Standard Practices

I.E.E. 30/5/60

60-318

330001

LYELL E.Z. EXPLORATIONS

STANDARD PRACTICES

330E

000 LYELL - E.Z. - EXPLORATIONS

60-318

330002

30th May, 1960

To: Mr. G.F. Hudspeth

Standard Practices

Enclosed are the standard practices which my section of the exploration organisation have been using. Standard practices numbers 1, 2, 10 and 24 although in use are not detailed since their length would run to several pages and they are available elsewhere, their source being given in each case.

B. Smith

Chief Geologist, L.E.E.

LYELL-E.Z. EXPLORATIONS

Queenstown

STANDARD PRACTICE LIST

Number	Title	Source
1.	Standard Geological Symbols	B.M.R. Circular No. 9
2.	Pattern and letter symbols for geological maps	B.M.R. Circular No. 8
3.	Report Headings - Regional Mapping	Plate P97
4.	Quantitative Terms used in describing layered rocks	Plate P95
5.	Measurement of height using an aneroid barometer	Superceded
6.	Rock classification guide	Plate P96
7.	Testing of Geophysical Anomalies - Magnetic	Superceded
8.	Testing of Geophysical Anomalies - Electromagnetic	Superceded
9.	Field Classification of Sizes	Plate P93
10.	Abbreviations in Field and Mine Mapping	F.M. Chace, Econ. Geol. 11/1956
11.	Map Sizes and Map Scales	Plate P98
12.	Drawing Standards	Plate P61
13.	Colouring Guide for Electromagnetic Sheets	Plate P67
14.	Colouring Guide for Magnetic Sheets	Plate P68
15.	Pencil Colouring for Field Mapping	Plate P69
16.	Photo-interpretation Symbols	Plate P70
17.	Precambrian Succession	Plate P110
18.	Scale of aerial photographs at varying heights above sea-level - Gordon Area	Plate 64
19.	Closed Magnetic Survey Technique	Plates P74, P75 & P109
20.	Index to System of Sheet Numbering	Plate P94
21.	Standard Electromagnetic Plotting	Plate P91
22.	Examination of Airborne E/M Anomalies	Plate P92
23.	Report Headings on Airborne/Geological Anomalies	Plate P111
24.	Stratigraphical Nomenclature	A.J.S., Vol. 12, 4/1950, p.170
25.	Photomosaic Guide Gordon and Arthur Areas	Plate P27d

REPORT HEADINGS (SP3)

Report on Examination of ..... Area

Dates of Examination:

Party Leader:

Personnel Employed:

Man days in the Field:

Location of Base Camp or Camps:

Means of Transport and Supply:

General Topography of Area:

Geological Investigation and Findings:

General Conclusions:

COMPARISON OF QUANTITATIVE TERMS USED IN DESCRIBING LAYERED ROCKS (SP4)

330005 330

Terms to describe Stratification		Terms to describe Cross-stratification		Thickness	Terms to describe splitting property
Very thickbedded	Beds	Very thickly cross-bedded	Cross-beds	Greater than 120 c.m.	Massive
Thick-bedded		Thickly cross-bedded		120 c.m. (about 4 feet) to	Blocky
Thin-bedded		Thinly cross-bedded		60 c.m. (about 2 feet) to	Slabby
Very thin-bedded	Laminae	Very thinly cross-bedded	Cross-laminae	5 c.m. (about 2 inches) to	Flaggy
Laminated		Cross-laminated		1 c.m. (about $\frac{1}{2}$ inch) to	Shaly (claystone, siltstone) Platy (sandstone, limestone)
Thinly laminated		Thinly cross-laminated		2 m.m. (about .08 inch) or less	Papery

REFERENCE: Bull. Geol. Soc. Amer. 64.4.53

P05

ROCK CLASSIFICATION GUIDE (SP6)

(After Hatch, Wells & Pettijohn)

1. Acid "Igneous"

	Biotite	+10% Qtz.	0% Qtz.
$+\frac{2}{3}$ e/c		Alkali Syenite	
$\frac{2}{3} - \frac{1}{3}$ e/c	Alkali Granite	Qtz. - Syenite	Syenite
$\frac{1}{2} - \frac{1}{2}$ e/c	Adamellite	Monzonite	
$\frac{1}{3} - \frac{2}{3}$ plag.	Granodiorite	Qtz. Di.-Dierite	Dierite
$+\frac{2}{3}$ plag.	Tonalite		

Hornblende

Mafics Increasing ——————→

Plag. mor calcic. ——————→

2. Sedimentary

A. LUTITE

An aggregate consisting of 50%, or more, of mineral or rock grains less than 0.03" in diameter.

