up by the pipe and the collecting target.

Is this method accepted as a 'standard?' And if so could I have more exact details?

I would be interested to know where such an instrument has been installed and how many miligram/sq.cm. have been recorded during some known interval of time especially for a coastal locality.

Many thanks again for your interest.

Yours faithfully,

F. Edmondson

For W.J. Gillies,
GENERAL MANAGER.

Mrs Macnicol:
Any comment & suggestions re this correspondence? AP.

NFA. Called Mr Edmondson 14/9/1973.

RLS:KG

45/38(57)

Mr. F. Edmondson,
State Electricity Commission,
Box L921, G.P.O.,
PERTH. W.A. 6001

22 AUG 1973

Dear Frank,

Colin Hounam of my Head Office has sent me the following note in regard to your letter of 11 July, which may be of some interest.

Yours sincerely,

DESPATCHED
Init. GdW

(R.L. SOUTHERN)
REGIONAL DIRECTOR.

COMMONWEALTH BUREAU OF
METEOROLOGY
DEPARTMENT OF SCIENCE

HEAD OFFICE
2 DRUMMOND STREET
CARLTON, MELBOURNE

TEL. 3476311 AREA CODE 03
TELEX: MET AUST AA30434
TELEGRAMS: WHR MELBOURNE

ADDRESS CORRESPONDENCE TO DIRECTOR OF METEOROLOGY, P.O. BOX 1289K, MELBOURNE, VICTORIA 3001

IN REPLY PLEASE QUOTE ... 30/301

- 2 AUG 1973

Regional Director,
WESTERN AUSTRALIA

WIND BLOWN SALT

Ref your 45/38 (54) of 20th July

As indicated on the phone last week I have some notes relevant to the above subject which may be of interest to Mr Edmondson.

2. During my U.K. study tour in 1962 I visited the University College of Wales at Aberystwyth and inter alia discussed crop husbandry with a Dr R.S. Edwards. One of his fields of work was the salt problem in relation to plant growth and the attached notes are based on discussions with him. I am not aware of the present location of Dr Edwards but I have recently corresponded with Mr J.A. Taylor, Lecturer in Geography at the above University. I am sure Mr Taylor would be prepared to assist in redirecting correspondence or advising whether Edwards' work is continuing.

C.E. Hounam

(C.E. HOUNAM)
for Director of Meteorology

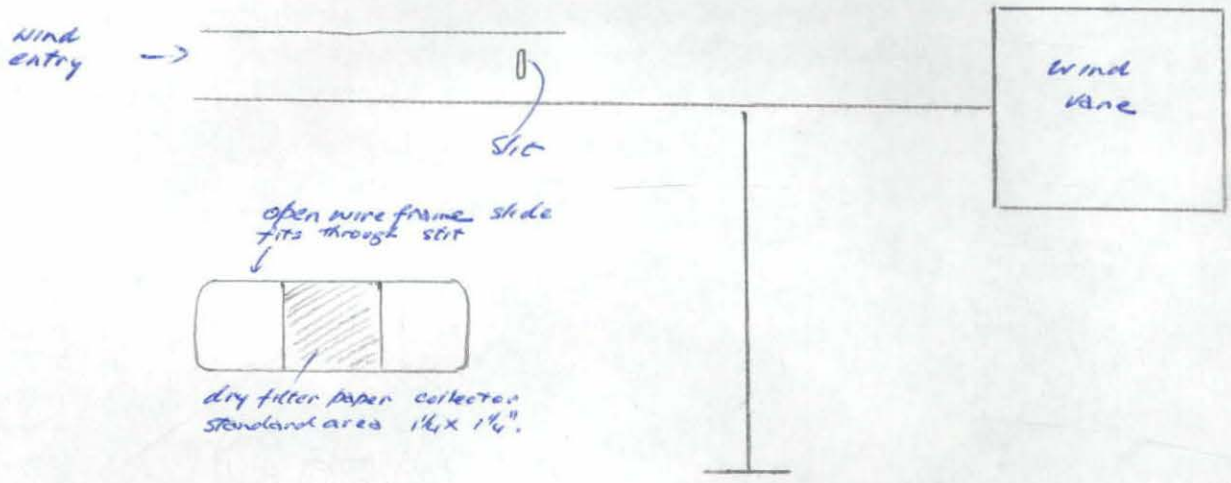
NOTES ON SALT DEPOSITION IN WALES

based on discussion with Dr R.S. Edwards March 1962

Little will be gained from studies of salt content of rain water since a far greater quantity is reaching the land surface during no-rain periods. For example river water in Sweden was found to contain a far higher salt content than indicated by deposition by rainfall alone.

The relative collecting efficiency of various surfaces has been studied : flat surfaces such as leaves are inefficient collectors, surfaces such as pine needles are good.

An instrument to collect dry salt has been designed at Aberystwyth:



Wind flows down the G.I. tube and portion of its aerosol content is fixed to the filter paper collector. Rain does not reach the paper to leach. Filter papers are replaced weekly or more frequently under strong wind conditions. Observations at present (1962) are simply relative.

Most salt aerosols are produced at the shore by the breaking of waves and the larger particles are deposited on or near the shore line. Smaller particles may travel great distances. The Edwards' experiment consisted of 12 collectors set up approximately $\frac{3}{4}$ mile apart in three lines at right angles to the coast each having a different degree of exposure.

Edwards was carrying out (1962) a correlation between salt catch distribution and wind direction.

He has an interesting theory on the deformation of coastal trees. It is known that smaller objects are better collectors than large; young leaves and buds should be better collectors than old leaves and therefore are worst affected by the salt concentration. The differential growth of trees in coastal areas could possibly be due to the killing of buds and young leaves on the windward side of trees, which results in distorted growth as expansion takes place on the leeward side of the tree.

RLS:KG

45/38(54)

20 JUL 1973

The Director,
Bureau of Meteorology,
MELBOURNE. Vic.

Attention: STCS

WIND BLOWN SALT (W.A.)

The attached copy of a letter from Frank Edmondson on behalf of the State SEC may be of interest to you. You may recall his continued responsibility for the efficiency of power transmission lines, badly affected by salt corrosion along our west coast.

I think the main point Frank is making is that salt sampling using a vertical filter directed into the wind by a vane produces exceptionally high counts compared to horizontal sampling used for other purposes. He is interested most in the effect of short term accumulations of salt in dry weather.

DESPATCHED
Init. GdW

(R.L. SOUTHERN)
REGIONAL DIRECTOR.

45/38 83

OUR REF: FE:CJ

YOUR REF:

TELEGRAPHIC & CABLE ADDRESS:
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THE STATE ELECTRICITY COMMISSION
OF WESTERN AUSTRALIA

132 MURRAY STREET, PERTH, WESTERN AUSTRALIA
TELEPHONE 25 0561

11th July, 1973.

Mr. R. Southern,
Deputy Director,
Perth Weather Bureau,
Wellington Street,
PERTH, W.A. 6000.

Dear Mr. Southern,

WIND BLOWN SALT

There are many studies of salt fall out being carried out by different departments for various purposes.

We have been principally interested in determining the amount of salt being carried by the strong summer on-shore winds along our coast south of North West Cape.

In order to determine the amount of salt passing a given point at approximately 30 feet from the ground we have installed a number of wind vanes with a flat piece of blotter just in front of the pivot point.

The main bearing is slightly 'stiff' to prevent unnecessary oscillations of the wind vane. We found that square sheets of blotter held in a fixed position facing generally at right angles to the prevailing on-shore winds did not give reliable results.

The results we obtained in 1972 - 1973 summer, for one month indicated figures far in excess of the figures published in the C.S.I.R.O. Divisional Report 1/58, "The Major Ions in Western Australian Rainwaters." For a four mile distance point this paper recorded 0.12 mg/sqcm per year whereas at 2 miles for a month we recorded 2mg/sqcm.

This paper of course is dealing with salt in rain water and not salt available as the result of wind only.

We are also going to experiment with the use of a vertical cylinder and compare the results with those obtained from the wind vane.

Your Department may be interested in these results and they also may be interested in carrying out the study along other coastlines. We must however, stress that we are not interested in total annual figures, because during the winter months we have no problems.

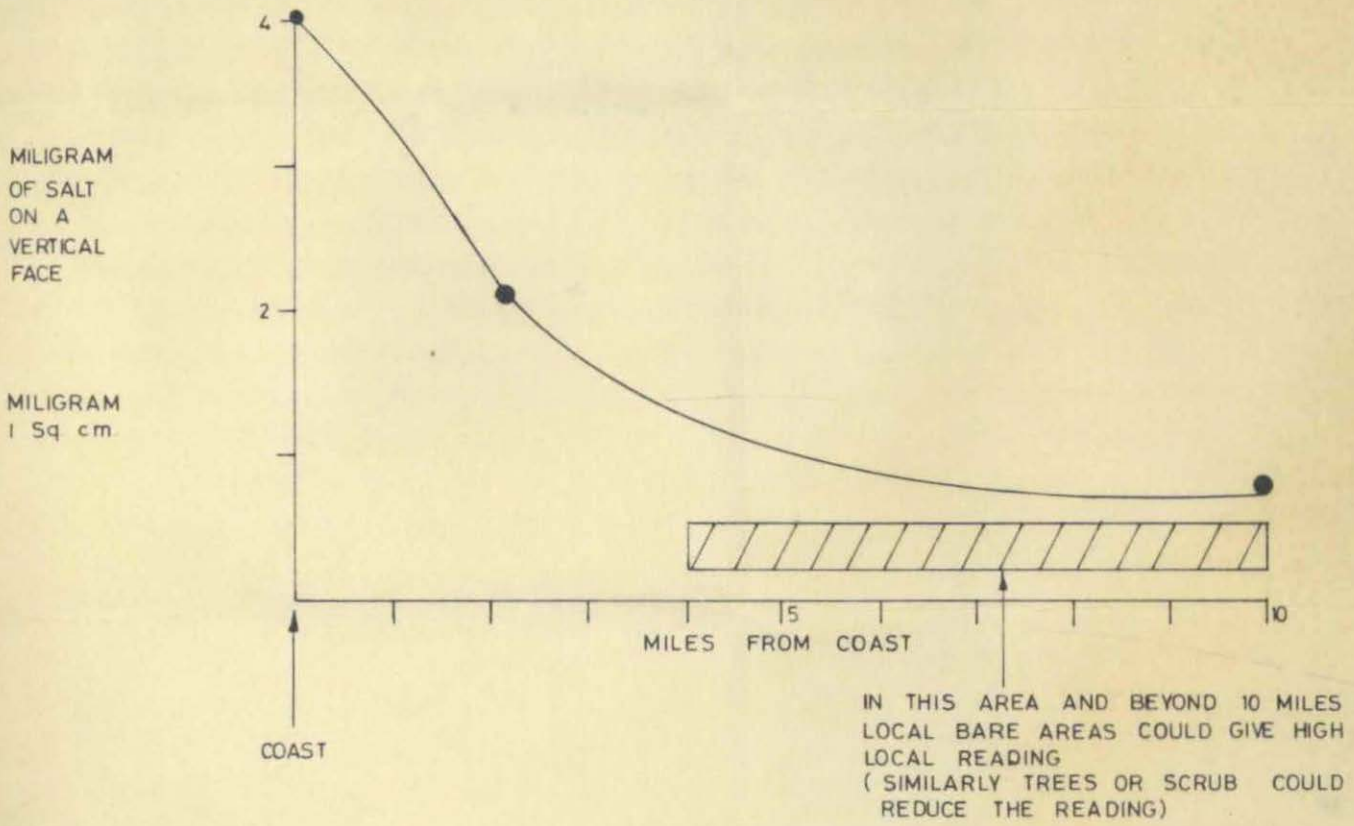
It has been my personal impression that salt has a great deal to do with the low scrubby nature of our coastal plains as well as the deficiencies in the sandy limestone soils.

