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NATIONAL ENERGY AUTHORITY

SURVEYING FOR MAPPING IN SCALE 1:20.000 NEAR TUNGNAFELLSJÖKULL

Gunnar Thorbergsson

OS82103/VOD45 B December 1982

NATIONAL ENERGY AUTHORITY
Hydro Energy Division

Surveying report

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Ágrip (Summary in Icelandic)

Niðurstöður landmælinga norðan og austan Tungnafellsjökuls sumarið 1982 eru gefnar. Mælingarnar nægja til að hægt sé að kortleggja allt að 900 ferkílómetra svæði með 5 metra hæðarlínum í mælikvarða 1:20.000.

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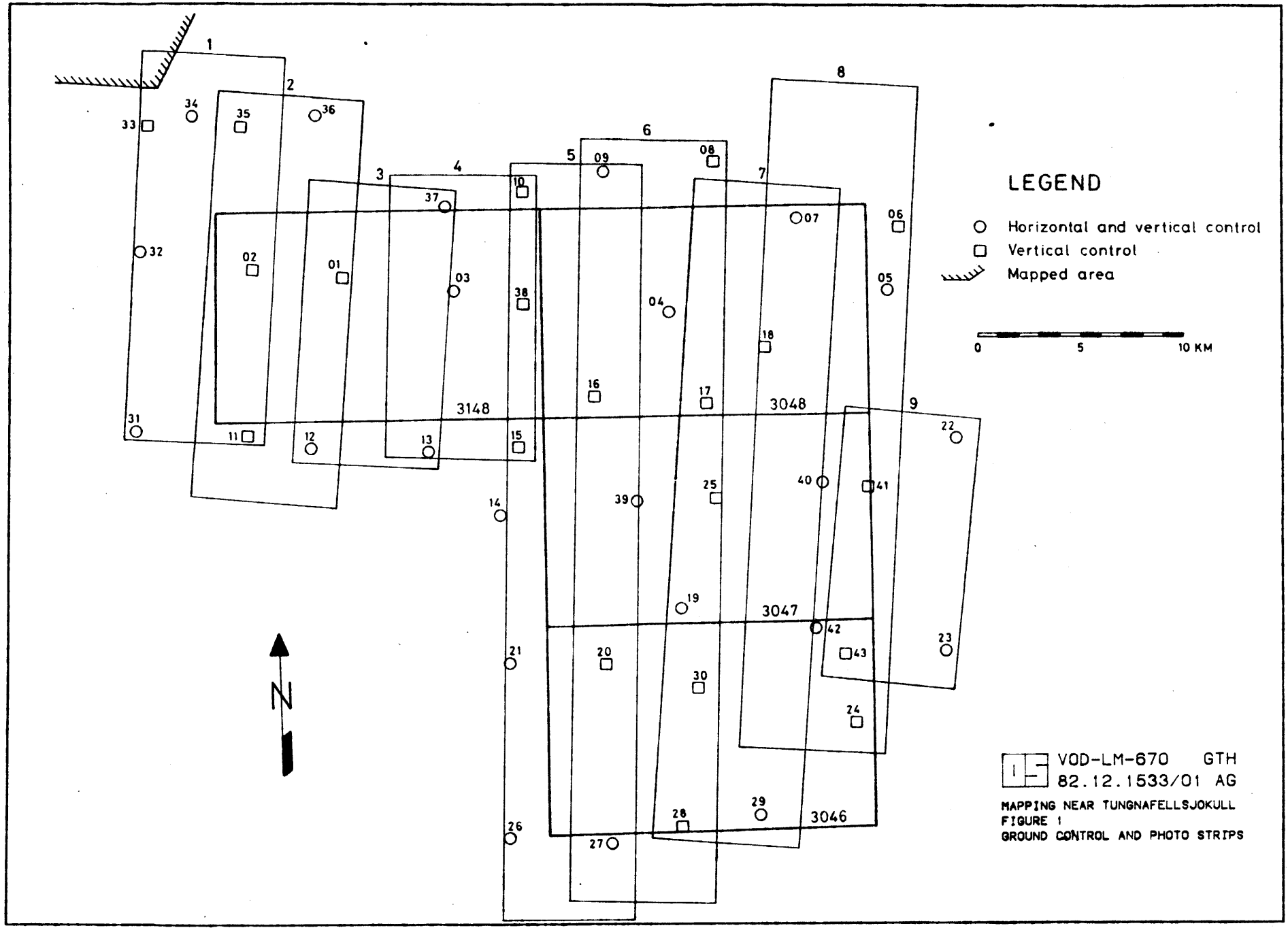

LEGEND
Horizontal and vertical control
Vertical control
Mapped area
0
5
10 KM
N
3148
3048
3047
3046
VOD-LM-670 GTH
82.12.1533/01 AG
MAPPING NEAR TUNGNAFELLSJOKULL
FIGURE 1
GROUND CONTROL AND PHOTO STRIPS

Table 1 Ground control

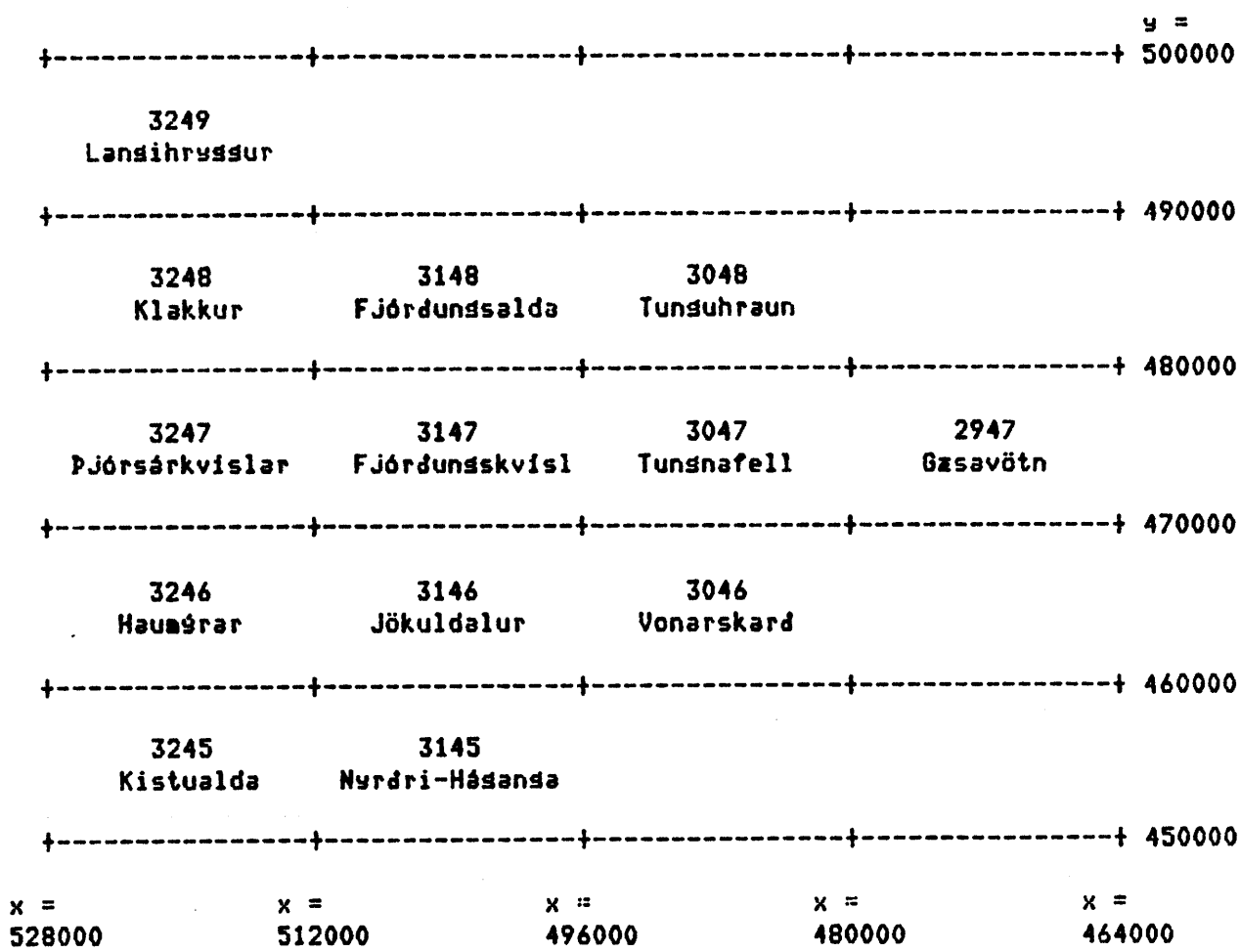
x-west	y-north	Elev.	Name
		770.84	HM01
		756.92	HM02
500399.12	486144.70	958.04	LH03
489799.82	484776.68	831.64	LH04
479022.00	485829.70	794.61	LH05
		780.97	HM06
483736.14	489297.66	765.61	LH07
		748.92	HM08
493374.04	491247.82	730.84	LH09
		757.80	HM10
		716.45	HM11
507073.99	478957.40	746.74	HM12
507053.68	478984.31	745.67	LM12
501449.33	478708.33	813.58	LH13
498100.69	476074.54	881.33	LH14
		826.17	HM15
		824.90	HM16
		829.58	HM17
		765.97	HM18
489441.80	470711.23	1267.84	LH19
		1179.79	HM20
497588.04	467979.77	1346.89	LH21
475639.90	478288.51	979.05	LH22
476910.71	469012.33	1319.86	LH23
		1239.81	HM24
		1178.90	HM25
497844.35	460082.81	993.00	LH26
497841.54	460080.26	993.00	LM26
492850.92	459544.42	958.72	LH27
		990.64	HM28
484525.20	461304.57	1254.48	LH29
		930.21	HM30
515891.85	478971.41	702.55	LH31
		777.57	HM32
515884.18	487149.50	780.21	LM32
		774.34	HM33
513042.53	494645.62	840.16	LH34
		843.31	HM35
506923.26	494588.93	897.39	LH36
501005.77	490106.18	791.97	LH37
		771.81	HM38
491480.98	476052.42	1391.3	LH39
482410.77	476811.77	910.91	LH40
		865.69	HM41
483244.19	469980.28	1164.87	LH42
		1007.27	HM43

Sketches of ground control

The sketches are on pages 13-34. A photo number is given on a sketch. Assuming that this photo is held so that its number is in the upper left hand corner, the distances in mm from the lower edge and the right hand edge to the ground control point are given on the sketch. The ground control points were marked on the photos used in the field.