B. ARENITE (SANDSTONE)

An aggregate consisting of more than 50% of mineral or rock grains greater than 0.03" and less than 0.1" in size.

(a) Orthoquartzite

The chief constituent is quartz (85-90%), plus small amounts of clastic chert, felspar (up to 10%), and heavy minerals. The cement is an introduced mineral cement, either siliceous or calcareous and, rarely, ferruginous.

Such deposits are likely to appear as white or grey sandstone in outcrop.

(b) Greywacke

Composed of large, very angular, detrital grains, mainly quartz, felspar and rock fragments (chiefly chert, phyllite and slate). These grains are set in a prominent "clay" matrix which consists of a mixture of chlorite and sericite and partially replaced by carbonate. Ferromagnesian minerals are NOT necessary constituents. The whole mixture is poorly sorted

and generally greenish-black in colour.

(c) Arkose

The typical arkose consists primarily of quartz and felspar (80-98%) with lesser amounts of mica and rock fragments. The cementing material is usually calcite or iron oxides, silica is rare; typically light pink or light grey in colour.

C. RUDITE

A clastic rock composed of 10% or more of rounded fragments over 1/10th inch in size. Further defined by predominant size of particles:

Boulder Conglomerate	+10"
Cobble Conglomerate	+2½"
Pebble Conglomerate	$\frac{1}{10}$ - 2½"

Oligomictic - Conglomerates of simple composition normally but one stable rock type (typical Owen Conglomerate).

Polymictic - Conglomerates of mixed composition, normally of several unstable rock fragments (i.e. Jukes Breccia).

330008

FIELD CLASSIFICATION OF SIZES (SP9)

Very fine grained	Grains not visible by naked eye, i.e. microcrystalline cherts.	vfg.
Fine grained	Less than 2 mm. (0.08")	fng.
Medium grained	1/10th inch to 1 inch	mdg.
Coarse grained	1 inch to 2 inches	csg.
Very coarse grained	+ 2 inches	vcsg.

REFERENCE. Economic Geology, November, 1956 F. Chace

1. Map Sizes (SP 11)

"P" Plates	13" x 8"
"Q" Plates	13" x any length greater than 8"
"R" Plates	26½" x 16½"
"S" Plates	33½" x 26½"

All borders are ¼" wide, and included in sizes.

These sizes, with or without folding, will fit a foolscap report.

2. Map Scales

A.	Regional Mapping	Photo scale of 1" = 30 chn.
B.	Field Mapping around prospects	1" = 100 ft.
C.	Mine workings	1" = 40 ft.
D.	Geophysical Investigations	Photo scale or 3 x photo scale

3. Sizes of Maps for Bound Reports

Note: Binding margin in used here to denote the extra margin needed.

"P" Plates	Binding margin ¾" on top or left 13" side
"Q" Plates	Binding margin ½" on top or left 13" side
"R" Plates	Binding margin ½" on lower half of left, or left half of top, 26½" side
"S" Plates	Binding margin ¼" on lower half of left, or left half of top, 26½" side

008

DRAWING STANDARDS

330010

S.P. 12

SCALE	30 chains to 1 inch	1 mile to 1 inch	4 miles to 1 inch	8 miles to 1 inch
Roads	A4 Highway R 0.8	A4 R 0.8	A3 R 0.8	A2 R 0.5
Tracks	O 0.3	O 0.3	O 0.3	O 0.3
Rivers	A4 River Q 0.3	A4 O 0.3	A3 S HB	A2 S HB
Lakes	A4 Lake	A4	A3	A2
Coastline	R 1.0	R 1.0	R 1.0	R 0.8
Transmission Line	A4 Line A 0.16	A4 A 0.16	A3 A 0.16	A2 A 0.16
Mountains, Towns	A4 MT.	A4	A3	A2
Beach	S HB	S HB		
Bay	A4 Bay	A4	A3	A2
Point	A4 Pt.	A4	A3	A2
Railway	S HB	S HB	S HB	S HB
Fault	R 1.5	R 1.5	R 0.8	R 0.8
Fold axis	S HB	S HB	S HB	S H
Boundary	S HB	S HB	S HB	S H
Linear	S HB	S HB	S HB	S H
TITLE BLOCK				
Title	A8	A8	A5	A4
Scale	A4 Scale:	A4	A3	A2
Index	A4 INDEX	A4	A3	A2
Comments	A4 ie. mosaics	A4	A3	A2
Number	A8 x 2	A8 x 2	A8 x 2	A4
L.E.E.	A8	A8	A8	

330011

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S.P.13

AIRBORNE GEOPHYSICS

Colouring Guide for Electromagnetic Sheets

E.M. (Degrees of phase shift x 10 in 400 cps)		Coloured Pencil
36	H	2627
33		2634
30		2633
27		2626
24		2623
21		2618
18		2625
15		
12		2638
9		
6		2621
3		
	L	

LYELL-E.Z.-EXPLORATIONS

Queenstown

S.P. 14.