Yours faithfully,

For W.J. Gillies,
GENERAL MANAGER.

SALT COLLECTION

FROM A FLAT TARGET ON A WIND VANE



45/38 57

29 Duke Street,
TOODYAY, 6566.
5th July, 1973.

Bureau of Meteorology,
127 Wellington Street,
PERTH, 6000.

Dear Sir/Madam,

I was wondering if you would be able to identify an object which a friend and myself sighted in the sky.

We saw this object on the 4th July, at 7:00p.m., and later, at about 8:45p.m., it was gone. The object was like a very large, bright star, and it was flickering the colours of blue, green and white. It was situated to the right of the Southern Cross, and was approxiamately 45° above the horizon. No stars surrounded it. It was much larger than any other stars visible, and at first we mistook it for Venus. However, it was in the wrong direction.

It gave my friend and myself quite a fright, and I would be very grateful if you could explain it to us.

Yours sincerely,

Jenni Cook.

Jenni Cook.

Forwarded to Govt. Astronomer 12 July '73
B Macnicol.

JSBH/JV

45/38(49)

The Government Astronomer,
The Observatory,
Walnut Road,
BICKLEY. W.A. 6076.

[4 JUN 1972

Dear Sir,

I am enclosing photocopies of two letters concerning U F O's.

Could you please answer them direct?

Our Aviation Supervisor tells me it is most unlikely that the object seen near Kojonup on the 26th would be an aeroplane.

DESPATCHED
Init. GAW

(J.S.B. HAMILTON)
for Regional Director

JH:KG

50

45/38

The Director-General,
Meteorological Office Met O 1 Rm T3,
Headquarters Annexe,
Eastern Road,
Bracknell,
BERKSHIRE RG12 2UR,
U.K.

Attention: Lt. Cdr. L.B. Philpott

Dear Sir,

Thank you for the interesting extract from the log of the M.V. Jervis Bay.

There is little I can add to my original remarks. We were not able to find from satellite pictures any evidence of dust in the vicinity of the M.V. Jervis. However, you might be interested in the following diagram which illustrates the type of meteorological situation which occurred over Western Australia during the first week of December 1972.

The combination of strong convection in the trough and strong easterly winds over the south of the state would be an effective mechanism for raising dust and transporting it out to sea. It would then gradually fall out of the atmosphere because of gravity and, to some extent, because of subsiding air associated with the high pressure system in the Indian Ocean.

However, it is surprising that two ships at such different latitudes should have observed the dust at almost the same time. It would be good to know whether this was merely a coincidence and if other ships had observed the dust at other positions and times.

Yours faithfully,

(J.M. HOPWOOD)
for Regional Director.

45/38

48

Lot 123,
Rowan Street,
Derby. 6728.
27th June, 1973.

The Bureau of Meteorology,
127, Wellington St.,
Perth.

Dear Sir,

In May I wrote to you concerning an object we had seen in the sky, which you were kind enough to identify for us as a satellite re-entering the earth's atmosphere.

I am not in the habit of seeing objects in the sky, but wonder if you could help us identify another one.

On Saturday, June 23rd, between 9 p.m. & 9.15 p.m. my friend & I were sitting outside a camp at Windjana Gorge while our husbands were fishing. Windjana Gorge is situated approximately 90 miles east of Derby. My friend noticed an object behind me & called to me several times to look

47

before I glanced around. When I did look, I saw an egg-shaped object gliding swiftly across the sky in (approx.) a north-south direction. Its path was about midway between the horizon & the centre of the sky. It did not appear to be at a great height & did not move nearly as rapidly as the re entering  satellite. There was no noise.

The object was a beautiful blue colour & it is hard to describe its size, but as a star appears to be this size ·, this appeared to be like this ○. I only saw it for a second & am unable to describe it any further as it disappeared behind the trees. My friend would not write to you which is a pity as she saw it for much longer than I did & could describe it better. However, her husband has ridiculed her over it & she refuses to do anything else about it.

My children are very interested & we would once again be very grateful for any help you could give us in identifying this object.

Yours faithfully,
(Mrs.) Winifred M. Walker.

45/38

<6

"Uperhill"
R.M.B. 310,
Kojonup.
6395.
28.6.73.

Bureau of Meteorology
Perth

Dear Sir,

On Tuesday 26th night soon after 7 P.M. we saw a bright light in the sky with red flickering light on top and a green one below. We live approximately 15 miles S.W of Kojonup and this light was to the west of our home. My husband, three children and myself watched it for about 10 mins before it faded out.

On both Wednesday night and Thursday night at about 10.0 P.M. we have seen a bright star that seems to twinkle, changing into red and green. This has been further south than the first one and the colors not as distinct. On Wednesday night driving home from Kojonup a friend and I saw it most of the Time.

We are wondering if this could be a weather balloon or a planet which is visible at this time of the year. The light seems to remain in the same place.

Would be very interested to hear the explanation for this light.

Yours faithfully,
Pamela Morley.

PAMELA MORLEY
R.M.B. 310.
KOSOMP.
6395.

45/38

44

PC

METEOROLOGICAL OFFICE Met 0 1 Rm T3
Headquarters Annexe Eastern Road Bracknell Berkshire RG12 2UR
Telex ~~24168~~ 848160 847010
Telephone 0344 (Bracknell) 20242 ext 2461

The Regional Director
(For Attn Mrs J M Hopwood)
Bureau of Meteorology
PO Box 6070
Hay Street East
Perth
Western Australia 6000

Please reply to The Director–General
Your reference
45/38(40)
Our reference
AF/M1334/68/Met 0 1
Date
22June 1973

Dear Mrs Hopwood

Thank you for your letter of 13 June 1973 containing your remarks on the observation of dust clouds which we sent you from the meteorological logbook of the mv Vancouver Island. We propose to publish the observation and your remarks in the October 1973 number of the Marine Observer.

I know you will be interested also in the following extract from the meteorological logbook of the mv Jervis Bay. This carries the same date as that of the Vancouver Island and the ships were approximately in the same longitude though the Jervis Bay was, of course, a thousand miles or so further south. The extract reads:

> "8 December 1972 vessel's departure from Fremantle on passage to Flushing. A fine clear night, no cloud, temperatures dry bulb 23.0, wet bulb 21.2°, sea 22.8°. Barometer 1015.5 and steady, wind direction S'ly force 3.
>
> The enclosed drawings (Figures 1-4) show the radar picture of dust particles in the atmosphere. Although visibility was in no way impaired, dust could be felt on all exterior surfaces. The formation of the circle on the screen was gradual until 1300 GMT; from then the band of dust became thicker and less speckled, establishing itself at a radius of 5.3 miles round the ship by 1400 GMT. For the following hour there was little change, the weather remained the same yet this circle seemingly continued to follow us. It was some 1½ hours later that the radius of the circle increased, the band became thinner and more irregular in shape before finally disintegrating at approximately 1545 GMT.
>
> Our theory is that the vessel encountered a 'blanket' of dust some 50 miles away. The reflective properties of the particles varied according to the density of the dust cloud. The funnel-like gap, shown in Figures 2, 3 and 4, caused by the ship's path through the 'blanket', appeared on the starboard quarter because of the wind direction at the time. (Captain K E Howard, Mr A J Fee, 2nd Officer and Mr R B Redhead, Radio Officer).
>
> /The vessel did not start her meteorological logbook until 1800 GMT on that day so there are no meteorological details available other than those given at the beginning of the narrative/.

On the assumption that your note would cover both these observations we propose to publish them both with your note in the October 1973 number of the Marine Observer. If, however, you would like to amend or modify your remarks, could you possibly let us have the final version by 17 July? If we do not hear from youby then we will just go ahead with our publication plans.

It is regrettable that the Jervis Bay's observation was not available at the same time as that of the Vancouver Island; then you could have had them both together.

Yours sincerely

L. B. PHILPOTT

LT CDR L B PHILPOTT
for Marine Superintendent

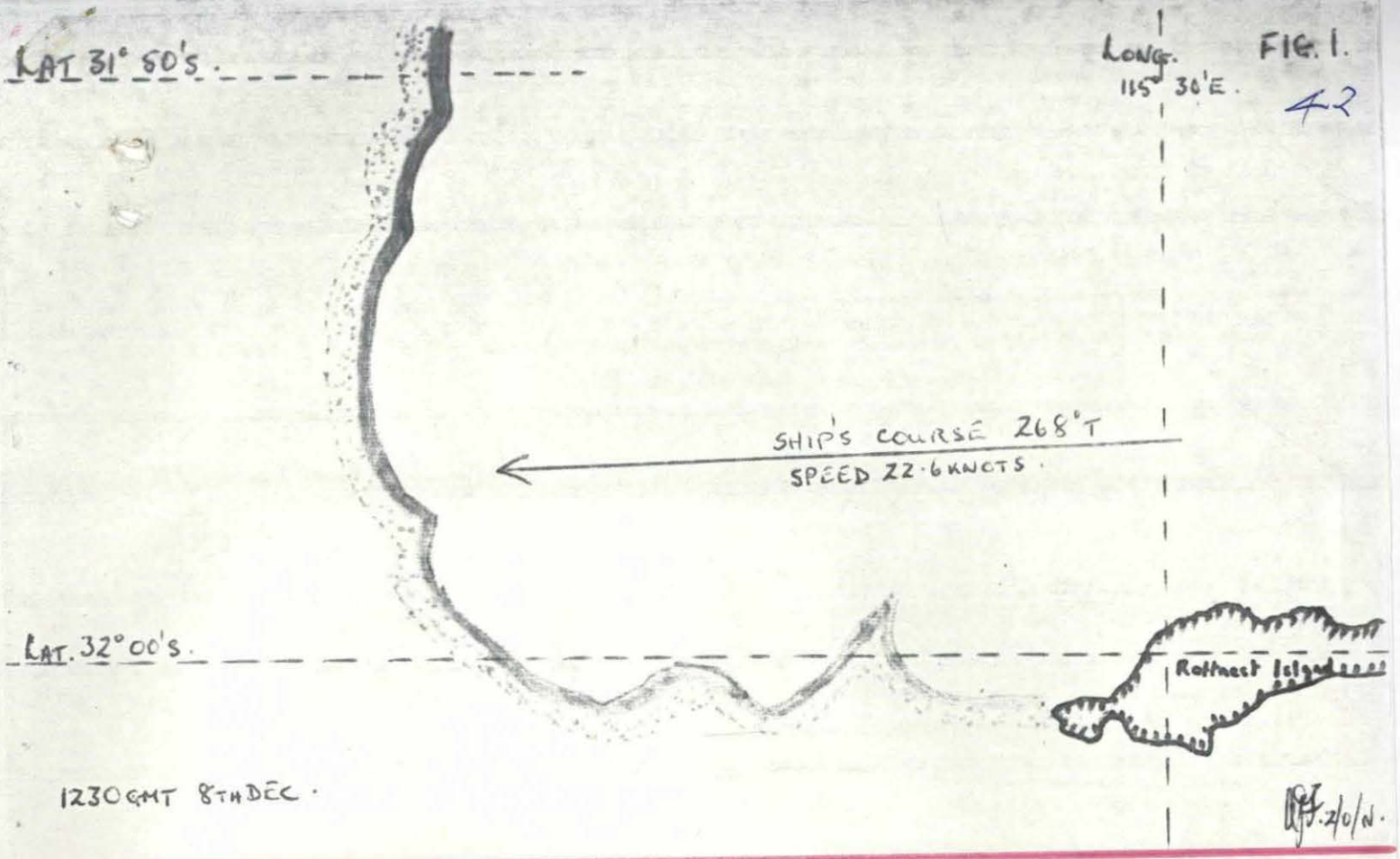
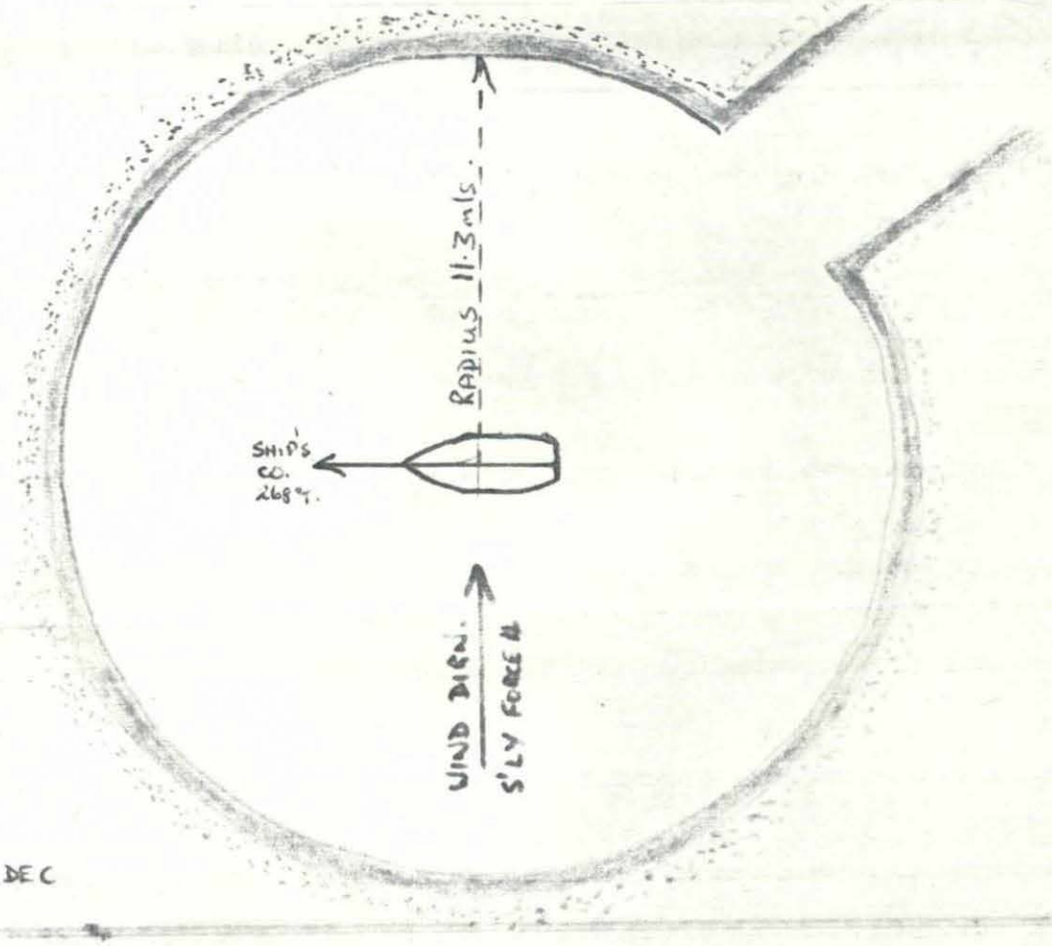