Map sheets

The area to be mapped will not be specified here. The whole sheets 3046, 3047, 3048 and 3148 can be mapped and parts of sheets 2947, 3248 and 3249. Part of sheet 3249 had been mapped previously (as well as part of sheet 3246 which is some distance away from the survey area). The number and names of these and adjacent sheets are shown below.



Permanent points on map

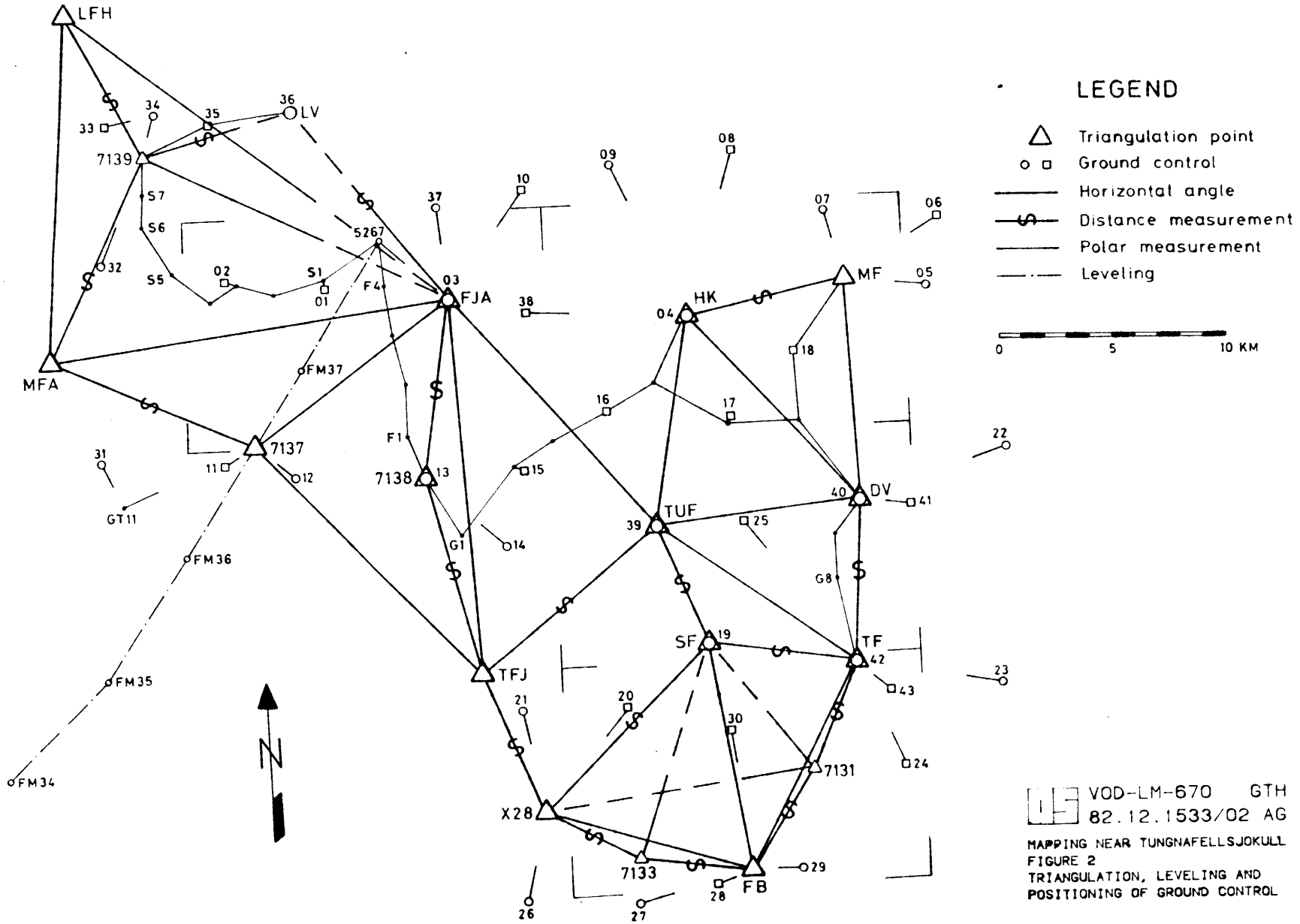
Triangulation points marked *1B, *2B or *3B in Table 2 should be put on the map if they fall within the mapped area. Such a point should be indicaded with a triangle or a double circle and the point number (not name) written nearby. Points 7136, ST36 and 5269 should be indicated by a single circle and the number written nearby, excert that the name ST36 must be used.

Table 2 Triangulation points and bench marks

x-west	y-north	Elev.	Name	Note	Number	Description	Done by whom
499325.7	470621.4	1536.1	TFJ	*1BV	2006	TUNGNAFELLSJOKULL	LI56 OS82
491480.98	476052.42	1391.3	TUF	*2BV	2044	TUNGNAFELL	LI56OS76OS82
517009.86	499241.33	987.6	LFH	*3B	5308	LAUGAFELLSHNUKUR	OS69OS76OS82
500314.67	486100.67	967.6	FJA	*2B	5309	FJORDUNGSALDA	OS69OS76OS82
518269.90	484036.23	849.0	MFA	*2B	5582	MIKLAFELL AUSTAN	OS74OS76OS82
496751.34	463993.98	1275.13	7128	*3B	7128	SNAPADALUR VESTAN	OS82OS82OS82
496734.93	464000.41	1275.59	X28	*3H		SIGNAL VID 7128	OS82OS82OS82
489444.64	470704.88	1268.46	SF	*3B	7129	STAKFELL	OS82OS82OS82
483360.14	469995.94	1163.79	TF	*3B	7130	TINDAFELL VESTAST	OS82OS82OS82
485135.25	465200.31	1216.92	7131	*3B	7131	INNSTA-BALKAFELL	OS82OS82OS82
487493.59	461219.32	1153.92	FB	*3B	7132	FREMSTA-BALKAFELL	OS82OS82OS82
492571.83	461639.83	955.93	7133	*3B	7133	KALDAKVISL VESTAN	OS82OS82OS82
482446.30	476767.16	913.61	DV	*3B	7134	DVERGALDA NORDAUSTAN	OS82OS82OS82
482721.06	485711.75	843.37	MF	*3B	7135	MARTEINSFLÆDA AUSTAN	OS82OS82OS82
489850.28	485030.11	852.95	HK	*3H	7136	HRAUNKVISLAR AUSTAN	OS82OS82OS82
509100.98	480108.56	749.40	7137	*3BF	7137	SPRENGISANDSVEGUR	OS82OS82OS82
501449.33	478708.33	813.98	7138	*3B	7138	TOMASARHAGI NORDAN	OS82OS82OS82
513659.58	492892.63	835.15	7139	*3B	7139	HAGLDUR SYDST	OS82OS82OS82
506963.27	494481.52	907.03	ST36	*4R		MERKTUR AF LANDSVIRKJUN	OS82OS82OS82
503163.51	488226.35	758.33	5267	*5BF	5267	FJORDUNGSVATN VESTAN	OS82OS82OS82

Results of adjustment

The coordinates of 13 triangulation points (Figure 2) were obtained by adjustment holding points TFJ, TUF, LFH, FJA and MFA fixed. The mean error in direction (half angle) was 2.7 seconds (8.4 cc) and the largest residues (as seen from a computer print-out not given here) are due to discrepancies between the present triangulation and the previous triangulation by OS in 1976 (when less accurate instruments for distance measurements were used). The residues of distances are within 0.2 m. The computed mean error in elevations is within 0.12 m. These results are sufficent for present purposes.



VOD-LM-670 GTH
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MAPPING NEAR TUNGNAFELLSJOKULL
FIGURE 2
TRIANGULATION, LEVELING AND
POSITIONING OF GROUND CONTROL

Surveying

The field work was started in the middle of July 1982. A helicopter, Hughes 300C, was used to transport the surveyors between stations. Because of strong southwesterly winds and sandstorms the helicopter was held up and then became inoperative for a few days. The field work was resumed in the middle of August and took in all about three weeks.

Table 3 — Horizontal angles

TFJ 71377138 346048.FJA 469012.TUF 1124356.X28 2272475.	999336241981
7138FJA TFJ 1739546.	
SF TF FB 797016.X28 1452789.	
FB X28 SF 684765.TF 1094113.	
FB 7133X28 133501.	
FB TF 7131 60263.	
HK MF DV 595555.TUF 1175069.	
TUF FJA HK 573502.DV 1408693.TF 1866851.SF 2227171.TFJ 3073485.	999218120418
X28 TFJ SF 764076.FB 1423539.71331565828.	
7133X28 SF 883094.FB 1724219.	
SF X28 TUF 1241726.	
TF 7131FB 54511.SF 848155.TUF 1182257.DV 1859709.	
7131FB X28 593904.SF 1236676.TF 1885218.	
DV TF TUF 864337.HK 1449463.MF 1895046.	
FJA TUF TFJ 418476.7138 556052.71371078051.MFA 1386214.ST362032150.	
7137MFA FJA 1361320.TFJ 2232827.	
7139LFH ST361160814.FJA 1608844.MFA 2614699.	
MFA LFH 7139 252927.FJA 874406.71371204867.	999114841036
LFH FJA 7139 266363.MFA 628141.	
MF DV HK 958863.	