AIRBORNE GEOPHYSICS

Colouring Guide for Magnetic Sheets

M. (Gammas)		Coloured Pencil
7000 +	H	2625
6800		2635
6600		2636
6400		2627
6200		2634
6000		2633
5800		2626
5600		2623
5400		2623
5200		2618
5100		2618
5000		2625
4900		2620
4800		2624
4700		2638
4600		2637
4500		2621
4400		2628
4300		2640
	L	

911

330013

LYELL-E.Z.-EXPLORATIONS

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S.P. 15

FIELD MAPPING - PENCIL COLOURING

Rock Type	Colour
Tertiary Tmac, Q, R.	2621
Devonian Db.	2624
Silurian S.	2632
Gordon Limestone Og.	2628
Caroline Ck. Sandstone Oc.	2638
Owen Conglomerate Oo.	2637
Cambrian, Dundas Group ϵ.	2625
Pre Cambrian pϵ.	2639
Granite	2618
Basic Igneous Jdl.	2635
Undifferentiated Slates	2634
Undifferentiated Quartzites	2620
Undifferentiated Calcareous Sediments	2640

SYMBOLS TO BE USED IN MAPPING

Silurian:	Florence Quartzites	Sf
	Keel Quartzites	Sk
	Amber Shales	Sa
	Crotty Quartzites	Sc
Pre Cambrian:	Carbine Group	Pc
	Jane Dolomite	Pj
	Scotchfire Schists	Psc
	Fincham Group	Pf
	Franklin Group	Pfe
	Frenchman Quartzites	Pfr
	Joyce Schists	Pjc

Tertiary Basalt	2636
Permian/Triassic	2619

P 69

012

330014

LYELL-E.Z.-EXPLORATIONS

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S.P. 16

PHOTO INTERPRETATION SYMBOLS

	Coloured Pencil	
Faults	2618	
Syncline	2620	
Anticline	2625	
Bedding	2623	
Joints	2633	
Linear	2638	
Dip 0 - 15°	2623	
15 - 45°	2623	
45° +	2623	
Lithological Boundary	2623	

THE PRECAMBRIAN SUCCESSION

Compiled from N.E.C. Reports

(S.P. 17)

Carbine Groups:

2000 ft. — Tillite, quartzite, phyllites, argillites, graphitic slates.

Jane Dolomite (pj):

3000 ft. — Dolomite valleys free from timber; massive variable grain size, obscure bedding.

Scotchfire Schists (PSc):

1500 ft. — Pale brown to red, purple, pale green, fine grained, micaceous, laminae of muscovite, tourmaline needles, chlorite. I/bedded thin dolomite bands, sometimes silicified to white, grey or black chert. Also thin quartzites and calcareous schists.

Fincham Quartzites (Pf):

2500 ft. — Pure white quartzites, fine grained, massive to schistose, ripple marks, white, grey and green schists.

Franklin Schists:

Basal 10,000 ft.

Schists: Dark grey, fine grained, lustrous, schistose, muscovite, quartz, biotite, garnet.

Raglan Quartzite: White to pale grey, bedded to laminated, tourmaline needles, lineation, isoclinal folds (2'-200').

Haulage Schist and Quartzite: As above, rich in knotted garnet schists.

Cardigan Schists: Light coloured, schistose, muscovite, 5 mm., albite (2/10") porphyroblasts. Gneisses.

Frenchman Quartzites (Mary Group)(Pfr):

Quartz Schists: White, light grey to yellow, phyllitic to massive schistose, characteristically platy appearance, cross bedding and ripple marks.

Massive Quartzite: White, rusty brown, clastic texture, distinct lineation.

Phyllites: Light to dark grey, fine grained, soft, lustrous, strong cleavage, bedding poorly developed, crenulate.

Joyce Schists (Pjc):

5000 + ft.

Garnet-mica Schists: Grey, medium grained, schistose, muscovite, quartz, garnet porphyroblasts (resemble Franklin Schists).