FIG. 1.

42

J.F. 2/0/N.

FIG. 2.



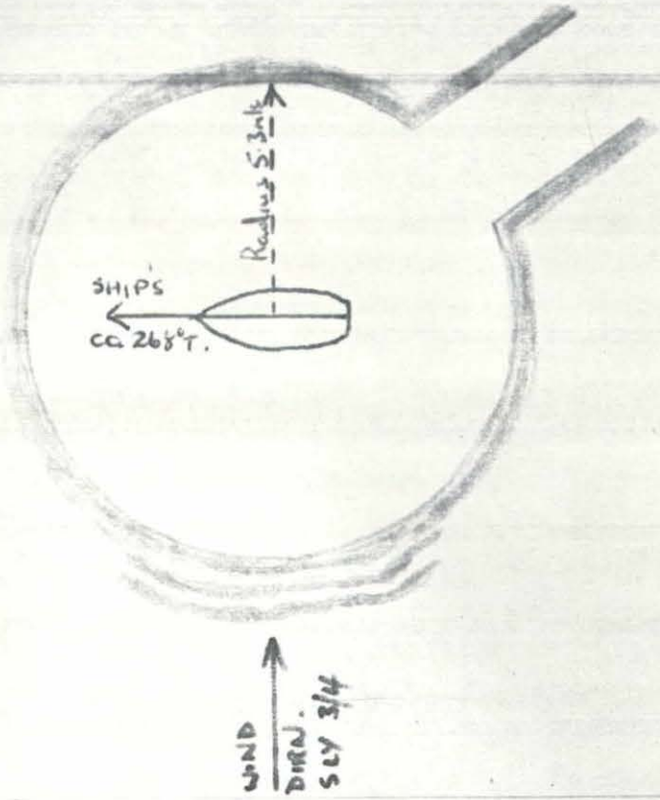
1300 GMT 8TH DEC

J.F. 2/0/N.

M.V. Jervis Bay

FIG.3.

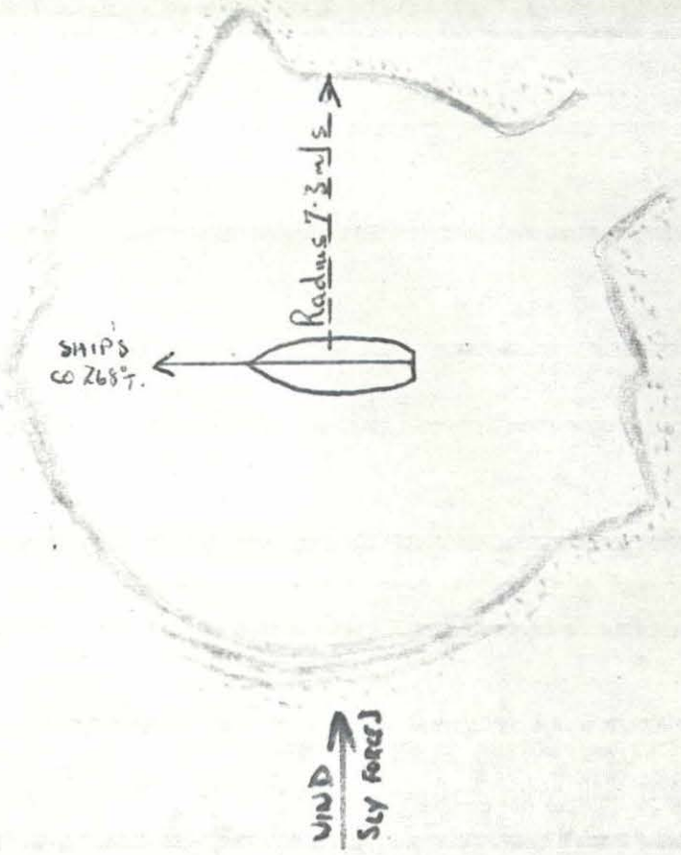
41



14.00 GMT 8TH DEC.

J.J. 2/0/N.

FIG.4.



1530 GMT 8TH DEC.

J.J. 2/0/N.

JH:KG

45/38(40)

Marine Superintendent,
Meteorological Office Met. 01,
Headquarters Annexe,
Eastern Road,
Bracknell,
BERKSHIRE,
ENGLAND.

13 JUN 1973

Dear Sir,

Your Ref. AF/M1334/68/Met. 01 of 3rd April, 1973

The observation of dust clouds on 8 December 1972 by Captain Hill of M.V. Vancouver Island is interesting but puzzling.

On 6, 7 and 8 December clouds of what might have been dust appeared in satellite photographs of the north-west coast of Western Australia and adjacent waters. On the 6th these clouds lay above the coast near Port Hedland and on the 8th they were at the position given by Captain Hill. Unfortunately it is not possible to distinguish with certainty between dust and water clouds on satellite photographs.

As usual during summer, a great deal of convective activity was occurring over land between 1 and 8 December. Dust raised from the surface could be carried to a height of 15,000 ft. by convection and transported for a considerable horizontal distance before gravity caused it to reach the surface again. The puzzlement arises because there are no reports of blowing dust being observed in the North-West during the last week of November and the first week of December. There are large, sparsely-inhabited regions in the north of Western Australia and the dust could have been raised without being observed in such an area. However, both wind observations during this fortnight and satellite photographs suggest that such a large mass of dust should have been observed as it approached the coast.

I am sorry we cannot be more helpful.

Yours faithfully,

DESPATCHED
1 - 6th

(J.M. HOPWOOD)
for Regional Director.

J. M. HOPWOOD

BUREAU OF METEOROLOGY 45/38 39 F 345 C.D.O. 9444

MEMORANDUM

For use between Central, Regional and Field Offices ONLY. Write or print clearly

DATE 22/5/73

TO O.I.C. PORT HEDLAND ATTENTION

YOUR REF:

FROM R.O. PERTH

OUR REF: 45/38

SUBJECT DUST

RECEIVED - 5 JUN 1973 B. of M. PERTH

We have been asked to comment on the observation of a dust-cloud by the crew of a ship at 13°45'S, 112°E, i.e. about 500 mi north of a North-West Cape on 8/12/72.

Clouds of what might have been dust appear on satellite photographs taken on the 6th, 7th + 8th of December. The dust, if that is what it was, crossed the coast on 6 December. Was it observed at Port Hedland? I would be grateful for information about it from Port Hedland station log book or any other source.

PLEASE TURN - OVER

SIGNATURE	PRINTED NAME	APPOINTMENT
Jennifer Hopwood	J. M. HOPWOOD	MET. II Special Services

INFORMATION COPY FOR O. I. C. ONSLOW

Do you have records of dust storms ~~about~~ during the first week of December? (or the last week of November ever?) J.M.H.

November 1970

FOR J. HOPWOOD

	SLP	TEMPS DB ↓	DEW PT ↓	WIND	VIS (NMS)
0600	1010.3	24.7	21	SSW/07	17
0900	1010.1	35.0	17	SE/04	25
1200	1008.5	35.1	24	W/11	25
1500	1006.4	24.8	24	W/14	25
1800	1006.5	30.1	25	W/12	25

MAX GUST W/020/1450

MAX TEMP 39.8

MIN " 23.4

T/MIN " 23.0

WEATHER — HAZE / FINE

CLOUDS

0600 ~~SKC~~ SKC

0900 SKC,

1200 1/8 at 4000',

1500 2/8 at 6000',

1800 1/8 at 6000'

RAINFALL — NIL.

EVAPORATION — 045.

NO OBS BTW MIDNIGHT AND 0600 WST. ON 12/12/72

P. N. DHARMARATNE

A/OIC. ONSLOW MET. OFFICE.

Nothing else the information asked for. g/m

JMH/JV

45/38 (38)

Mr. A. Beck,
2 Alfred Road,
CLAREMONT. W.A. 6010.

Dear Adrian,

Your UFO questionnaire is enclosed. It has been answered as fully as possible. However, you will see that we have not received many UFO reports. I think you would be able to get more information from the Observatory at Bickley, the Department of Civil Aviation and the RAAF.

Yours faithfully,

(J.M. HOPWOOD)
for Regional Director

DESPATCHED
31 MAY 1973
Init. GdW

4438

37

2 ALFRED ROAD,
CLAREMONT.
W.A. 6010
1-6-73

Dear Sir,

I am a second year student of Saint Louis and I am wondering if you could assist me in a project I am entering into the Science Talent Quest.

The topic of my entry is Unidentified flying objects and I would be grateful if you could complete this questionnaire for me, or advise me on any other course I could follow to obtain information on this rather hard subject.

My classmates and I are very interested in your work and we hope to visit you before too long.