Table 4 — Distance measurements

TFJ 7137TUF	9541113	34	144.	163.	+++836241981
TFJ 7137X28	7119376	26	144.	144.	+++836241981
TFJ 71377138	8390111	30	144.	132.	+++836241981
SF SF TUF	5724607	22	123.	163.	+++5
SF SF X28	9906250	35	119.	125.	+++5
SF SF TF	6127668	23	119.	134.	+++5
DV DV TF	6838228	26	130.	134.	+++5
71337133FB	5100228	20	110.	143.	+++5
71317131FB	4628305	19	125.	148.	+++5
MFA FJA 7137	9976638	37	137.	137.	+++918791291
71337133X28	4797214	19	125.	141.	+++5
71387138FJA	7481463	27	138.	158.	+++5
ST36ST36FJA	10699479	37	122.	068.	+++5
MFA LFH 7139	9987228	35	147.	131.	+++614841036
ST36ST367139	6883538	26	131.	115.	+++5
71397139LFH	7181021	27	115.	133.	+++5
TF TF 7131	5114779	20	131.	140.	+++5
HK HK MF	7162680	26	130.	152.	+++5

Table 5 Vertical angles

SF	123	TUF	154 986562.
SF	119	X28	200 999908.
SF	119	TF	1461011101.
DV	130	TF	065 977083.
7133	110	FB	154 975444.
7131	125	FB	1601008829.
MFA	137	7137	1361006786.
7133	125	X28	154 957712.
TUF	140	SF	1311013942.
X28	116	SF	1271000866.
TF	138	SF	127 989390.
TF	138	DV	1381023606.
FB	147	7133	1181024984.
FB	153	7131	133 991564.
7137	129	MFA	180 994040.
X28	147	7133	1341042678.
7139	115	LFH	068 986830.
TF	131	7131	157 993583.
HK	130	MF	1651001133.
LFH	133	7139	0061013930.
7131	150	TF	1391006854.
MF	158	HK	138 999469.

Table 6 Trigonometric leveling

7138	G1	291724.		143	133	057	992684.	0681007911..
G1	G2	263091.	147	137	150	0591003816.	056	996913..
G2	G3	214551.	149	139	147	064	994526.	0621006191..
G2	HM15	24548.		139	140	1401021932.		.
G3	HM16	292506.	137	147	134	0591006777.	066	993963..
HM16	G4	256545.	144	134	154	060	991864.	0591008796..
G4	G5	371242.	144	154	122	0391002983.	060	997677..
G5	HM17	13648.		122	140	1401065420.		.
G5	G6	326148.	132	122	133	064	996888.	0391003738..
G6	HM18	293960.	123	133	135	0651020906.	064	979693..
G6	DV	434834.	123	133	139	066	992631.	0641008007..
DV	G7	134293.	148	139	134	061	991768.	0641009119..
G7	G8	183838.	125	134	135	0611008482.	060	992268..
7138	F1	167847.	133	143	138	0591004311.	062	996450..
F1	F2	249465.	148	138	153	0641005417.	059	995237..
F2	F3	198313.	143	153	127	0591001425.	064	999284..
F3	F4	192498.	137	127	157	0651005643.	059	995064..
F4	5267	175084.	147	157	120	0621002593.	065	998136..
5267	S1	295122.	130	140	136	061	994976.	0631005627..
S1	S2	195889.	146	136	160	066	999818.	0611000923..
S2	S3	190146.	150	160	133	0571009094.	066	991655..
S3	S4	171536.	143	133	150	066	994414.	0571006339..
S4	S5	191543.	140	150	138	062	998616.	0681002100..
S5	S6	231980.	148	138	153	0641000708.	062	999968..
S6	S7	145634.	143	153	135	0661006160.	064	994682..
S7	7139	158680.	144	135	120	063	972422.	0661028232..
7139	HM35	335902.	111	120	144	067	998707.	0621001854..
HM35	ST36	363243.	147	152	131	058	989166.	0641011455..
TF	G8	421529.	142	131	155	0681038863.	139	961642..
MF	HM18	344889.	148	158	149	1571014457.	165	985841..

A triangulation involving 18 points (Figure 2) was carried out using Wild-T2 theodolites for measuring horizontal angles (Table 3) and Geodimeter 14A for distance measurements (Table 4). Vertical angles were measured simultaneously between stations (Tables 5, 6, 7 and 8).

A leveling line was run into the western part of the survey area (near Fjordungsvatn) from the south. Trigonometric leveling with distance measurements and simultaneous observation of reciprocal angles was used to obtain elevations in the east part of the survey area (Table 6). Positioning of ground control was done by polar (or radial) measurements and simultaneous observation of vertical angles (Table 7). The data in the tables is used directly as computer input. For explanation see report OS79006/ROD03.

Table 7 Positioning of ground control

5267	S1	295118.	138	137	120	063	995085.	0631005710..
S1	S2	195890.		120	156	067	999805.	0611000971..
S1	HM01	25915.		120	070	0701031215.		.
S2	HM02	199882.		156	149	1581008974.	162	991290..
7137	HM11	153452.	126	132	146	0601014043.	040	986842..
7137FJA	HM12 709846.	233133.		127	152	1601000769.	060	999655..
HM127137	LH121082614.	3380.		152	020	0201044874.		.
SF TF	LH193194114.	696.		123	185	1851000000.		.
TF	HM25	734726.	134	138	122	130	999004.	1461001595..
FB X28	LH273621003.	561725.	148	153	173	1821022350.	160	978144..
FB	HM28	136809.	155	153	139	1471076270.	160	923816..
FB TF	LH29 701515.	297183.	148	153	180	189	978513.	1601021725..
FB	HM30	544879.	137	142	121	1291026392.	149	974054..
7137MFA	GT113433957.	543312.	123	129	113	1211002163.	136	998346..
GT117137	LH312698124.	242401.	103	113	090	0901008229.		.
ST36FJA	LH362653942.	11503.		149	162	1621052700.		.
HK	G4	310393.	147	153	134	143	998920.	1601001317..
HK	HM38	734030.	147	153	135	1441007364.	160	993259..
HK MF	LH092732444.	714872.	147	153	143	1521011229.	063	989550..
HK	HM08	732215.	147	153	126	1351009410.	063	991359..
HK MF	LH04 935558.	25933.	153	153	137	1371052787.	153	947239..
X28 TFJ	71282999575.	17625		147	193	1931000000.		.
X28 TFJ	LH21 103001.	407118.	141	147	136	145	989043.	1541011311..
X28	ST20	559927.	141	147	140	1491010845.	154	989635..
ST20	HM20	10106.		140	140	1401016352.		.
X28 TFJ	LH262413131.	408210.	141	147	139	1481044288.	157	956049..
LH26X28	LH261294037.	380.		139	139	1391000000.		.
FJA TUF	LH031765047.	9566.		088	164		088	941339..
7138FJA	LH13 0.	01		138	178	1781000000.		.
FJA TFJ	52671448715.	356114.	144	150	114	1231037644.	157	962659..
FJA TUF	ST372350659.	406802.	144	150	146	0671027810.	066	972819..
ST37FJA	LH371292620.	230.		146	146	1461000000.		.
FJA	HM10	574555.	158	150	126	0531023635.	066	977091..
DV TUF	LH401478488.	5710.		139	140	1401029950.		.
DV	G7	134293.	148	139	134	061	991768.	0641009119..
G7	G8	183838.	125	134	135	0611008482.	060	992268..
7138FJA	LH141327330.	426138.	133	143	154	071	990224.	0681010369..
7139LFH	ST34 498512.	189617.	111	120	126	060	996787.	0631003813..
ST347139	LH343301674.	8573.		126	100	1001042355.		.
7139	HM35	335902.	111	120	144	067	998707.	0621001854..
HM35	ST36	363243.	147	152	131	058	989166.	0641011455..
ST34	HM33	201354.	135	145	143	0601022889.	062	977810..
7139MFA	ST323917521.	623166.	108	114	134	0641005615.	063	995060..

```
ST327139LM323352331.      13870.      134 050 0501018432.           .
ST32     HM32             11625.      134 120 1201032653.           .
TF       G8              421529. 142 131 155 0681038863. 139 961642..
TF  7131LH422859796.      11702.      131 080 080 996883.           .
TF       TF1              49586. 137 131 159 159 977686. 1311022387..
DV       HM41            214905.      151 139 1471014320. 158 985857..
DV  TF   LH222774605.     697565.      151 127 135 994342. 1581006244..
TF  DV   ST231011592.     656965. 142 152 150 158 984529. 1591016033..
ST23TF   LH23  98193.       4339.      150 180 1801090998.           .
TF1      HM24             488832. 152 162 195 203 992473. 1691007901..
TF1      TF2               52801. 159 149 147 1471013938. 149 986133..
TF2      HM43             166266. 137 147 140 1481062246. 147 937862..
MF       HM18             344889. 148 158 149 1571014457. 165 985841..
MF  HK   ST07 900518.     370551. 152 158 150 1581012373. 165 987935..
ST07MF   LH071147618.       9321.      150 100 1001049343.           .
MF       HM06             501060. 152 158 150 1581008148. 165 992272..
MF  HK   ST052041450.     369881. 152 158 144 1521008567. 165 991735..
ST05MF   LH051282167.        680.      144 144 1441000000.           .
```