Muscovite Quartzite: White, thinly bedded to laminated, schistosity parallel to bedding.

Pyroxene-amphibolite: Heavy, dark green medium grained, granular, greasy lustre, actinolite, garnet porphyroblasts, sometimes even texture.

Diopside-amphibolite:

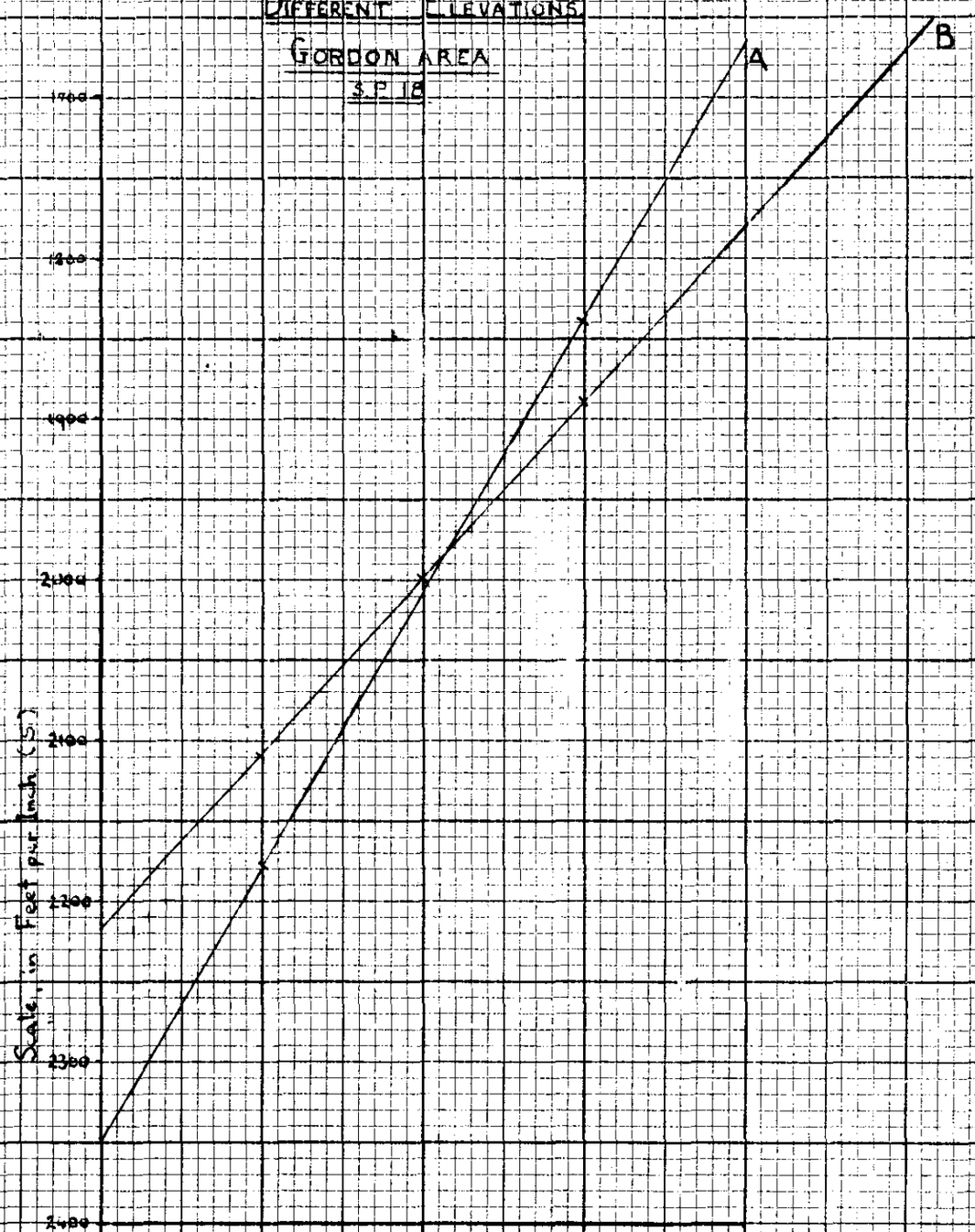
330016

311

Scales of Aerial Photographs at Different Elevations

Gordon Area

S.P. 18



A. Photos taken at 14,050 ft. B. Photos taken at 18,500 ft.

$$S = \frac{F''}{(H-h)''}$$

5 cm

215

CLOSED MAGNETIC SURVEY TECHNIQUE - STANDARD PRACTICE 19

1. Purpose

The purpose of this type of survey is to secure the maximum degree of accuracy from the instrument. It is important that every care is taken in positioning the instrument and in taking the readings.