Hoping you can help me,

yours faithfully,

Adrian Beech

45/38 5C

BUREAU OF METEOROLOGY F 345

MEMORANDUM

For use between Central, Regional and Field Offices ONLY. Write or print clearly

DATE 24/5/73

TO R/O W.A. ATTENTION MRS HOPWOOD

YOUR REF: HS/38

FROM OIC PT. HEDLAND

OUR REF: HS/53

SUBJECT DUST

RECEIVED 25 MAY 1973 B. of M. PERTH.

Sorry, I am unable to offer any assistance re the possible dust cloud observed on 8/12/72.

I have checked through station records around that date but cannot find any reference to observations of dust or haze in this area of the State which could ~~have~~ conceivably have been transported to the vicinity of the ship report.

SIGNATURE	PRINTED NAME	APPOINTMENT
Smith	WTP SMITH	OIC PT. HEDLAND

November 1970

JBH:LY

45/38 (35)

Mrs. W. Walker,
Lot 123,
Rowan Street,
DERBY. W.A. 6728

Dear Madam,

The object you saw on 20th May, was identified as a satellite re-entering the earth's atmosphere.

It was seen by people in Broome and at Roebuck Plains Station, and also by the crew of a Qantas aircraft flying over Derby at the time.

It probably landed somewhere in the Indian Ocean.

(J.B. HAMILTON)
for Regional Director

DESPATCHED
28 MAY 1973
Init.

4598 34

RECEIVED 24 MAY 1973 B. of M. PERTH.

Lot 123,
Rowan Street,
Derby. 6728.
May 23rd, 1973.

The Director,
Bureau of Meteorology,
127, Wellington Street,
Perth. 6000.

Dear Sir,

On Sunday, May 20th, just after sundown we were returning to Derby from a south easterly direction.

We saw what appeared to be a bright fast moving star flash across the sky. It was visible for about 3 or 4 seconds. As it travelled it left what appeared to be a white vapour trail behind it which remained visible for about 5 minutes before disappearing.

Some friends who were with us & had not seen it thought it was a jet, but it was too bright & too fast moving to be one. We see a lot of jets up here & we are sure it wasn't one.

Our three school age children are very keen to

discover what it was, & why it left a trail. We have all seen "falling stars" before, but never with the white trail.

We would all be very interested to learn a little more about it.

Thank you for your help.

Yours faithfully

(Mrs.) Winifred H. Walker.

BUREAU OF METEOROLOGY

32 F 345 C.D.O. 9444

MEMORANDUM

For use between Central, Regional and Field Offices ONLY. Write or print clearly

DATE 22/5/73

TO O.I.C. PORT HEDLAND ATTENTION

YOUR REF:

FROM R.O. PERTH

OUR REF: 45/38

SUBJECT DUST

We have been asked to comment on ~~a story~~ the observation of a dust-cloud by the crew of a ship at 13°45'S, 112°E, i.e. about 500 mi north of North-west Cape on 8/12/72.

Clouds of what might have been dust appear on satellite photographs taken on the 6th, 7th + 8th of December. The dust, if that is what it was, crossed the coast on 6 December. Was it observed at Port Hedland? I would be grateful for information about it, from Port Hedland station log book or any other source.

SIGNATURE	PRINTED NAME	APPOINTMENT
Jennifer Hopwood	J. M. HOPWOOD	MET II Special Services

FILE COPY Information copy to O.I.C. ONSLOW

November 1970

45/38 31

Science

45/3863

15 MAY 1973.

RECEIVED
18 MAY 1973
B. of M.
PERTH.

Marine Superintendent,
Meteorological Office Met. 01,
Headquarters Annexe,
Eastern Road,
Bracknell,
BERKSHIRE,
ENGLAND.

Dear Sir,

Please refer to your letter AP/M1334/68/Met. 01 of 3rd April 1973 regarding a dust cloud observed by the officers and entered in the meteorological logbooks of M.V. Vancouver Island.

This observation has been onforwarded to the Regional Director, Western Australia, and he has been requested to provide you with his comment on the observation.

Yours faithfully,

(K. FRASER)
for Director of Meteorology

Regional Director,
WESTERN AUSTRALIA.

Enclosed is copy of a letter from the U.K. Meteorological Offices which is self explanatory and this office reply. ENGLISH?

It would be appreciated if you could provide the U.K. with a comment in this matter.

(K. FRASER)
for Director of Meteorology

Mr Clifford
Shall you reply please.
21/5.

Dr Hopwood. What do you think of this?

SRNT 17/10 PC 45 3863

PC
METEOROLOGICAL OFFICE Met O 1 Rm T3
Headquarters Annexe Eastern Road Bracknell Berkshire RG12 2UR
Telex 848160 847010
Telephone 0344 (Bracknell) 20242 ext 2461

The Director
Commonwealth Bureau of Meteorology
P O Box 1289K
Melbourne
Victoria 3001
Australia

Please reply to The Director-General
Your reference

Our reference
AF/M1334/68/Met O 1
Date
3 April 1973

Dear Sir

It is thought that you might be interested in the following extract from the meteorological logbook of the mv Vancouver Island (27664), Captain B Hill on passage from Mackay towards Cape Town via the Torres Strait.

> "8 December 1972 at 0930 in 13°45'S, 112°08'E. Wind 180° force 2. Low thin dust clouds passed over the ship. Noticed by yellow-brown atmosphere and dry dusty smell of air. Light deposit of very fine dark brown dust on paintwork. Lasted about 20 minutes. Nearest land: Australia's NW Cape, 500 miles to the south. (Messrs L Buchanan, Chief Officer and I Macdonald, Cadet)".

If we could have a comment on this observation, it would be an interesting item for the Marine Observer.

SRNT

Yours faithfully

for Marine Superintendent

29

BUREAU OF METEOROLOGY

F 345
(APR 66)

C.O.C. 4444

MEMORANDUM

For use between Central, Regional and Field Offices ONLY. Write or print clearly

DATE 29 / 11 / 72

TO R.O. W.A.

ATTENTION Facilities/Obs. 4

YOUR REF:

FROM Observations Standards and Practice Section

OUR REF: 60/237

SUBJECT Issue of Field Book Covers and code booklet

Action has been taken to issue a small supply of Field Book Covers and the Recording and Encoding Weather Observations booklet (B220) to your office.

Additional small stocks will be available at Central Office store if required at a later date.

H/12 Rowe
Chapman

SIGNATURE	PRINTED NAME	APPOINTMENT
A K Day	A. K. Day	S.T.O.1

C.D.O. 9444

BUREAU OF METEOROLOGY

28 F 345 (APR. '66)

MEMORANDUM

For use between Central, Regional and Field Offices ONLY. Write or print clearly

DATE 21/11/72

22 NOV 1972

TO

Regional Director W.A.

ATTENTION

Observer 4

YOUR REF:

FROM

Observation Standards and Practice Section

OUR REF:

55/257

SUBJECT

Instructions to Co-operative Observers

Additional instructions concerning the calculation of dewpoint depression were included in the distribution of stationery to all Co-operative Observers.

It is regretted that there is an error in the final example given. See attached sample of instruction.

This is brought to your notice, if you are not already aware of it, so that you will be able to answer any queries that may be raised by Observers.

RECEIVED 27 NOV 1972 B. of M. PERTH.

B 28/11 Seen 29/11

6 28/11

Mr Chapman
Mr Rowe
Mr Kemp
Mr O'Brien

SIGNATURE	PRINTED NAME	APPOINTMENT
A K Day	A. K. Day	S.T.O.1

PLEASE NOTE THE FOLLOWING POINTS. THESE ARE ADDITIONAL TO THOSE CONTAINED IN THE BOOKLET AND DEWPOINT TABLES

1. Indicate negative temperatures in the field book by including the minus sign. Also add zeros to make up the necessary three figures when any temperature is below 10 in value. For example:

minus 0.5° is entered as -00.5 minus 5.5° is entered as -05.5

plus 0.5° is entered as 00.5 plus 5.5° is entered as 05.5

---

2. To calculate dewpoint depression when the dry bulb temperature is positive and wet bulb temperature is negative, ignore the signs and add the two values. For example:

dry bulb $+0.6^{\circ}$	dry bulb $+4.5^{\circ}$
wet bulb -0.2°	wet bulb -2.0°
d.p. depression = 0.8°	d.p. depression = 6.5°

Where both temperatures are negative calculate the difference between the two values in the normal way. For example:

dry bulb -0.6°

wet bulb -0.2°

d.p. depression = 0.4°

Flying Objects

20/1

10 Phillip Rd
Dalkeith
6th Oct 1972

Officer in Charge,
Bureau of Meteorology

Dear Sir

Last [illegible] in the Northern sky I noticed a bright bluish green & pinkish orange brightness in the sky as I took the tin rubbish to the rubbish bin.

I got out binoculars & investigated & it looked for all the world like these so called flying saucers, I called my 11 year old daughter out to look & asked her to discribe what she saw & she said it exactly as I had seen it. Then we got my friend across the street to look & he likewise. When his son returned she told him & he came out with his binoculars which are much different to mine. Looking through them the object was one shape & only the colours above

The object moved across the sky from East to West.

What I am trying to explain is that different binoculars give an optical illusion. Ours definitely like the flying saucers. with the mentioned colours one side & appeared to have lots of little lights on one side & the opposite side just silvery.

Just thought this may be of interest

Yours Truthfully
S. M. Meeks (Mr)

forwarded to Bickley Observatory.

RLS:BL

25

45/38

Messrs. K.M. & M.P. Wellstead,
Petersham,
BORDEN. W.A. 6338

Dear Mr. Wellstead,

Thank you indeed for the carefully documented copies of weather observations attached to your letter of 28th September, and may I commend you. Theat must be of great value in the bushfire season.

I have enclosed several publications you may find of interest.

Yours faithfully,

(R.L. SOUTHERN)
REGIONAL DIRECTOR.

COMMONWEALTH BUREAU OF METEOROLOGY F 406

24

MINUTE

(For intra office use only, in Central and Regional Offices. Print or write clearly).

Subject Observations Petersham (Borden)

File reference ___/___

To

Minute

The station is located 5½ miles SE of 'Wirra' an official rainfall station. He is in a fairly isolated area and rainfall readings may be of value to the Bureau from a voluntary Rainfall station.