Table 8 — Various polar measurements

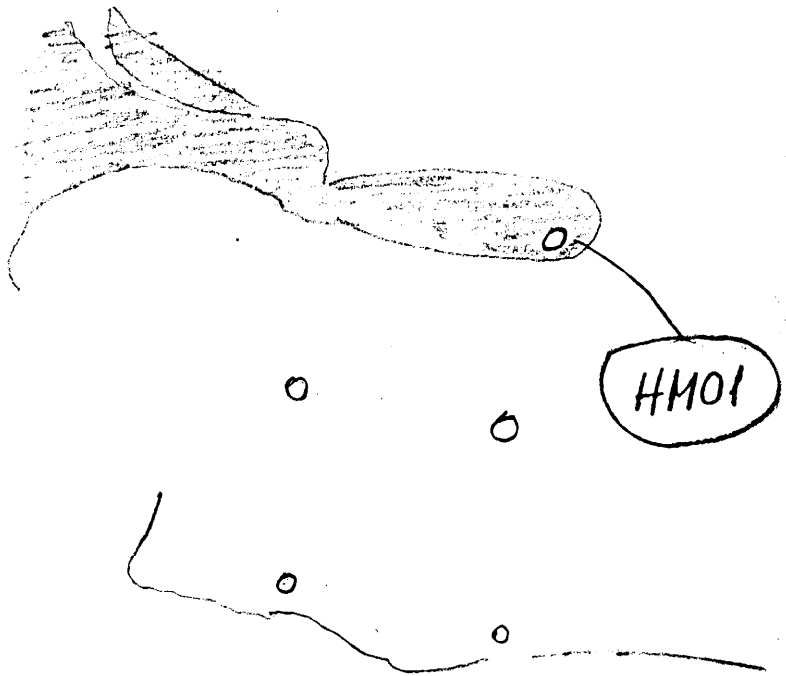
```
TFJ 7137TUF 1124356.    9541113 111 144 130 1501010085. 175 990752..268148 413.
TFJ 7137X28 2272475.    7119376     144 149 1641023589. 192 976983..268148 413.
TFJ 71377138 346048.    8390111     144 138 0661055277. 149 945468..268148 413.
LFH     7139            718102. 133 133 115 0061013930. 068 986830..
7139LFH ST361160814.    688354.           9999  83500.9999  90700..
```

Table 9 — Measured height differences

SF	TUF	122.87	0.031
SF	X28	7.10	0.010
SF	TF	-104.65	0.027
DV	TF	250.10	0.021
7133	FB	198.00	0.039
7131	FB	-63.02	0.047
MFA	7137	-99.60	0.010
7133	X28	319.64	0.044
LFH	7139	-152.42	0.019
7131	TF	-53.12	0.038
MF	HK	9.64	0.019
7138	G4	44.93	0.028
G4	G6	2.16	0.041
G6	MF	-17.73	0.049
G6	DV	52.47	0.053
DV	TF	250.18	0.044
7138	5267	-55.65	0.051
5267	7139	76.82	0.030
7139	ST36	71.88	0.041
TFJ	TUF	-144.67	0.011
TFJ	X28	-260.43	0.020
TFJ	7138	-722.26	0.007
HK	G4	6.02	0.104
5267	FJA	209.26	0.079

HM01

10240-077-159



2 m north of outcrop on flat sands

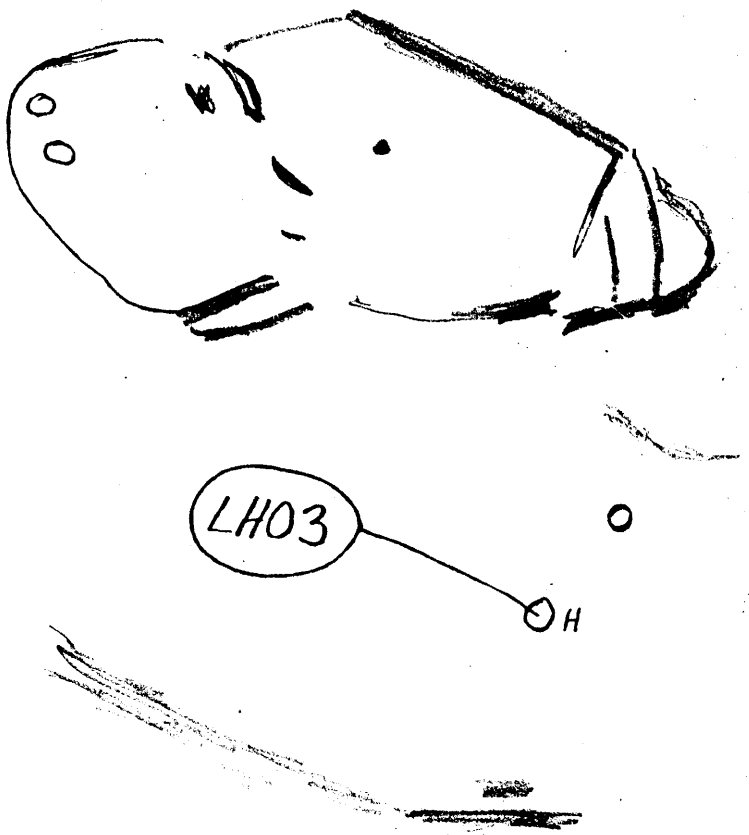
HM02

10202-078-098

2 m east of large boulder

LH03

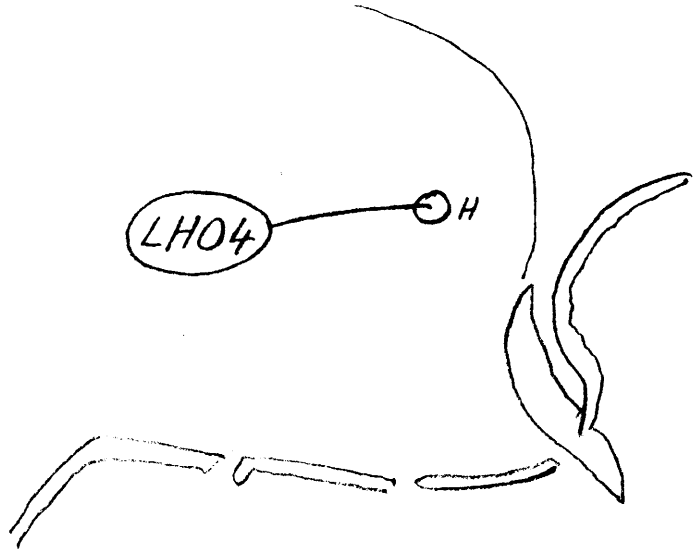
10317-180-100



Centre of boulder.
Elevation 1 m north of boulder.

LH.04

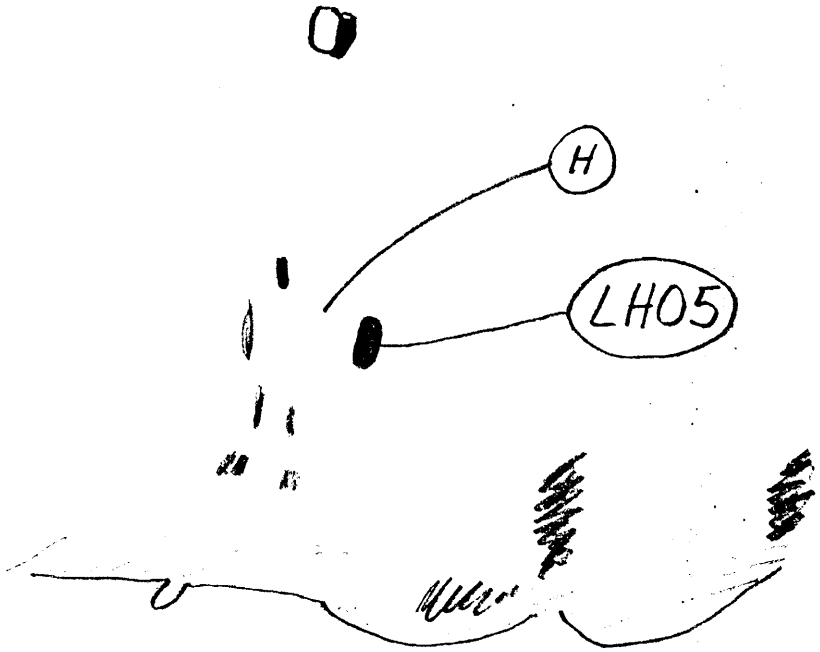
10365-058-083



Centre of boulder.
Elevation 1 m
north of boulder.

LH05

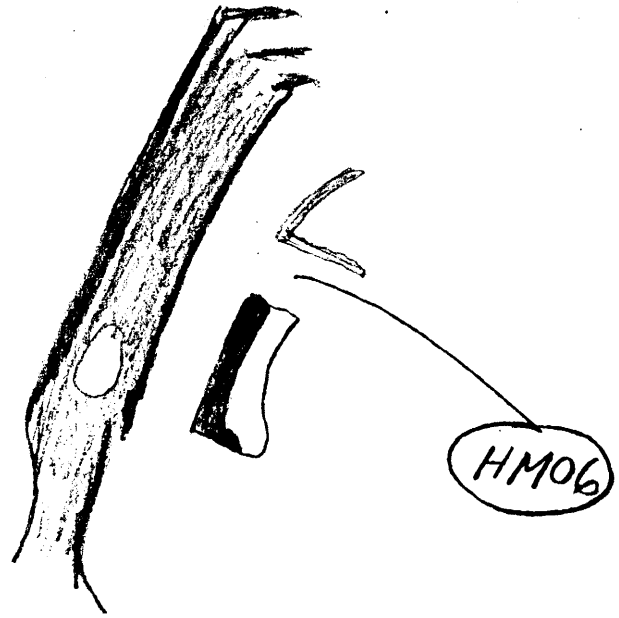
10435-115-197



Centre of black outcrop. Elevation 7 m south-vest in direction of small lava outcrop.