2. Procedure "A" (Plate P74)

The principle of the method is to establish a series of check points at which the instrument is read at hourly intervals (the maximum time without checking is 1½ hours). The operator must determine how many readings he can take in an hour.

Field procedure is shown on the diagram A:

Assume a series of lines (N-S) 300' apart each 2000' long. A base line (E-W) is cut at the south end of the lines.

(For operator reading 20 stations in an hour.)

1. First read 5 base line stations (Line 0 - 12E).
2. Return to line 0, Base Line station and read again.
3. Read the first 10 stations on line 0.
4. Cross E to 1000N on line 3E and read station.
5. Return, reading stations en route, to Base Line in 3E. 20 stations have now been read - check in to 0, Base Line - 0 Station.
6. Proceed to 6E on B.L.
7. Read to 1000N line 6E - cross to 1000N line 9E.
8. Read to B.L. in 9E and check in to 6E.

This method is continued until the first 1000 feet on all lines have been read.

To read the stations from 1000N to 2000N, the same procedure is followed using the stations at 1000N as checks.

NOTE At the beginning and end of each day's work, it is essential to check in to a station established on the original Base Line.

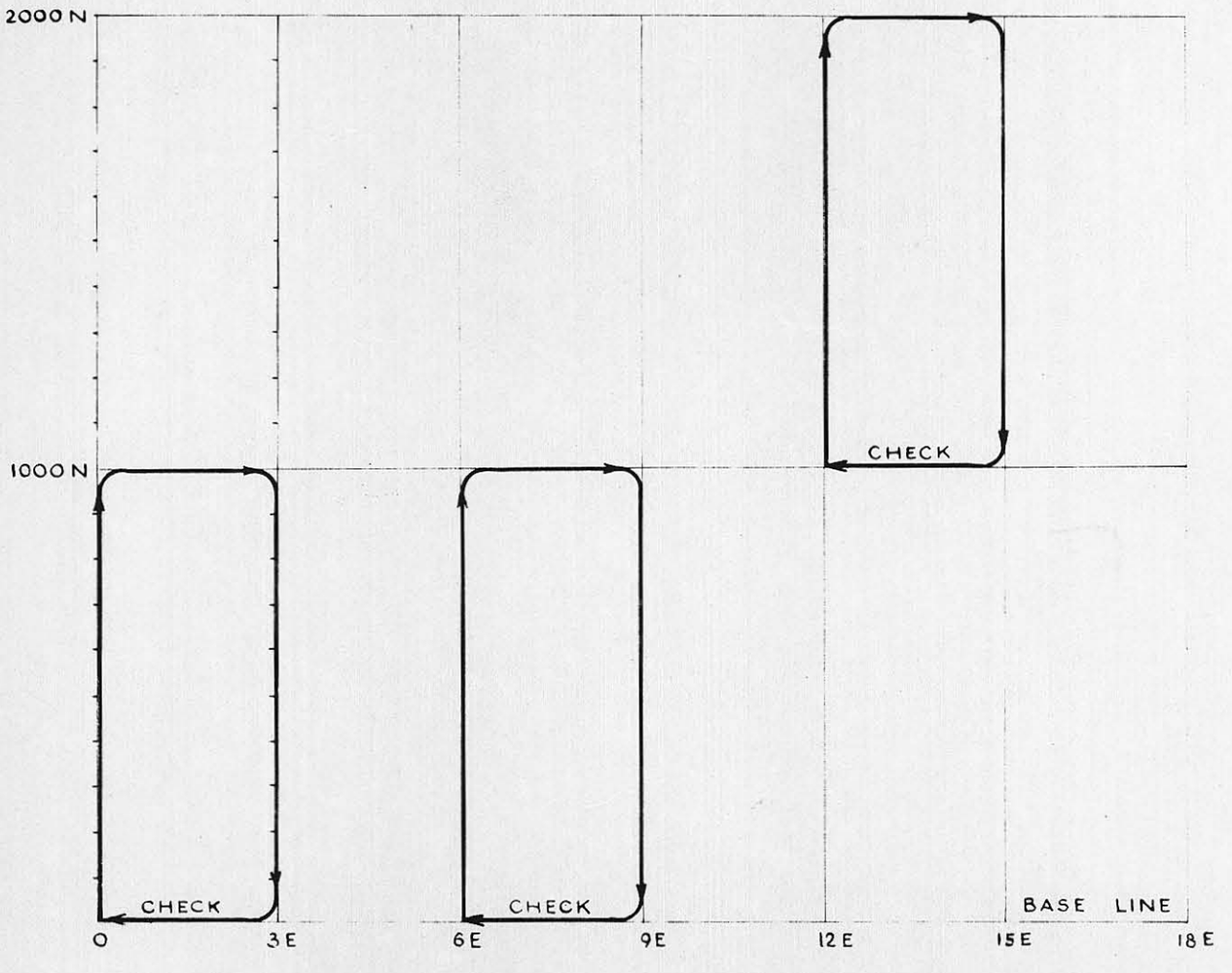
"B" Alternative procedure to be used when the lines cut are excessively long (Plate P75)