Synoptic stations in the area are

Mettler 25 miles south

Ongerup 22 miles north

Katanning 50 miles West

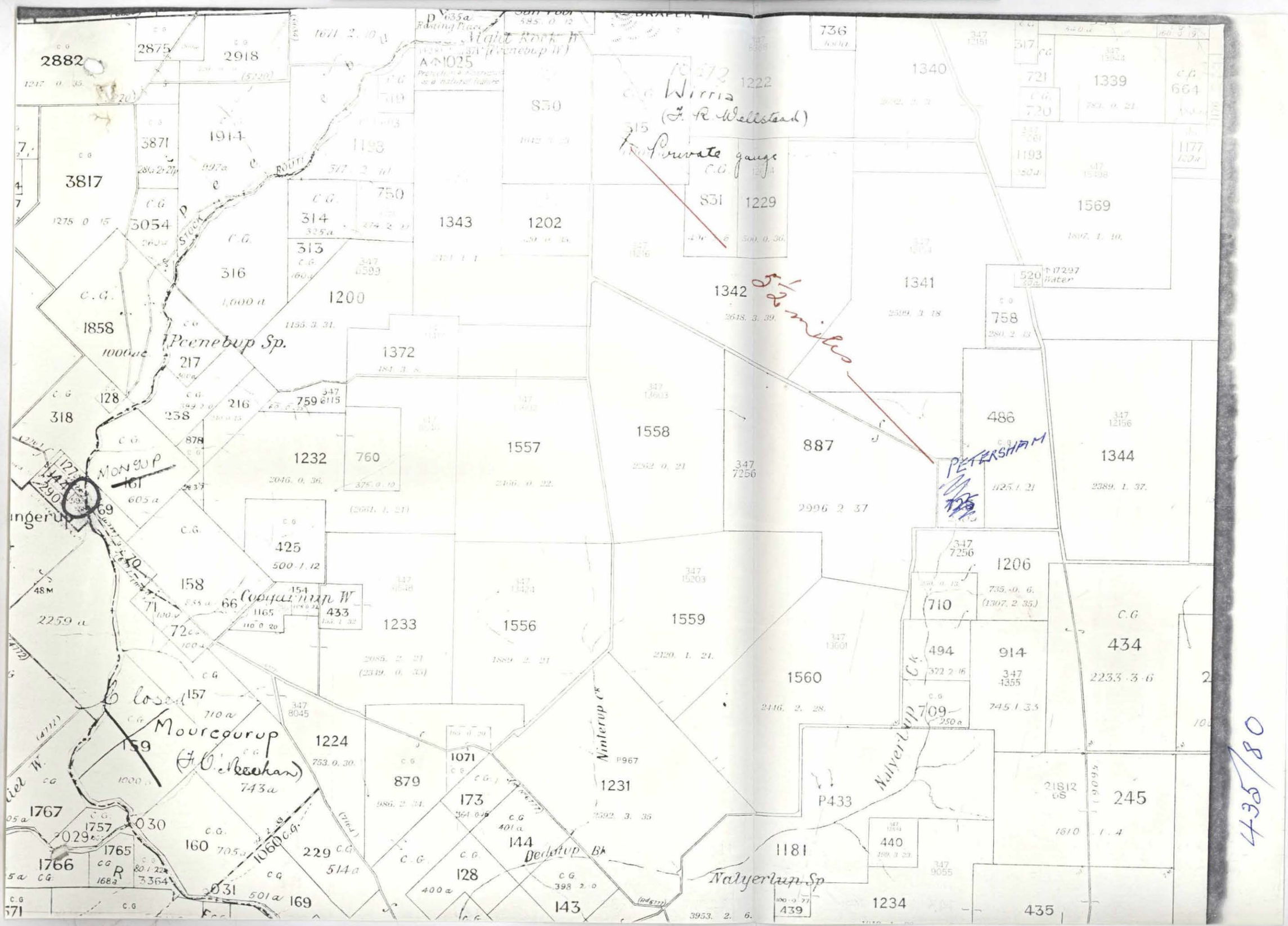
AEF

Obs 4

6/10/72

C.D.O. 9497

November 1968



22

Petersham.
Borden. 6338.
28th. Sept. 1972.

Mr. Southern.
Bureau of Meteorology.
127 Wellington St.
Perth. 6000.

Dear Sir.

Further to information sought by you at Gairdner River Hall on the 30th August.

Attached some observations done by us at Kent Location 725. Nalyerlup Creek. 15 air miles S.E. Borden. Litho. 435.

Barometer may not be set accurate, but we are used to reading same at these settings. These observations are done primarily for Bush Fire Work.

We hope these may be of some interest in comparing them with forecasts given out by the Bureau.

Yours faithfully,

K.M. & M.P. Wellstead.)

1971/72.

21

DATE.	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	F.D.R.
June.1	0712.	3	4	W	0	45	46	29.997R	Wind cloud level SW.
	1248	8		ssw	3	50	57	29.999R	
2	0700	8		wnw	2	50	50	29.1001R	
	1247	10		w	3	51	56	29.1001F	
3	0700	1		0	0	45	45	29.1003R	
	1300	2		n	3	55	63	29.1002F	high haze
4	0700	10	6	n	2	50	50	29.998F	
	1300	10		0	0	54	56	29.994F	
5	0700	10	6	n/nnw	2	54	56	29.990S	2 layers cloud 1 solid lifting
	1253	9		nw	5	58	62	29.986F	
6	0720	1		nw	4	48	49	29.984S	
7	0710	1		wnw	3	46	47	29.996R	
	1300	9		w	3	53	58	29.997S	
8	0710	1		n	2	47	48	29.998S	
	1300	5		nw	7	54	60	29.996S	
9	0745	3	24	nw	4	52	54	29.987R	
	1300	2		wnw	5	57	62	29.990R	
10	0750	10		nw	2	50	51	29.997S	
	1300	5		w	6	54	61	29.996F	
11	0730	1		nw	2	46	46	29.998R	ground fog
	1335	9		nw	4	56	60	29.998S	
12	0700	0		0	0	37	36	29.1002R	ground fog. frost.
	1300	1		0/n	0/1	53	60	29.1002S	
13	0745	0		n	2	44	46	29.1007R	
	1300	1		n	2	56	60	29.1006F	
14	0740	1		n	2	43	45	29.1006	
	1300	0		n	4	54	64	29.1003S	
15	0710	1		nw	3	46	49	29.1000S	dry night
	1300	2		nw	3/4	58	65	29.998F	
16	0710	1		nw	3	49	51	29.998S	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	F.D.R.
16	1300	3		nw	4	57	62	28,996F	
17	0710	10	8	w	2	51	51	29.998R	
	1300	9		w/sw	3	53	59	29.999R	
18	0730	10		nw	2	48	48	29.1005R	heavy fog
	1250	4		wnw	2/3	55	61	29.1004F	
19	0710	3		nw	3	49	50	29.1003F	
	1245	2		nw	5	55	63	29.1000F	
20	0800	10		nw	3	62	54	29.999F	light misty showers
	1252	10		sw	4	48	52	29.999S	some light showers.
21	0706			w	2	39	41	29.1006R	
	1300	3		sw	3	50	55	29.1007R	
22	0710	1		0	0	42	45	29.1009S	
	1300	4		w	2	53	60	29.1009F	
23	0717	0		ne	0	39	39	29.1011R	
	1250	6		sw	1	54	59	29.1011S	
24	0710	1		ne	0	40	41	29.1009F	high streaky cloud.
	1300	5		nw	4	51	58	29.1008F	
25	0705	1		nnw	1	42	43	29.1007S	
	1250	5		wsw	3	56	63	29.1006F	
26	o700	4		n	0	43	45	29.1004F	
27	0715	0		nw	2	39	40	29.998S	
	1300	3		nw	4	54	60		
28	0715	8	2	0	0	46	47	29.1004R	wind cloud level W.
	1245	4	2	w	0	49	57	29.1004S	
29	0715	1		nne	2	43	44	29.1002F	
	1250	9		n	5	54	63	29.998F	
30	0720	10		nw	5	52	53	29.995R	
	1250	8		wnw	5	54	59	29.994F	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
July.9	0725			n	2	40	43	29.1004F	
	1256			n	4	53	63	29.1001F	
10	0730	1		nne	0	40	44	29.1001S	
	1250	1		wnw	1	50	63	29.1001S	
11	0730			wnw	0	38	40	29.1000S	light frost.
	1250			wnw	3/4	53	60	29.999F	
12	0725	10	4	w	2	43	48	29.994F	
	1258	6		w	5/6	50	53	29.991F	
13	0730	10		nw	2/3	42	43	29.992F	
	1250	6		nw	5	48	54	29.988F	
14	0720	10	9	w	3	43	44	29.989R	fog cover
	1255	6		wnw	4/5	50	57	29.989S	
15	0717	1	5	w	2	37	38	29.1000R	
	1250	4		wnw	5	50	57	29.1001S	
16	0715	3		nnw	3	44	47	29.998F	
	1257	8		nw	5	50	59	29.995F	
17	0720	1		wnw	3	42	43	29.998R	
	1248	5		w	3	49	55	29.999R	
18	0740	1	4	nw	3	43	44	29.1002S	
	1308	8		w	2/3	50	55	29.1002S	
19	0720	10		nw	4	48	52	29.999F	
	1255	2		nw	6	55	61	29.998F	
20	0720	3	1	w	3	48	50	29.998S	light misty showers.
20	1250	9		w	5	49	54	29.997F	
21	0715	3	6	0	0	36	38	29.1006R	wind cloud level S.E.
	1250	1		s	2/3	47	55	29.1007R	
22	0725	0		n	2	34	35	29.1004F	daddy of a frost.
	1250	0		nnw	3/4	47	55	29.1002F	
23	0710	2		n	1/2	39	41	29.997F	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
July. 24	0720	10	3	n	4	47	51	29.987F	
	1250	10		nw	4	54	57	29-987S	
25	0750	8	11	w	1	47	48	29.998R	
	1250	6		ssw	2	53	55	29.999R	
26	0725	1		ne	0	36	36	29.1003R	good frost.
	1250	9		se	1	50	54	29.1002F	
27	0725	2		nne	2	42	43	29.998F	
	1253	8		wnw	3/4	50	60	29.995F	
28	0737	4	5	nw	4	53	54	29.988F	
	1250	5		nw	4/6	57	65	29.987F	
29	0715	2		nnw	2	47	49	29.990F	
	1300	8		nw	4	57	61	29.988F	
30	0715	1	43	nw	4	47	48	29.984S	
	1250	5		wsw	3	52	58	29.985S	
31	0718	5		wnw	3	45	45	29.988F	
	1250	8		w	4	51	56	29.988S	
Aug. 1	0755	1		nw	4	46	47	29.990R	
	1250	5		wnw	6/7	55	61	29.990S	
2	0713	8	3	wnw	1/2	47	48	29.999R	
	1300	9		sw	0/1	51	58	29.1000S	
3	0712	1		nw	3	45	47	29.1000S	
	1300	6		nw	5/6	55	61	29.998F	
4	0720	7	9	0	0	42	43	29.1002R	
	1250	9		sw	4	48	54	29.1002S	
5	0720	1		0	0	38	38	29.1002F	Wind cloud level W.
	1250	10		w	4/5	49	53	29.1000F	
6	0710	2	2	w/sw	2	45	45	29.1003R	
	1300	5		sw	4	48	48	29.1004S	
7	0730	2		wnw	3/4	42	43	29.1003F	
	1250	9		wsw	5	48	52	29.1001F	
8	0728	6	6	sw	4	40	43	29.999S	
	1250	5		wsw	4	47	52	29.1000R	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Aug. 9.	0720	10		w	2	40	43	29.999F	Wind cloud level. S./7
	1250	9		wsw	4	48	53	29.999S	
10	0712	9	1	w	2	44	45	29.1003R	Wind cloud level.S.
	1250	9		sse	2	48	52	29.1004R	light misty showers.
11	0730	10	3	se	0	44	45	29.1003F	
	1250	10		nw	2	48	55	29.1000F	
12	0712	8		nw	3	43	45	29.990F	
	1250	10		wsw	6/7	44	46	29.986F	gusts to 8/9.
13	0717	4	16	w	3	38	40	29.994R	wind cloud level s.w.
	1250	8		wsw	3	48	52	29.995R	
14	0720	9		nne	4	42	47	29.990F	
	1250	10		n	5/6	48	52	29.984F	gusts to .7.
15	0745	4	37	nw	3	51	57	29.977S	
	1250	8		nw	5	49	52	29.977S	
16	0715	1	5	nw	4	41	43	29.987R	
	1400	4		w	3	49	55	29.990R	
17	0715	1		nw	3	47	48	29.994S	
	1200	8		wnw	4/5	55	60	29.994S	
18	0710	4		nw	3	45	46	29.998R	
	1250	4		w	4	54	62	29.996F	
19	0710	7	9	w	3	44	45	29.998R	
	1255	8		s	4	53	55	29.998S	
20	0720	1		n	1	40	40	29.1001F	
	1250	3		nw	3	54	63	29.999F	
21	0710	2		nne	2	42	44	29.995F	
	1250	9		nw	4	54	62	29.991F	
22	0733	0	3	0	0	38	39	29.998R	frost.
	1245	0		nnw	3	50	55	29.998S	
23	0702	8		nw	2	43	45	29.1001S	
	1245	7		s	3/4	53	55	29.1003R	
24	0700	10		se	1	44	47	29.1005S	
25	0656	0		ne	3/4	42	43	29.998F	
	1228	0		nne	3	55	64	29.995F	high cloud N.N.W.
26	0655	10	37	wnw	2/3	51	63	29.982S	break in cloud W. 0655
	1240	8		wsw	6/7	56	58	29.983R	
27	0728	9	12	sw	5	47	49	29.992R	misty sw showers.
	1253	7		sw	5	54	61	29.995R	
28	0720	9	1	ssw	3	44	47	29.1000R	
	1245	10		s	4	49	53	29.1001R	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Aug.2	0725	2		s	1	43	44	29.1005R	
	1245	9		se	4	51	53	29.1005S	
30	0725	8	6	wnw	0	43	44	29.1004F	
	1250	8		s	1	54	56	29.1004S	
31	0652	9		ssw	1	44	47	29.1005F	
Sept.									
1	0700	9		ne	0	37	37	29.1004F	very sharp frost.
	1232	6		wsw	0	51	56	29.1004S	
2	0642	0		0	0	40	40	29.1003F	heavy overnight dew.
	1242	2		se	3	54	62	29.1002F	
3	0655	10		nne	4/5	43	45	29.997F	
	1235	4		nnw	5/6	53	65	29.992F	
4	0640	0	5	nne	1	43	44	29.998S	
	1245	3		nw	5	56	65	29.996F	
5	0735	0	3	nw	3	47	50	29.994R	
	1245	5		sw	4	48	58	29.997R	
6	0715	0		nnw	3	43	45	29.998F	
	1250	3		wnw	6/7	52	61	29.995F	
7	0758	10		wnw	5	52	54	29.992R	
	1250	9		wnw	5/6	54	64	29.990F	
8	0720	10		w	3	48	49	29.988F	light misty rain.
	1300	4		wsw	5/6	47	55	29.989R	
9	0725	1	4	nw	2	43	44	29.1000R	
	1250	6		ssw	1	51	56	29.1002S	
10	0718	5		sw	1	44	46	29.1009R	
	1250	10		sse	1	49	55	29.1008F	
11	0712	0		ne	0	41	42	29.1008F	good frost.
	1247	5		nne	2/3	54	57	29.1004F	
12	0735	10		n	5	43	50	29.994F	
	1245	10		nw	4	52	67	29.990F	
13	0710	9	10	nw	3	51	52	29.985F	
	1250	8		wnw	4	55	63	29.985S	
14	0723	10	7	wnw	1	52	53	29.996R	
	1250	9		0	0	56	64	29.997R	Variable winds. W.
15	0708	9				52	54	29.998S	
	1250	3		nw	3	58	67	29.996F	
16	0705	10		wnw	2	52	62	29.988F	very heavy fog
17	0710	1	22	nw	4	48	50	29.984F	
	1250	2		w	5	53	63	29.984S	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Sept.									
18	0710	9	1	w	3/4	57	59	29.984F	
	1250	3		w	5	48	55	29.982F	
19	0725	0		w	5/6	39	42	29.982S	fog along Stirlings
	1250	7		wsw	4/5	47	49	29.983S	
20	0710	4	2	wnw	4	43	44	29.988R	
21	0645	1		nw	3	48	50	29.990R	
	1245	9		wnw	4/5	56	62	29.989F	
22	0710	0	25	nw	2	44	48	29.990R	
23	0705	2		wnw	2	42	43	29.990F	
	1250	3		wnw	5	49	59	29.988F	
24	0715	2	5	nw	6/7	39	43	29.984F	
	1250	8		w	5/6	45	52	29.984S	heavy wind gusts. rain. hail. sleet. snow.
25	0710	7	39	wsw	3/4	39	40	29.990R	snow on Stirlings
	1250	4		sw	5	50	53	29.993R	
26	0722	8	2	wnw	3	46	47	29.1000R	cloud level wind S.W.
	1245	9		w	4	52	59	29.1001S	
27	0715	9		nw	4	48	53	29.1001F	
	1250	3		nw	5	56	64	29.998F	
28	0710	10		w	5	55	57	29.990F	gusts 9. 0705 hrs.
	1250	5		wnw	5	56	64	29.989F	
29	0705	9		nw	3	53	55	29.988F	
	1250	10		wnw	3	55	58	29.984F	Wind E. T. 2115 hrs.
30	0703	3	70	nw	3	52	53	29.983R	
	1250	9		wnw	5	56	61	29.984S	
Oct. 1	0703	0	7	W	5	49	53	29.988R	
2	0704	6		nw	5	51	54	29.994F	rising 6/7 in morning down nil late afternoon.
	1250	1		wsw	4	56	68	29.997S	
3	0725	0		n	3	51	54	29.998F	Wind to 6. NNW/NW.
4	0704	1		wnw	4	55	60	29.988S	
	1250	7		wnw	5/6	63	73	29.983F	
5	0703	7	29	nw	4/5	52	53	29.984F	
	1250	8		wsw	4	50	52	29.986R	Winds 7/8.
6	0702	1	15	w	3	44	47	29.992R	
	1250	9		w	4	51	59	29.992S	
7	0657	5		nnw	4	48	50	29.991F	
	1250	7		w	5	47	55	29.991S	
8	0705	4	4	wsw	2/3	44	45	29.995R	
	1250	9		ssw	6/7	46	48	29.999R	Winds . 8.