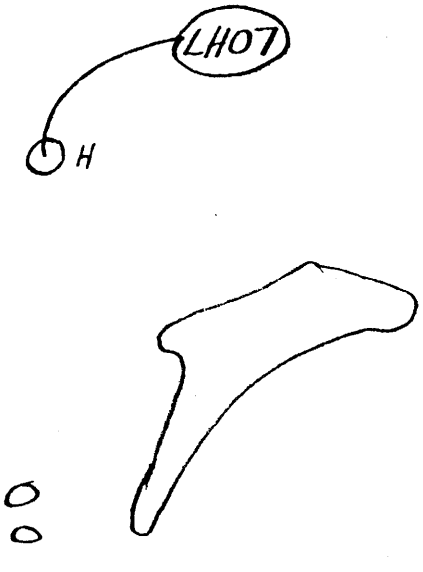
HM06

10434-116-195



LH07

10619-156-155



Centre of boulder.
Elevation 1 m
north of boulder.

HM08

10366-190-021

2 m from boulder in
direction to second
boulder

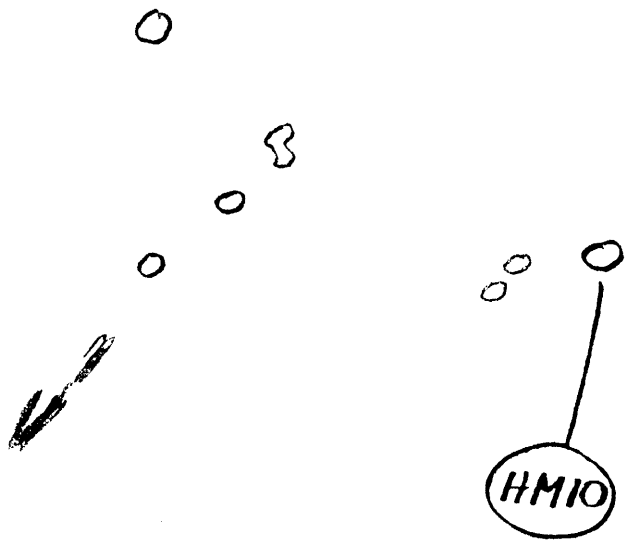
LH09

10367-161-205

Centre of low flat lava outcrop.

HM10

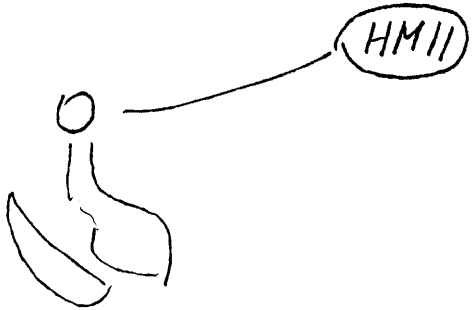
10546-179-196



2 m east of light boulder

HM11

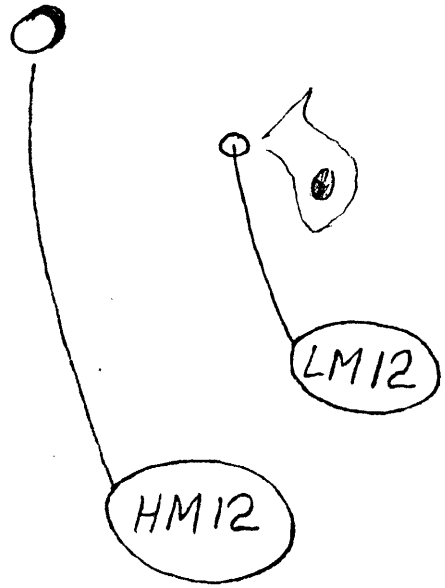
10204-120-077



2 m north of flat boulder

LM12 - HM12

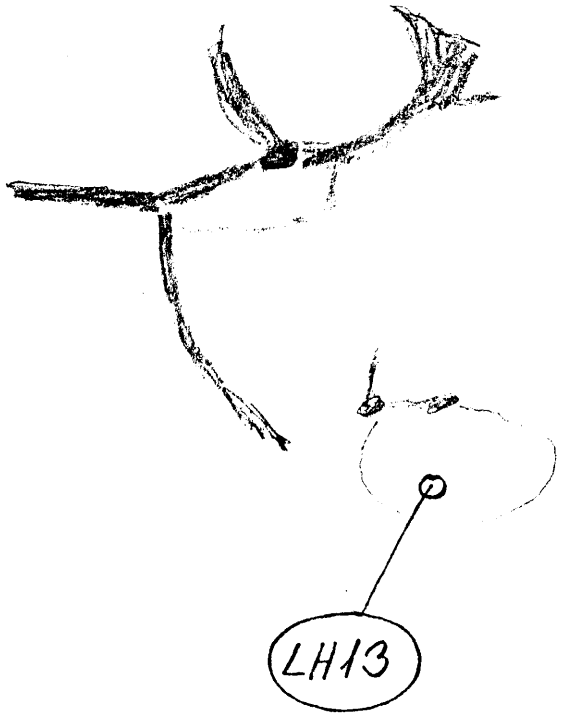
10205-036-188



HM12 is 1 m east of big

LH13

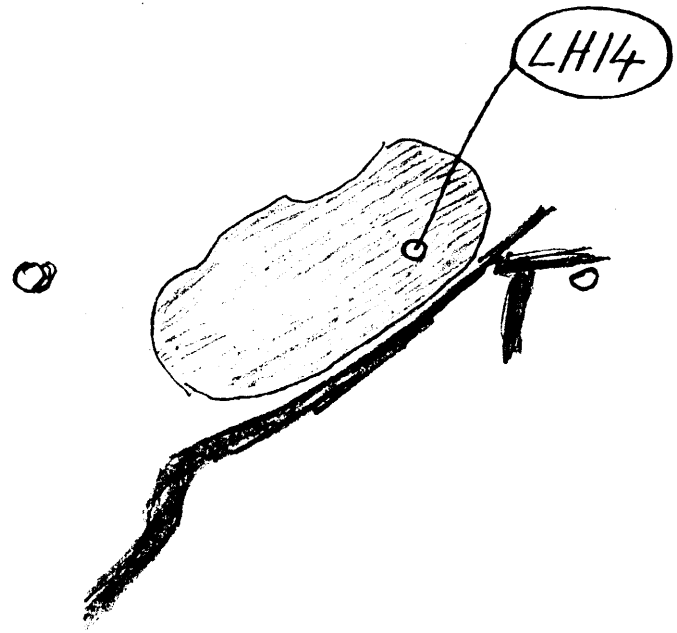
10237-125-015



Elevation 2 m south of boulder.

LH14

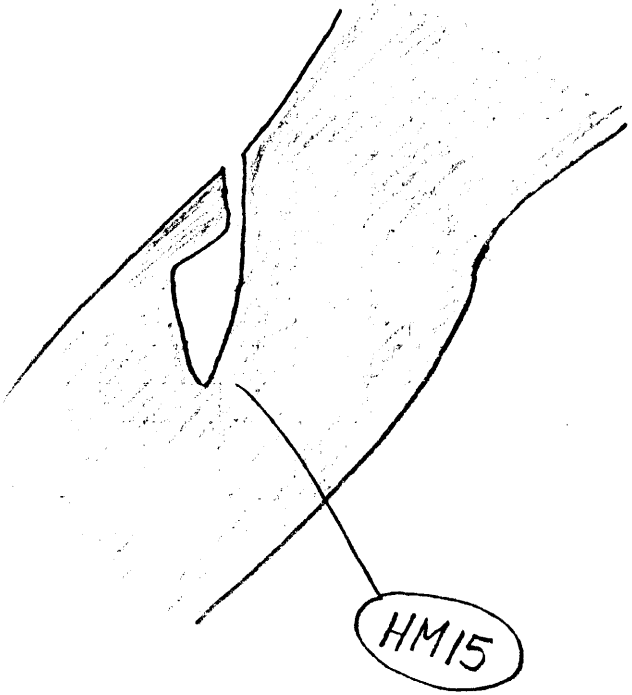
10321-100-185



White spot in dark background

HM15

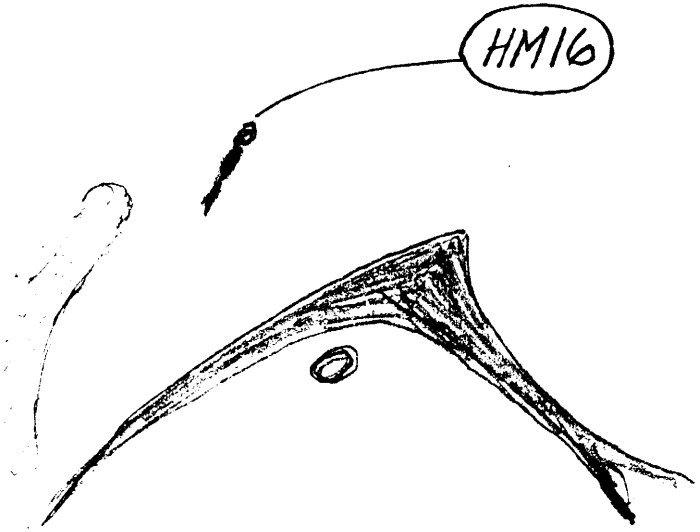
10320-118-183



2 m north of east apex of white triangle. Dark area is very flat.