Basically the method is the same. The Base Line checks are first established.

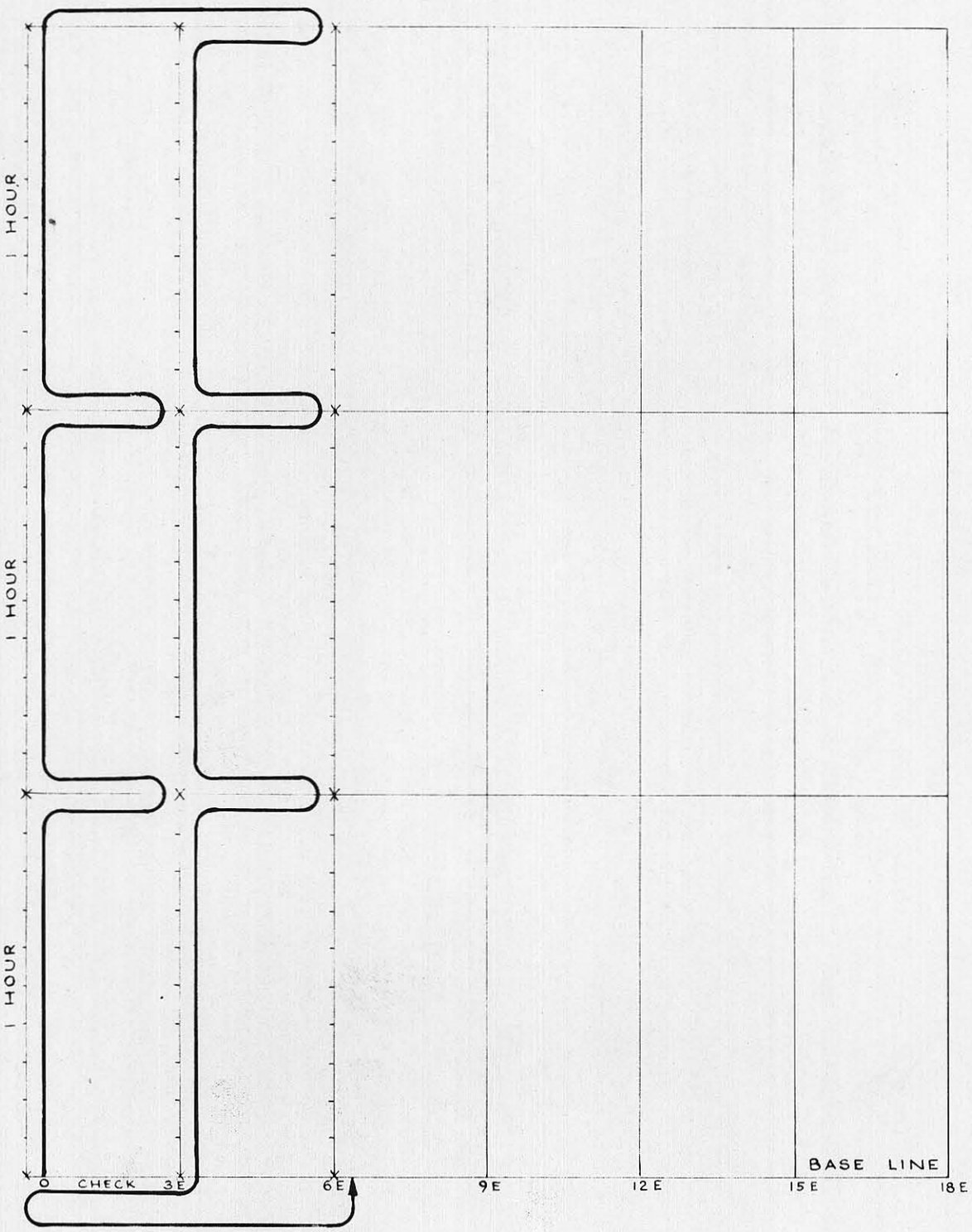
Now, instead of running short (1000') closed loops, the whole line may be read at once, excepting that at each hour the operator must make a traverse to the next line to establish a check point which is read again during the operator's return. This procedure is repeated for each line. See diagram B.