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
9	0715	9	4	sw	3	45	46	29.1004S	
	1225	8		sw	4	52	57	29.1004S	
10	0745	7		nw	0	48	52	29.1007R	
	1250	6		w	2	54	59	29.1005F	
11	0702	0		nw	2	48	50	29.1004F	
	1250	2		sw	1	54	63	29.1000F	
12	0707	6		w	3	48	50	29.991F	
	1250	10		wnw	6	55	60	29.986F	just started rain.
13	0720	1	15	nw	5/6	45	45	29.983F	
	1250	10		wnw	5/6	52	54	29.980F	gusts to 7/8.
14	0705	3	20	wsw	4	47	50	29.986R	
	1250	10		sw	4	51	57	29.989R	
15	0710	9		nw	2	45	51	29.995S	
	1250	9		nw	3	57	59	29.994F	
16	0702			n	2	49	53	29.993F	
	1250	4		n	3	58	72	29.990F	
17	0720	7		wsw	4	53	56	29.993R	
	1330	3		wsw	3	56	63	29.996R	
18	0700	7		ne	4	50	53	29.998F	
	1250	9		wnw	4	60	73	29.993F	
19	0658	10		nnw	3	50	62	29.984F	
	1300	10		nnw	4	59	61	29.984S	
20	0658		4	n	1	52	53	29.984F	
	1250	9				55	62	29.982F	
21	0658	10	8	sw	4/5	50	53	29.982S	Rain N.W. heavy thunderstorm S of house. 1½" or more.
	1250	10		wsw	5	54	58	29.984R	
22	0658	10		wsw	2	54	60	29.995R	
	1250	7		sw	3	50	68	29.996R	
23	0658	10		nnw	1	54	55	29.999R	
	1245	4		wsw	2	59	67	29.998F	
24	0745	4		ese	2/3	56	61	29.994F	
	1245	10		se	2	58	67	29.991F	
25	0658	9	47	wsw	3/4	44	46	29.992F	
	1250	8		wsw	4	44	46	29.996R	Winds to 8.
26	0658	2	12	sw	3	45	48	29.1005R	
	1250	7		wsw	3	50	57	29.1009S	
27	0657			wnw	3	45	48	29.1006F	
	1245	1		wnw	3	55	67	29.1004F	
28	0653			nnw	3	50	52	29.999F	
	1250	1		wnw	5	53	61	29.996F	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM
Oct. 29.	0658			nw	3	50	52	29.999S
~~1250~~	1250	1		w	4	55	67	29.998F
30	0658	1		w	2	52	55	29.1001R
	1245	4		w	2/3	56	67	29.1000F
31	0708			ese	3	54	58	29.1002S
	1245			ne	2	59	77	29.998F
Nov 1	0658	2		nw	2	55	58	29.992F
	1250	2		wnw	5	60	75	29.990F
2	0658	1		wnw	1	53	55	29.996R
	1250	7		wsw	2	56	65	29.995F
3	0658	2		w	1	52	55	29.996S
	1250	4		w	3	54	68	29.994F
4	0648	7		nw	4/5	53	57	29.990F
	1300	8		w	5/6	58	70	29.989F
5	0645	8		sw	4	50	52	29.998R
	1250	9		sw	5	53	63	29.999R
6	0658	9		ssw	1	48	53	29.1004R
	1245	3		ese	2	54	65	29.1004S
7	0740	1		ne	3	50	58	29.1002F
	1250	1		nne	2	57	77	29.998F
8	0658	7		sw	3	55	58	29.994S
	1245	9		sse	4	59	69	29.994S
9	0658	10		se	5	48	53	29.998S
	1249	10		se	3/4	50	52	29.996F
10	0655	10	118	sse	5	48	50	29.991F
	1253	10	92	sse	6	49	50	29.986F
11	0650	10	229	sw	5	48	49	29.984S
	1250	10		sw		50	55	29.986R
12	0658	10	7	sw	2	49	50	29.994R
	1245	10		s	2	54	55	29.997R
13	0646	8	47	s	2	51	52	29.1001R
	1604		61					
14	0727	10	1	e	1	51	53	29.999F
	1250	9		nw	3	58	65	29.996F
15	0655	7		wsw	3	51	53	29.988F
	1250	7		wsw	4	54	60	29.988S
16	0657	1	20	w	4	43	46	29.991S
17	0643	8	5	wsw	3	47	48	29.997R
	1250	6		sw	4	56	65	29.997S

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few light spits. 0600.