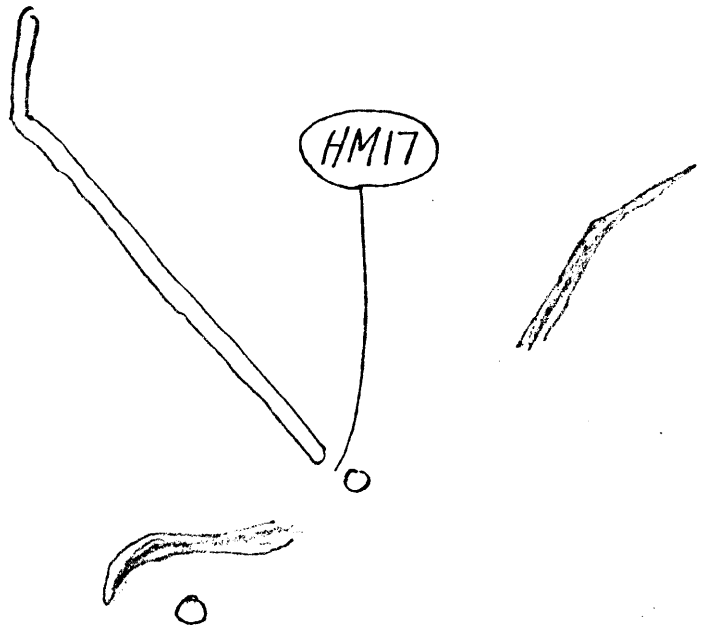
HM16

10544-066-072



HM17

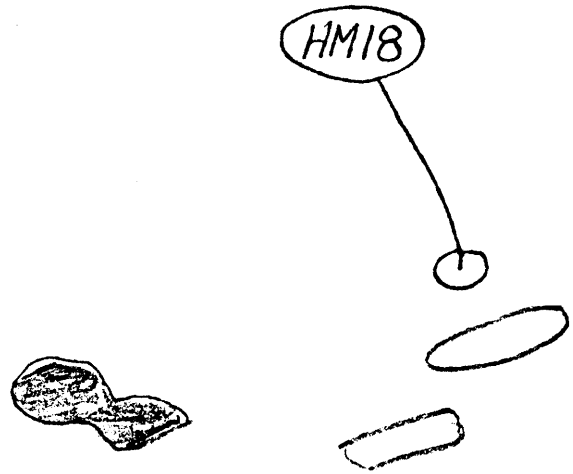
10622-159-030



1 m south of white flat boulder

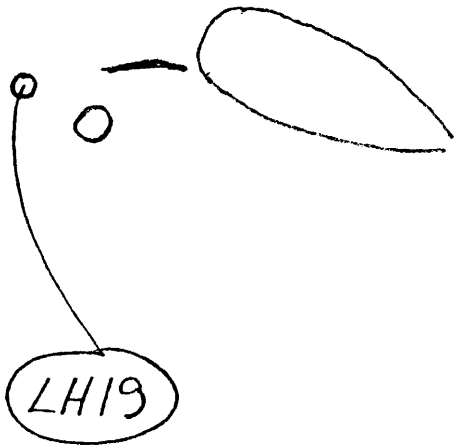
HM18

10436-107-011



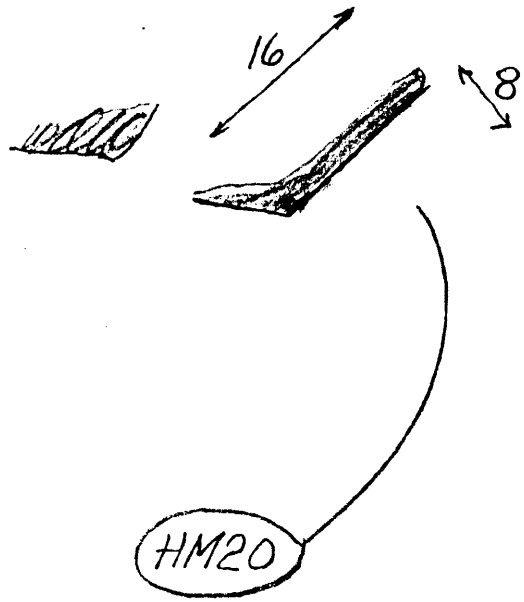
LH19

10369-168-061



HM20

10358-183-184

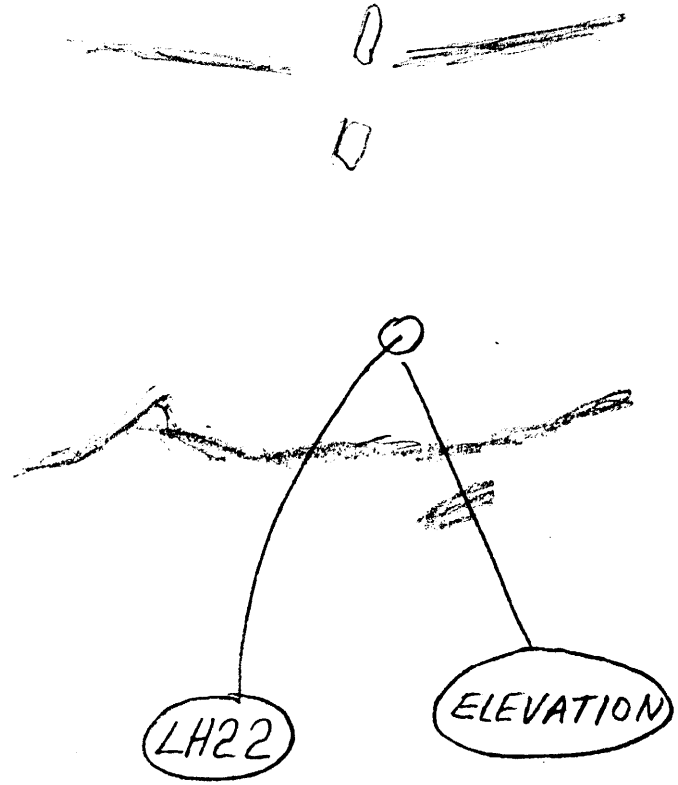


LH21

10539-106-206

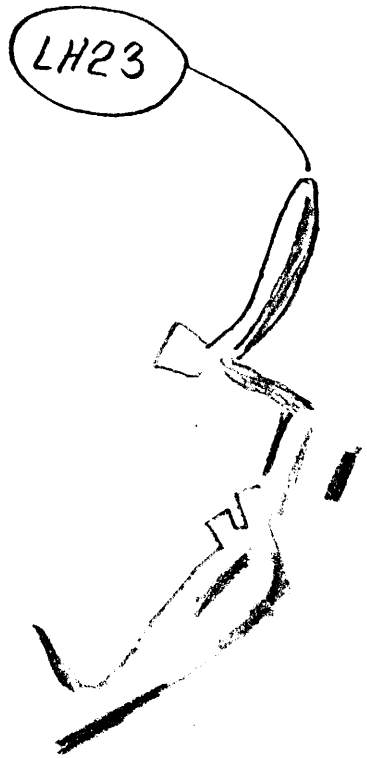
LH22

10495-089-033



LH23

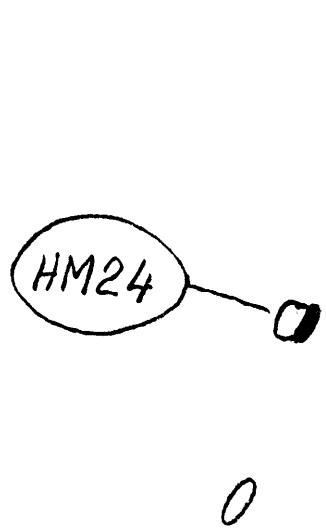
10491-176-036



ON GROUND AT WEST END OF OUTCROP

HM24

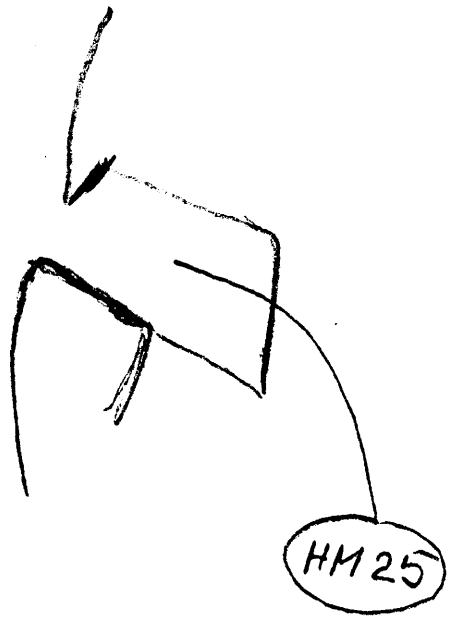
10442-071-194