NOTE Method B is obviously not as accurate as method A, but the check points can be rechecked separately in the case of very long lines, although of course "A" is still superior.

METHOD "A"



METHOD "B"



INDEX TO SYSTEM OF SHEET NUMBERING (SP20)

Each anomaly has a plan number (e.g. Q21, S7). This is divided into sheets.

1. Geology and Surveying.
2. Geochemistry.
3. Magnetics.
4. Bouguer Gravity.
4a. Structural Interpretation from Gravity.
5. Self Potential.
6. Slingram - out of phase.
7. Slingram - in phase.
8. Turam - phase.
9. Turam - ratio.
10. Vertical Coil.
11. R.E.M.
12. Afmag.
13. Induced Polarisation.
14. Seismic Refraction.
15. Dip Circle.
16. Diamond Drilling.

E.G. Q26/3 is magnetic investigation of anomaly 24/1S.

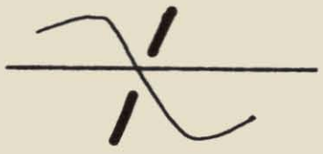
NOTE: Plan number has no relationship to anomaly number.

019

STANDARD ELECTROMAGNETIC PLOTTING (SP21)

1000 c.p.s. ——————————

5000 c.p.s. - - - - - - - - - - -

Definite conductor 

Probable conductor ●

Possible conductor ○

Electromagnetic axis on plan ▬ ▬ ▬

Transmitter position ⊠

Plotting Convention

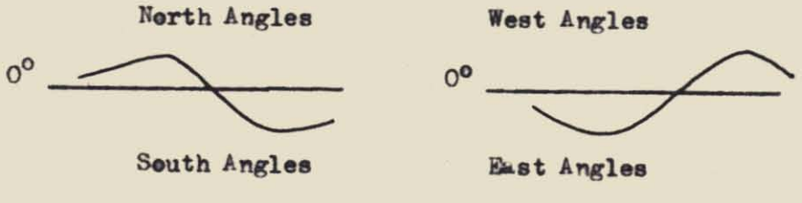
The direction of dip is the direction in which the top of the receiver is facing.

Dip angles are plotted in profile.

North and West angles are plotted above the line.

South and East angles are plotted below the line.

A crossover is from left to right from above to below the line in all cases.



CROSSOVER ANTICROSSOVER

EXAMINATION OF AIRBORNE ELECTROMAGNETIC ANOMALIES (SP22)

1. The axis of the conductor can first be established by an in-line traverse with the R.E.M. instrument, 100 feet instrument separation.

2. Normally three traverse lines 400 feet apart are placed at right angles to the trend of the anomaly. The lines are usually 1500 to 2000 feet in length, pegged every 100 feet horizontal distance.

3. Using the set-up technique, with readings every 100 feet only a maximum of 9 stations can be read with the R.E.M. unit (i.e. transmitter at 14N/10E, receiver at 18N/6E to 18N/14E). Using the big loop all 21 stations on the line 14N could be covered, if required.

4. Orientation between transmitter and receiver is maintained by the orientating board.

Orientation between the receiver and transmitter is maintained by holding the receiver horizontally and sweeping it in a horizontal plane until maximum signal is achieved.

5. The transmitter is normally run for one minute, then two minutes are allowed for the receiver operator to walk the 100 feet to the next station and the cycle is repeated. However, these time intervals vary and depend upon the terrain, operators and the working efficiency of the instruments and must be decided by the personnel at the anomaly location.

6. The dip angles are plotted as laid out in SP21, on a vertical scale of 1 inch equals 10 degrees of tilt and a vertical scale of 1 inch equals 200 feet.

330023

REPORTS ON AIRBORNE/GEOLOGICAL ANOMALIES (SP23)

Where applicable, reports on these anomalies will consists of three parts:

I. Geology

1. Topography

2. Geology:

   a. Lithology
   b. Structure
   c. Mineralisation

II. Geophysics

Ground Geophysics

III. Geochemistry

GEOLOGY SECTION

1. Dates of Investigation

   Preparation + Geological
   Preparation + Geological + Geophysical
   } whichever applies

2. Man Days in Field

   Personnel

3. Location

   Geographical, within photograph such and such, on flight line ?? near fiduciary point ??