Rain all day } showers
all night } forecast.
all day again }

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Nov 18	0645	8		wnw	3	50	63	29.994F	
	1250	7		w	3	57	63	29.992F	
19	0655	9		wsw	3	40	41	29.994S	
	1250	9		ssw	3	54	58	29.996R	
20	0658	8	5	s	0	51	53	29.999S	
	1250	10		s	1	57	62	29.998F	
21	0711	8		ene	3	53	55	29.995F	
	1245	2		e	3/4	63	77	29.990F	
22	0658	10	12	se	4/5	56	58	29.986F	
	1252	10		ese	4	59	61	29.983F	
23	0650	10	122	se	5	54	55	29.987S	winds gusty creek full flood.
	1248	10		se	5	56	58	29.988R	
24	0656	10	82	ese	2	53	56	29.996R	
	1246	9		se	1	58	65	29.996S	
25	0650	7		nne	2	53	55	29.996S	
	1250	8		ese	3	59	68	29.997F	
26	0654	10		se	2	56	58	29.998S	2 layers cloud.
	1248	10		se	2	58	60	29.997F	very light mist showers.
27	0645	9	11	ese	1	52	53	29.998S	light misty showers.
	1250	10		ese	2	58	64	29.998S	
28	0710	1		ene	4	54	60	29.997S	
	1252			nne	3	62	70	29.994F	
29	0656	7		nne	5	58	68	29.988F	
	1250	9		n	5/6	65	85	29.984F	wind SSW. 1345 hrs.
30	0645	5		s	1	54	55	29.996R	
	1250	7		se	2	57	67	29.996S	
Dec. 1	0654			ene	0	51	56	29.998S	
	1250	3		s	2	55	69	29.998S	
2	0655			n	1	53	58	29.997F	
	1250	1		wnw	4	60	75	29.994F	
3	0645			w	2	54	58	29.996S	
	1250	2		se	2	59	72	29.995F	
4	0657	2		ssw	0	56	61	29.997F	
	1248	5		sse	1	59	64	29.994F	
5	0740	1		se	2	55	62	29.998S	
6	0658	9		e	2	53	58	29.999R	
	1250			ene	2/3	62	75	29.996F	
7	0643	9		e	3	57	59	29.992F	
8	0658	10	17	wsw	3	60	61	29.984S	
	1250	5		w	5	60	65	29.984S	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
9	0654	3	5	w	4	50	53	29.992R	17
	1248	1		sw	5	54	68	29.993S	
10	0657			wsw	4	52	57	29.997S	
	1251	1		wsw	3	60	70	29.995F	
11	0657	10		w	2	55	57	29.996S	
	1250	1		w	3	62	74	29.994F	
12	0725	9		sw	1	57	60	29.996R	
	1248	1		s	2	61	69	29.995F	
13	0655			s	3	52	57	29.1002R	
	1233			ssw	3	57	68	29.1003R	
14	0645			ene	3	52	56	29.1004S	
	1248			ene	1/2	60	76	29.1002F	
	1453			ne	1	58	79	29.1000F	
	1710			e	4	63	76		
15	0657			n	4/5	57	67	29.998F	
	1015			nw	4/5	62	83	29.996F	
	1250			nw	3	62	89	29.995F	
	1500			wnw	3	63	90	29.993F	Wind SSE. 1700 hrs.
16	0657	10		sse	3	57	57	29.996R	
	1305	10		se	5	56	62	29.996S	
	1510	10		se	4	57	61	29.996S	
17	0650	10	7	se	3/4	56	57	29.998S	
	1250	10		se	3	60	60	29.998S	light misty rain all morn.
18	0658	4	4	e	3	60	63	29.996F	3 layer cloud. E/NE/W.
	1245	4		ssw	1	62	83	29.992F	
19	0740	9		s	4	59	63	29.996R	
	1255	10		s	3	60	64	29.997S	
20	0653	9		sse	2/3	53	58	29.999S	
	1120	10		sse	3	55	57		
	1254	10		sse	2	55	60	29.999S	
21	0654	8	3	se	3	53	55	29.999S	
22	0645	4		ene	3	50	55	29.997S	
	1250	7		se	2	58	68	29.994F	
23	0645	2		e	3	55	58	29.990F	
	1253	1		se		63	77	29.988F	
24	0645	10		wsw	1	55	56	29.994R	
	1250	2		wsw	3	60	73	29.992F	
	1505			wsw	3	61	78		
25	0655	2	6	sw	4	50	56	29.997R	
	1255	5		ssw	4	55	65	29.998R	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Dec 26	0716	4		sse	2	51	59	29.1000S	light dew.
	1253	3		s	2	53	63	29.999F	
27	0659	1		s		51	56	29.999S	
	1248	1		ssw	2	57	70	29.996F	
28	0658	9		nnw	1	54	59	29.995F	
	1245			w	2	50	76	29.992F	
29	0653	10		s	1	55	56	29.996R	light misty rain.
	1250	6		sse	3	59	69	29.996S	
30	0652	9		ssw		55	58	29.998S	
	1250	1		sse	3	62	72	29.998S	
31	0656	7		ese	4	53	58	29.1001R	
	1255			ene	2/3	60	76	29.1000F	
1972. Jan 1	0656			ene	3	56	58	29.998F	fog in S.
	1250	1		ese	2	61	78	29.996F	
2	0655	5		e	3	59	60	29.994F	
	1045	8		e	2	64	76	29.992F	
	1250	8		e	2	67	83	29.990F	
	1425	9		ne	4	64	85	29.	
3	0650	1		se	1	62	63	29.993R	heavy dew light fog.
	1000	1		e	3	68	90	29.992F	
	1135			ene	3	67	94	29.992S	
	1243			se	4	71	96	29.991F	
	1450			se	4	68	83	29.992R	
4	0653	10		e	2	62	63	29.996S	
	0945			ese	3	68	79	29.996S	
	1100	1		e	4	69	87	29.995F	
	1200	1		e	4	71	90	29.994F	
	1250	4		se	4	71	85	29.992F	
	1435	3		se	4	69	82	29.991F	
5	0652	7		sw	2	52	63	29.990F	
	1250	1		wsw	4	62	83	29.988F	10/10 cloud till 1030 hrs.
6	0657	10	6	ssw	5	58	58	29.988S	
	1250	10		sse	4	60	61	29.992R	
7	0655	10	44	se	2	52	55	29.999S	
	1250	10		sse	3	58	64	29.999S	
8	0658	10		se	1	54	62	29.1002R	
	1312	10		se	3	57	60	29.1002S	
9	0748	10		se	3	56	58	29.1004S	spitting in mind
	1250	9		ese	4	62	67	29.1004S	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Jan.									
10	0650	10		ese	2	56	57	29.1002F	
	1230			ese	2	62	73	29.1000F	
11	0645	10		e	2	55	57	29.1000R	light dew.
	1250			ese	3	63	73	29.999F	
12	0652			ne	4	55	58	29.999F	early fog cleared.
	1249			nne	4	62	84	29.998F	
13	0645	1		n	4/5	57	68	29.996F	
	0905	4		n	5/6	61	84	29.996S	
	1005	4		n/nw	4/5	63	86	29.996S	
	1200	1		n/nnw	5	65	88	29.994F	
	1255			nnw	5	66	94		
	1400			w	5	67	99		
	1500			nw	5	66	99	29.992F	} Winds 0-5. S.W. at GD. 15 knots.
	1600			s	5	66	81		
14	0643	3		sse	3	57	60	29.1000R	
	1250			sse	3	58	71	29.1000S	
15	0657			ene	2	56	60	29.1001S	
	1250			ne	1	62	76	29.998F	
16	0750					58	63	29.998S	light fog early.
	1245			e	1	54	80	29.997F	
17	0650	6		se	3	58	61	29.1000R	
	1250			se	3	63	76	29.998F	
18	0650	8		ese	2	58	60	29.996F	
x24	1250	9		sw	4/5	70	80	29.991F	
26	0700	9	4	se	2/3	58	58	29.999S	
	1248	10		se	3	59	62	29.998S	
27	0657	4	1	ene	3	60	63	29.996F	
	1250	4		ene	4	68	87	29.993F	
28	0656	6		wnw	4/5	62	65	29.994R	
	1250	9		wsw	3	68	80	29.996R	
29	0657	10		se	1	61	63	29.1000R	
	1245	2		se	2	65	77	29.999F	light - variable winds
	1450	2		e	2	67	82	29.998F	
30	0712	6		ene	1	62	67	29.997F	
	1143	8		nw	6	70	88	29.995F	
	1245	5		nnw	5	70	96	29.994F	
	1416	8		nw	6	69	94	29.993F	
	1530	7		se	5	70	80	29.993S	wind change. fine spells.
31	0658	4		sse	2	64	65	29.999R	
	1250	9		se	1	65	73	29.999S	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Feb 1	0658	10	2	ese	0	61	62	29.1001S	
	1243	10		se	4	65	68	29.1000F	
2	0657	10		ese	3	58	60	29.1004R	
3	0648	3		e	4	58	64	29.1004S	
4	1345	2		é	0	68	91	29.996F	
5	0648	10		se		64	64	29.996F	very heavy fog
	1015	1		ese	2	68	75	29.997R	
	1245			ese	2	65	85	29.996F	
6	0740	3		se	2	64	67	29.996F	dry fog
	1130			sse	1	70	84	29.996S	
	1245			sse	2	71	88	29.996S	
7	0655	10		e	1	63	63	29.999S	heavy fog
	1050	2		n	4/5	70	94	29.998F	
	1250	1		nne	5/6	70	103	29.996F	gusts to 7.
	1404	4		nne	4/5	69	100	29.994F	
	1500	4		nne	5	68	98	29.993F	lighting strike in Paris.
	1545	4		ne	6	68	98	29.993F	
	1645	9		ne	4	65	93	29.993S	lightning in area storms. danger rating 19.
8	0645	1		w	0	65	73	29.995F	
	0753	1		ne	0	69	89	29.995S	thunder clouds. N.E.
	1130	1		nnw	1	68	94	29.995S	
	1250	1		nw	2	67	97	29.994R	
	1408	1		se	3	72	87	29.994S	
	1610	1		se	4	72	83	29.995R	
9	0645	10		se	1	63	64	29.998S	
	1300	4		ese	4	70	80	29.995F	
10	0655	10		ese	0	62	62	29.989F	
	1250	9		e	2/3	68	82	29.986F	
11	0658	10		s	3	56	60	29.994R	
	1247	9		s	4	58	70	29.996R	
12	0654	1		e	2	50	55	29.1004R	
	1245	3		é	4	59	68	29.1003S	
13	0700			ne	3	55	58	29.1003S	
	1241			ese	2	62	84	29.1000F	
14	0656			e	1	57	60	29.999F	
	1248			ne	3	63	87	29.997F	Winds E.S.E 1430 hrs.
15	0640	6		ese	1	56	58	29.995F	
	1248	7		nne	0	63	85	29.992F	high cloud. rainbow around Sun.
16	0645	10		se	2	62	64	29.997R	
	1252	1		se	4	66	73	29.998R	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	BRY	BROM
17	650	3		e	3	59	59	29.1000S
	1250	3		ese	5	66	78	29.999F
18	0650	10		ese	3/4	58	60	29.999S
	1226	4		ese	3	62	71	29.999S
19	0700	8	6	é	3	48	48	29.998S
20	0720			ene	3/4	58	67	29.1002R
	1245	1		ese	5	65	78	29.1001F
21	0655	9				55	58	29.1002R
	1300	8		ne	4	65	85	29.1000F
22	0652	1		n	3	57	65	29.999F
	1105	0		n	4	66	92	29.999
	1250			nnw	2/3	66	94	29.998F
23	0645	1		n	3/4	58	74	29.997F
	1105	5		n	4/5	65	88	29.997S
	1255	6		nw	4/5	67	95	29.996F
24	0659	5		se	2	64	65	29.998S dry fog
	1216			se	2	68	80	29.998S
25	0655	1		ese	2	60	63	29.1000S
	1250			se	4	67	80	29.999F
26	0650	10		e	2	61	63	29.994F
	1247			nw	1	66	87	29.990F
27	0715	10		se	1	60	61	29.990S
	1255	10		se	5	58	62	29.992R
28	0654	4	8	sse	4	51	56	29.998R
	1300	10		se	3	57	63	29.999R
29	0645	9		se	4	55	58	29.1000F
	1300	9		é	4	62	66	29.998F
March. 1	0655	10	13	é	2/3	60	60	29.994F
	1250	10		e	2	64	64	29.992
2	0655	10	53	se	4	62	62	29.994S
	1250	10		se	3	64	64	29.994S
3	0657	10	17	e	3/4	62	63	29.995S
	1250	10		e	5	64	66	29.996R
4	0653	1		ene	2	58	61	29.996S
	1247	10		ene	3/4	62	66	29.996S
5	0705	6		ene	2	62	64	29.996S
	1245	1		e	1	70	80	29.994F
6	0650			nne	3	62	64	29.990F
	1250			nne	4	76	87	29.987F