ON GROUND SOUTH OF LARGE BOULDER

HM25

10624-095-051

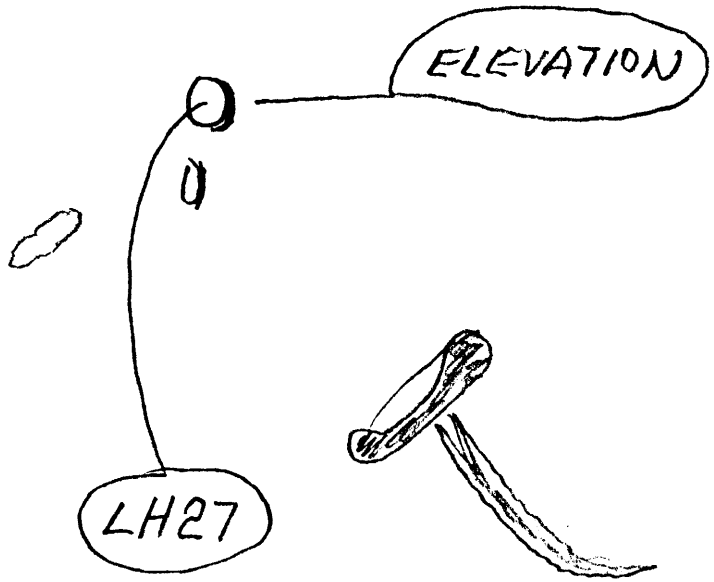


LH26

10537-041-208

LH27

10537-021-041



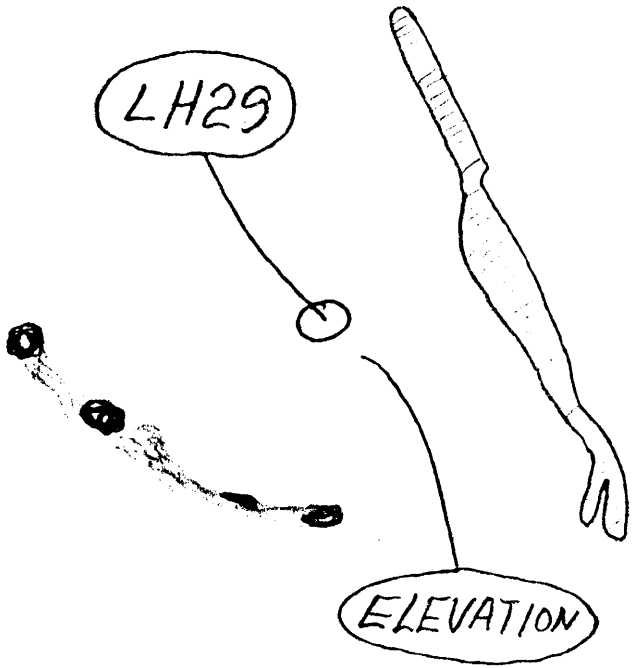
HM28

10356-136-029

Very flat area

LH29

10629-071-202



ELEVATION ON GROUND
2 TO 8 METERS NORTH-
EAST OF BIG BOULDER

HM30

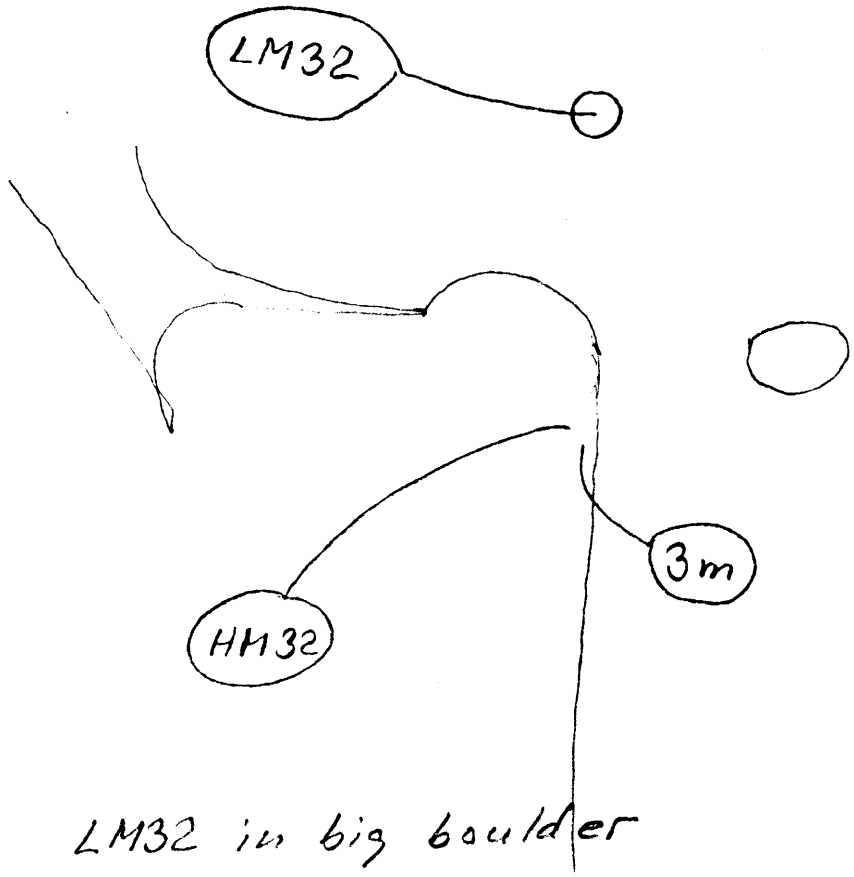
10628-008-045

LH31

6329-124-029

LM32-HM32

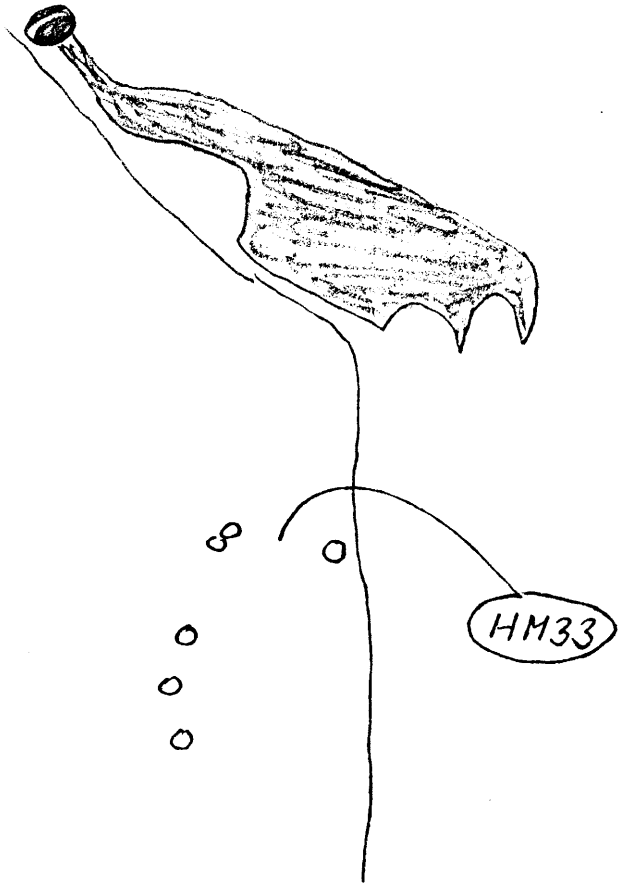
6327-062-011



LM32 in big boulder
HM32 on flat sands

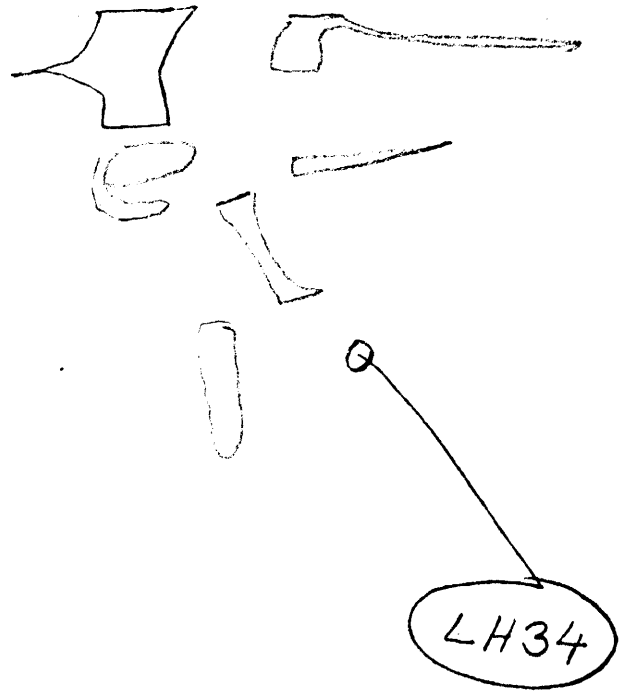
HM33

6324-135-023



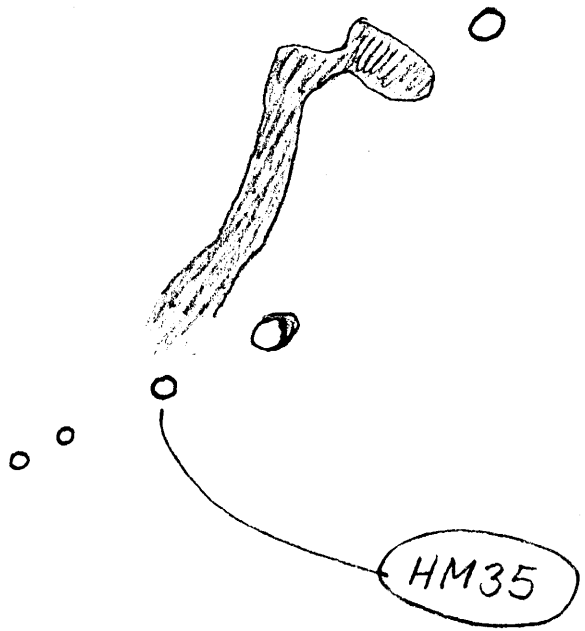
LH34

6323-211-084



HM35