4. Topography

5. Geology

   A. Lithology

   B. Structure - check with geophysical results

   C. Mineralisation

6. Conclusions and Summary

GEOCHEMISTRY SECTION

1. Samples and Lot Numbers

   As above, analysed for ??

2. General Comments

3. Conclusions

Reports on regional mapping projects follow SP3

PLATE 1.

022

60-318
330024

SOUTH-WEST TASMANIA

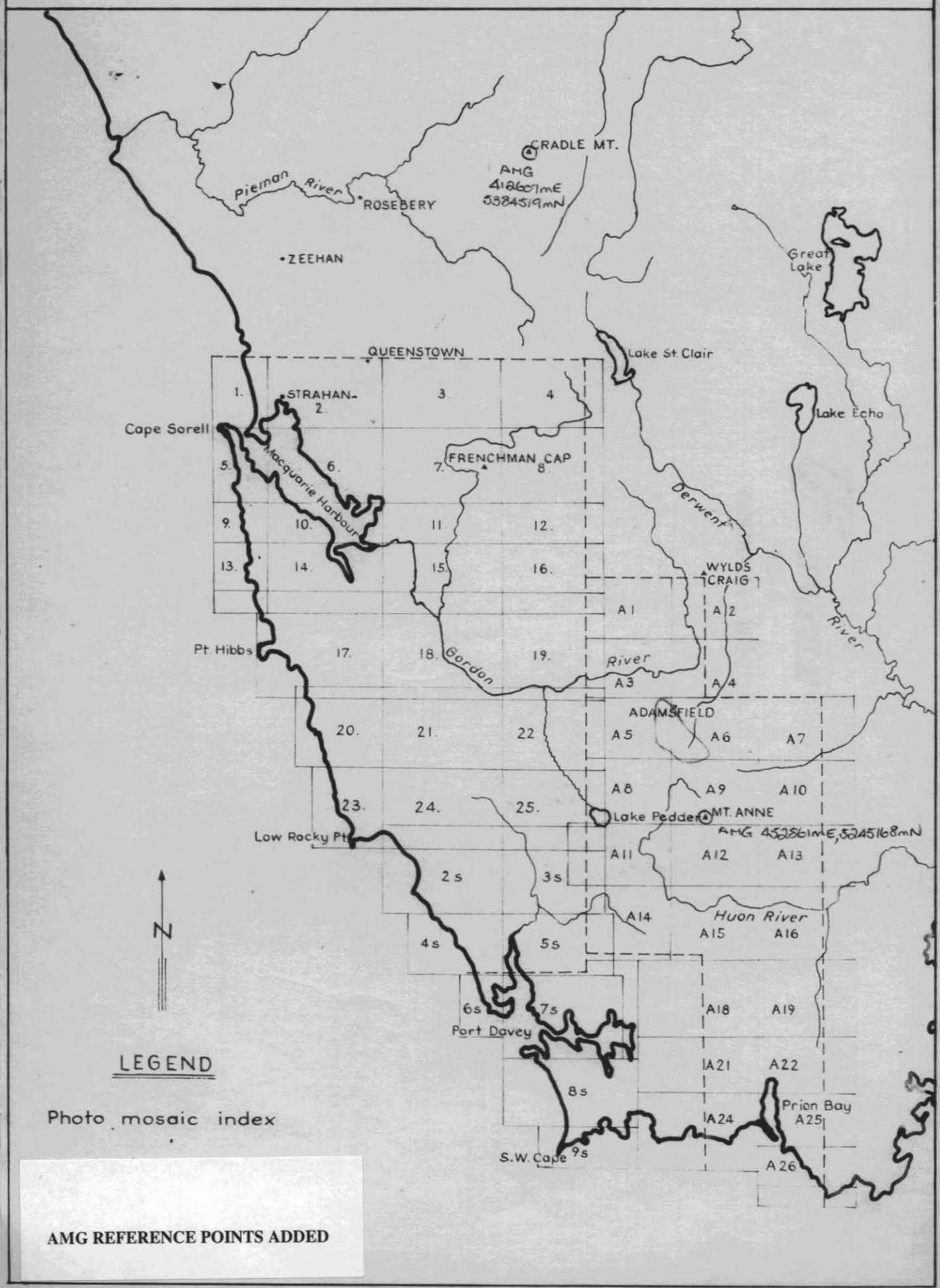
SP 25

SCALE

16 miles to 1 inch

8 4 0 8 16 24 32

5 cm



LEGEND

Photo mosaic index

AMG REFERENCE POINTS ADDED

P 27d