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
7	0657	10		s	3	64	66	29.990R	
	1300	10		s	2	65	69	29.992R	
8	0656	4				57	59	29.998R	
	1248	4		sse	3	63	69	29.996F	
9	0655	9				58	58	29.996S	Wind cloud level S.S.E.
	1249	2		sse	0/1	65	71	29.995F	
10	0656	9		se	2/3	55	60	29.1000R	
	1248	2		ese	2/3	61	70	29.999F	
11	0650	9		ese	3	56	58	29.1003R	
	1234	6		e	5	62	67	29.1003F	
12	0710	4		e	3/4	58	64	29.1002F	
	1245			e	1/2	66	79	29.1000F	
13	0648	10		se	4	59	63	29.1003R	two layers cloud
	1250	5		se	4	62	68	29.1004R	" " "
14	0650	5		se	2	59	61	29.1004S	
	1247	9		e	3	64	70	29.1004F	
15	0648	10		ese	3/4	60	62	29.1004F	
	1235			e	3	66	75	29.1003F	
16	0645	8		e	2	62	63	29.999F	two layers cloud.
	1300	1		nnw	1	69	84	29.996F	
17	0655	1		nne	2	58	62	29.996R	
	1300	1		sw/s	3	69	76	29.998R	Winds variable.
18	0648	1				50	52	29.1004R	Wind cloud level S.S.E.
	1245	2		se	2	59	69	29.1004S	
19	0717	2				55	57	29.1006S	Wind cloud level E.SE.
	1250	3		sse	2	59	69	29.1004F	
20	0655					53	55	29.1004S	
	1300	1		ene	0/1	63	78	29.999F	
21	0656	8		se	2	62	63	29.1001R	
22	0650	8		ese	3	58	60	29.1002F	
	1300	1		e	4	66	73	29.999F	
23	0650	4		nw	0	60	60	29.999F	
	1215	1		nw	4/5	63	84	29.996F	
	1825	7		w	4	58	80	29.994R	clouds laying N & S.
24	0650	10		wsw	3	58	64	29.996R	
	1300	10		sw	4	58	61	29.996S	
25	0658	6		sw	2	45	47	29.998S	
	1255	8		wsw	2	52	62	29.999R	
26	0715	5				43	44	29.1001R	
	1245	1		nne	1	52	63	29.1000F	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
March.									5
27	0655	7		n	4	49	54	29.989F	
	1045	1		nw	8	56	78	29.983F	dust storms (supposed to be light variable)
	1249	1		nw	7	58	82	29.983F	
28	0656	1				46	48	29.994S	
	1250	5		wnw	4/5	58	71	29.993F	
29	0658	3		nw	3	57	58	29.994R	
	1250	4		wnw	4/5	61	74	29.994S	
30	0658			nnw	1	54	55	29.1001R	
	1250	6		sw	2	60	70	29.1002R	
31	0656	2		ne	1	53	58	29.1002F	
	1248	1				62	80	29.1000F	
April. 1	0655			nne	2	55	64	29.1000S	
	1245			nnw	2/4	65	92	29.1000S	
2	0710	2		n	3	55	70	29.999F	
	1250	3		nnw	4/5	65	90	29.998F	
	1415	1		nw	4/5	66	94	29.997F	
3	0650	5		sw	0	60	61	29.997S	
	1245	10		sse	2/3	63	66	29.999R	
4	0657	1					47	29.1000S	
	1250	7					67	29.999F	
5	0654	1		nne	1		54	29.998F	
6	0656	9		nw	4		60	29.987S	
	1250	9		w	3/4		62	29.988S	
7	0656	2	4	w	2		43	29.996R	
	1250	6		sw	4		55	29.998R	
8	0658	6	6	w	2		48	29.1002R	
	1245	4		w	0		60	29.1002S	
9	0720			n	0		47	29.1005S	
	1252	1		n	2		70	29.1004F	
10	0656			nnw	2/3		53	29.998F	
	1252	1		nw	6/7		81	29.996F	
11	0648	5		wnw	2		54	29.1002R	Winds cloud level S.W.
	1247	9		se	2		64	29.1003R	
12	0655			ne	0		51	29.1006S	
	1249	1		n	3		73	29.1004F	
13	0656	4		n	3		58	29.1002F	
	1248	4		nw	3		85	29.999F	gusting to 4.
14	0657	1		se	1		57	29.1002R	
	1247			s	3		76	29.1001F	

Brisk instrument

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
Apr 15	0657	9		ese	0		53	29.1003S	4
	1253			ne	0		80	29.1001F	
16	0718			n	2		67	29.1002R	
	1247			nw	3/4		91	29.1001F	
17	0655			n	3		66	29.999F	
	0845			n	3/4		73	29.999S	
	1245			n	5		89	29.997F	a ragged day
18	0650	1		nw	3		52	29.989F	
	1250	5		nw	6/7		80	29.988F	
19	0656	7		nw	2		56	29.990F	
	1300	10		wnw	4		55	29.984F	
20	0657	3	41	w	4		48	29.991R	one hell of a heap of dust yesterday.
	1253	4		wsw	5/6		60	29.990F	
21	0658	9		w	1		52	29.1000R	
	1248	6		w	2		68	29.1000S	
22	0657	7		w	1		57	29.1003S	Wind cloud level S.W.
	1250	10		sse	3/4		61	29.1006R	
23	0730	10	16	e	2		54	29.1008S	
	1250	9		ene	2		60	29.1008F	
24	0658			ne	1		48	29.1007F	
	1248			ne	0		68	29.1005F	
25	0650			nnw	2		52	29.1004F	
	1245			w	3		73	29.1003F	
26	0650	3					48	29.1004S	Wind cloud level w
27	0656	fog		n	0		52	29.1001F	heavy day fog. 100yds. Vis.
	1248	3		nw	5/6		83	29.998F	
28	0658	3		wnw	3		53	29.998F	
	1250	5		w	4/5		73	29.998S	
29	0655			n	o		50	29.1000R	
	1245	8		nw	2		69	29.1001R	
30	0720			n	1		55	29.1001S	heavy mist fog.
	1249	1		wnw	1		77	29.999F	
May 1	0703			ne	0		58	29.1001R	light fog.
	1250	1		w	0		73	29.1000S	
2	1250	1		ne	1		73	29.1002S	
3	0656			ne	2/3		59	29.1000F	
	1250			nnw	5/6		88	29.998S	
4	0700	9		n	2/3		56	29.998F	full cover light high cloud.
	1250	10		nw	5/6		83	29.996F	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
[illegible]	[illegible]:00	9		sw	3		58	29.1002R	
	1250	10		se	3/4		60	29.1003S	
6	0700	10	22	se	2		56	29.1004F	
	1247	9		[illegible]	1		62	29.1002F	
7	0720	5					50	29.999F	heavy fog.
8	0650	7		wnw	0		57	29.1001R	
	1247	3		wnw	3		68	29.1001S	
9	0655			nw	0		46	29.1002R	
	1250	3		wnw	0		70	29.1004S	
10	0705	1					48	29.1006S	fog early
	1252	3		se	2		69	29.1004F	
11	0648	1					55	29.1002F	Winds NE. cloud level.
	1250			ne	0		72	29.1000F	
12	0705	10					55	29.996F	heavy fog.
	1250	9		wnw	3	60	68	29.993F	
13	0718	10	20	wnw	3	55	57	29.986F	
	1255	6		wnw	6/7	55	65	29.984F	
14	0715	6	11	w	3	45	46	29.995R	
	1250	8		wsw	4	57	58	29.998R	
15	0710	2		nw	2	47	48	29.1000R	
	1250			wnw	3	58	68	29.1000S	
16	0711	5		wnw	0	50	52	29.1002F	
	1250	8		w	2	58	64	29.1004S	
17	0700	1		wnw	0	48	50	29.1005R	
	1252	7		wsw	2	58	64	29.1006S	
18	0700	1		ne	0	45	46	29.1010R	light ground fog.
	1249	1		N	0	61	69	29.1010S	
19	0650			ne	1	47	50	29.1011S	
	1250			n	3/4	58	74	29.1010F	
20	0700			n	2	46	51	29.1008S	
	1245	1		n	3	67	74	29.1007F	
211	0740	1		n	1	48	52	29.1004S	
	1245	8		wnw	1	65	85	29.1003F	
22	0702	7	8	ese	2	55	56	29.1008S	
	1250	9		ese	3	63	65	29.1008S	
23	0700	6		ne	1	54	54	29.1008S	two layers cloud.
	1250	1		n	2	63	68	29.1006F	
24	0700	9		n	1	55	57	29.1007S	
	1250	9		nnw	1	58	67	29.1006F	

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
May 25	0705			nne	0	45	47	29.1009R	
	1250			ne	3	56	76	29.1009S	
26	0700	1		ne	2/3	48	52	29.1009S	
	1250	1		n	3	58	70	29.1008F	
27	0700			ene	4	45	50	29.1007F	
	1245			n	3	54	67	29.1007S	Wind N.E. am. 5/6.
28	0700	3		nne	4	43	48	29.1004F	
	1245	3		n/5	4/5	50	65	29.1002F	high cloud. W.
29	0714	2		n	2	43	52	29.1000F	
	1250	3		n	3	55	74	29.998F	
30	0700	10		n	0	50	58	29.997F	
	1233	10		nnw		53	66	29.995F	gauge out. force 6/7.
31	0700	10	8	wnw	5	53	54	29.985F	
	1253	8		nw	6	55	60	29.982F	
June. 1	0700	1	15	w	3	47	47	29.990R	
	1245	9		sw	4	53	62	29.994R	
2	0705	10		nw	3	50	52	29.998S	
	1248	8		wnw	4	54	63	29.998S	
3	0700	10	5	wsw	0	44	44	29.1003R	heavy fog.
	1245	3		wsw	2	55	60	29.1002F	
4	0715	1		nw	2	47	47	29.1002F	
	1245	10		nw	6/7	56	61	29.1001F	
5	0700	1		nw	4	53	55	29.1002R	
	1250	8		nw	5/6	59	68	29.1001F	
6	0710	1		n	0	47	48	29.1008R	
	1249	3		nw	0	59	66n	29.1008S	
7	0700			nnw	0	52	54	29.1007F	light ground fog.
	1250	1		w	1	57	64	29.1006F	
8	0700	2				44	45	29.1004F	
	1250	5		wnw	4/5	58	68	29.1002F	
9	0715	2		wnw	2	47	48	29.1002S	patches fog & smoke.
	1250	4		sw	3	60	67	29.1002S	
10	0715	8				44	45	29.1004S	some fog & drizzle.
	1245	5		n	4	58	64	29.1003F	
11	0740	9		n	1	45	53	29.1001F	cloud high & dry.
	1245	8		n	5/6	54	69	29.1000F	
12	0715	4		n	3	44	51	29.999F	
	1250	10		n	5	53	68	29.998F	
13	0710	10		n	6	53	64	29.994F	
	1258	10		nw	7/8	56	65	29.993F	1140hrs. heavy gusts 8/9 and dust.

DATE	TIME	CLOUD	RAIN	WIND	FORCE	WET	DRY	BROM	
June 14	0700	6	11	nw	0	54	55	29.998R	
	1252	9		nnw	2	58	63	29.998S	
15	0645	2		nw	0	47	48	29.999S	
	1247	4		sw	4	57	64	29.1000R	
16	0700					33	33	29.1004S	heavy frost.
	1248	3		e	2/3	55	56	29.1004S	
17	0720	9		ene	1	48	50	29.1002F	
	1248	9		w	0	56	58	29.1000F	
18	0725	6	9	sse	0	50	50	1001S	Millabars
	1247	4		se	2	57	58	1001S	
19	0700		8			40	40	1002S	
	1247	7		ene	3	57	60	1002S	
20	0700	1		nne	3	47	48	1001F	
	1255	7		nne	4	57	65	~~1~~ 998F	
21	0718	10	21	n	5	55	55	988F	
	1255	10		nw	5	58	60	984F	
22	0700	1	24			38	40	994R	
	1248	2		s	3	52	54	994S	
23	0700	1				37	38	995F	
	1250	9		nw	2	50	54	992F	
24	0704	7		nnw	2	54	55	984F	
	1250	8		n	4	47	48	980F	
25	0730		32	nw	4	42	43	984R	
	1253	9		wnw	6/7	48	51	985S	
26	0700	3		nw	5	45	47	992F	
	1255	9		wsw	5/6	53	60	990F	
27	0714	2	7	wsw	3	42	44	992R	
	1248	7		sw	6	48	49	994R	
28	0720	4		w	5	39	40	997S	cloud level winds SSW.
	1300	5		sw	3/4	48	53	998R	
29.	0700	5		w	1	43	45	1000F	cloud level winds SSW.
	1235	9		s	1	49	54	1001R	
30	0700	8		w	1	43	44	1003R	
	1235	9		sw	1	52	57	1003S	