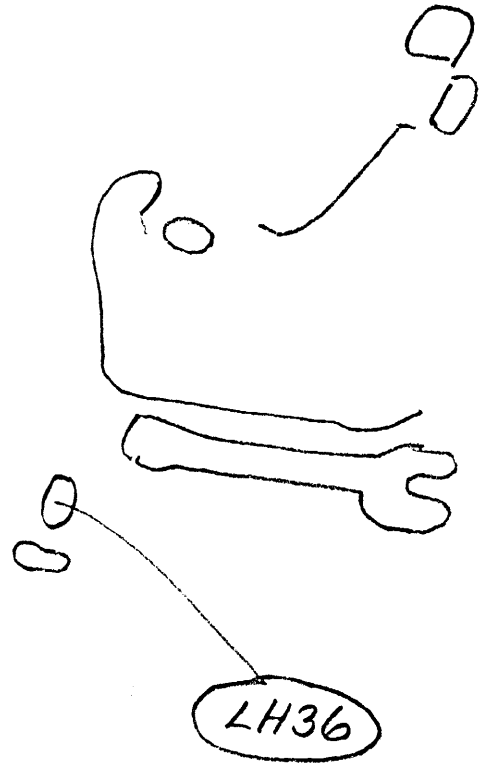
6324-119-165



2 m east of boulder

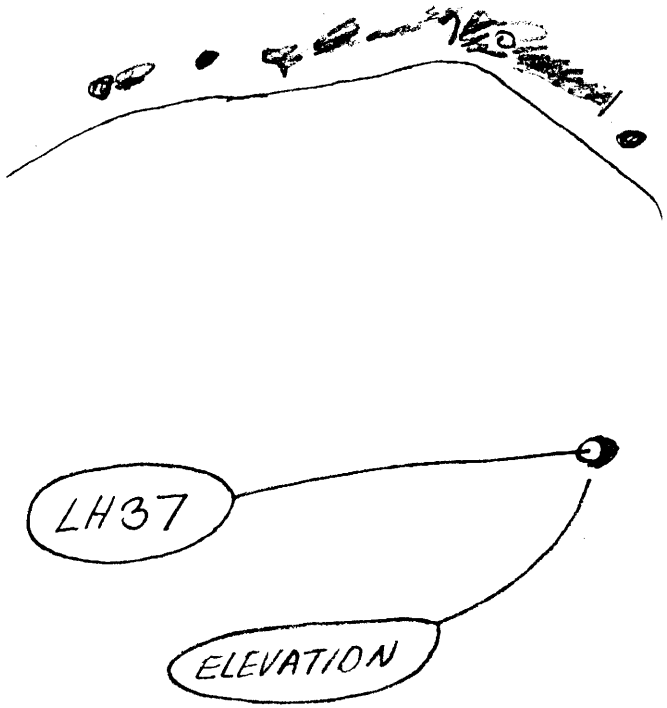
LH.36

10199-130-163



LH37

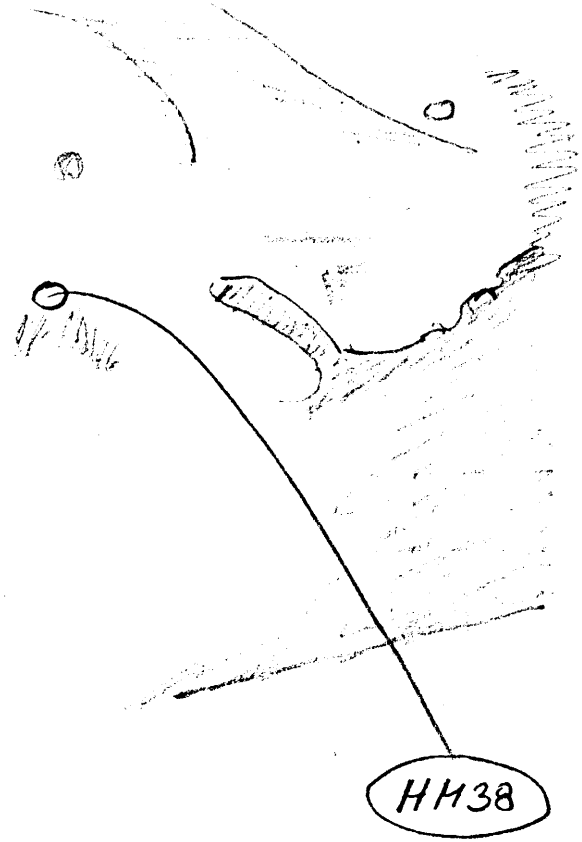
10317-051-080



Elevation on ground 2 m east of big boulder

HM38

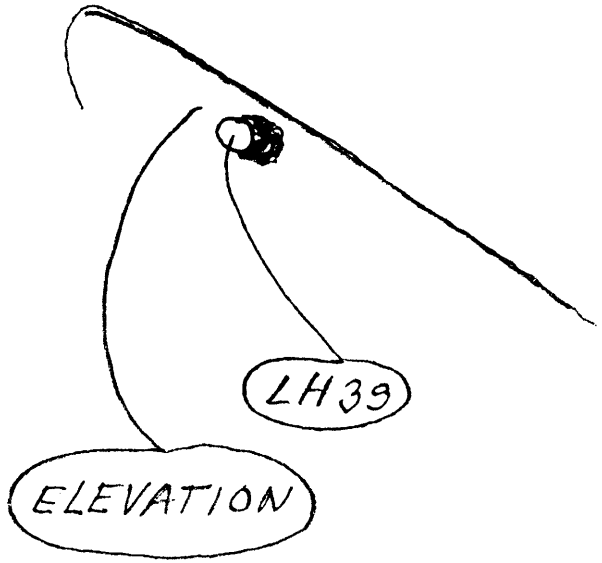
10318-094-205



ELEVATION 2 M EAST OF BOULDER

LH39

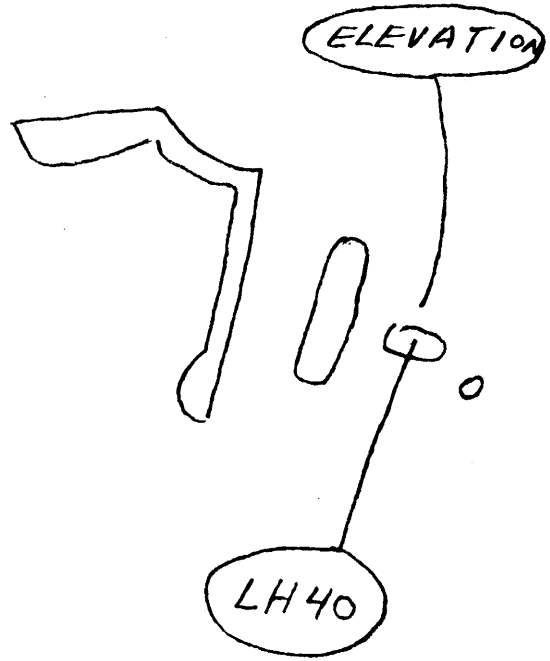
10361-154-135



CHAIRN ON TUNGUFELL
ELEVATION 1 M SOUTH-

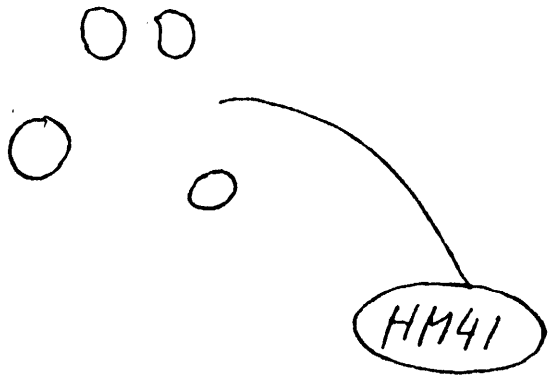
LH.40

10437-210-105



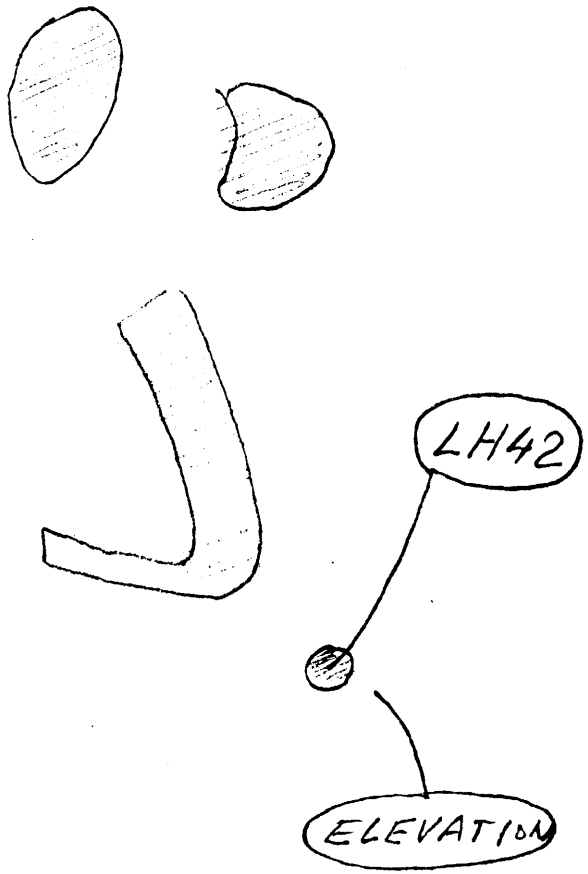
HM41

10438-106-173



LH42

10441-020-100



HM43

10440-175-153