TIDE TABLE CORRECTIONS

A Program for the ALWAC III - E Computer
at the University of British Columbia.

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May, 1961.

Purpose: This program is intended to carry out the calculation of tidal differences on data for a given reference station, in order to obtain a corrected tide table applicable to nearby locations. The program accepts the input of correction factors and an initial date, and outputs the corrected data, with headings, in a form suitable for tabular printing.

Data Format: The program accepts input of any one-line title followed by a single carriage return. It then expects constants and parameters in the following form.

$$\overset{c_1}{-x}\,[\,xx\,]\;\overset{c_2}{-x}\,[\,xx\,]\;[\,r\,]\;\overset{c_3'}{xxxx..}\;[\,\overset{c_4'}{xxxx..}\,]$$

$$kk\,[\,h\,]$$

$$DDD\,[\,nn\,]\,[\,MM\,]$$

These symbols have the following significance:

C_1 and C_2 are the time correction factors (in hours and minutes) for high and low tides respectively, and each consists of a sign (space or minus) followed by a single decimal digit, a space, and then the final two digits, terminated with any <u>single</u> dummy character. The next character should be a space if the corrections C_3 and C_4 (the height corrections) are additive, and should be an 'r' if they are ratios.

The quantities $c_3' = 100c_3$ $c_4' = 100c_4$

are integers in the format of routine I - 35 -- i.e. - any number of decimal digits preceded by spaces, tabs, or carriage returns, and possibley a sign, and terminated by a <u>single</u> space, tab, or carriage return.
Kk is to be a two digit decimal number specifying the number of days between stop codes on the output tape, and is followed by a single dummy character. The single digits 'h' or 'l' specify whether the initial tide is high or low, respectively, and are followed by a single dummy character. DDD is a set of three alphabetic digits giving the first three letters in the day of the week, nn is a two digit decimal number giving the date, and MM is a two digit decimal number specifying the month, of the tide to which the first reading on the data tape applies. DDD and nn should each be followed by spaces and MM followed either by a stop code or by any dummy character, as indicated below under OPERATING INSTRUCTIONS.

The data itself is to be in the form of a standard tide table, without headings - i. e. /

$$tttt\,[\,..h'..\,]$$

where tttt is a four digit number giving the time in hours and minutes, and terminated by a single dummy character, and the quantity

$h' = 10h$ where h is the height of the tide

is input in the format of I - 35 -i.e. - as an integer with any number of decimal digits preceded by space, tab, or carriage return, and possibly sign. Each line is followed by a single carriage return which serves as the terminating character for h'. An extra carriage return (that is, two in all) follows the last reading of each day.

Data for succeeding months at the same location should be input without further headings or paramter inputs.

One exception to the above format exists: if at any time the tides do not alternate - ie. - if two successive high or low tides are encountered, the first must be terminated by a space, followed by a 'c', and then followed by one or two carriage returns as above.

Finally, at the end of a set of data for a single reference station, a terminating group of 12 characters must follow the final two carriage returns. The group

30[30[30[30[

is suggested.

Operating Instructions:

1. Set all console switches to NORMAL
   Set Flexowriter-off-computer switch on the flexowriter to COMPUTER
   Set Type -off- " " " " " " "
   Set Free-Isolate switch to ISOLATE
   Turn Record switch ON
   Turn High Speed Reader and High Speed Punch ON.

2. Place program tape in High Speed Reader (narrow side in to wall of reader)
   Depress High Speed Clear switch on the high-speed console to CLEAR

3. There are then two modes of operation:
   a) The correction factors and initial date for a single location may be punched at the beginning of the data tape for a reference station. In this case the dummy character following MM will not be a Stop code, and it is necessary only to place the data tape in the High Speed Reader (narrow side to the wall) and type on the flexowriter the entry code
      CLEAR 4000 carriage return.

   b) The correction factors and initial dates for several locations on the same reference station may be typed on a tape separate from the data tape for the reference station. In this case the dummy character following MM must be a stop code. The tape with correction factors and initial dates should be placed in the High Speed Reader, and the entry code
      CLEAR 4000 carriage return
      typed on the flexowrtier. The program will stop after input of the information for one location; the data tape

for the reference station may then be placed in the High Speed Reader, and the Start Read button on the High Speed console depressed.

4. In either mode of operation, the computer will halt on a 1b5f command at the end of each month's calculations. If the Jump-Normal-Proceed switch is depressed to PROCEED, the calculation will be continued for the same location and the subsequent month. Thus, if the Jump-Normal-Proceed switch is left in the PROCEED position, the calculations will continue until either the data is exhausted or the clculations to the end of the year are completed for the given location. Alternatively, if the Jump-Normal-Proceed switch is placed to JUMP, the program will be restarted, and will accept new titles, correction factors, and dates.

5. In printing the output tape, a tabular form with three columns may be convenient. For this format a value kk = 11 should be used during the calculations. When printing the output tape, the Flexowriter tab stops should be set at

8, 12, 22, 27, 36, 42.

The left margin stop should be set at 3 for the first column, 18, and 33, for the second and third respectively. At the foot of each column the flexowriter will stop, enabling the paper to be moved back to the top of the page, and the left margin to be reset.

Accuracy: The time reading is rounded to the nearest minute; the height readings are rounded to the nearest 1/10th of a foot.

Timing: Using the High Speed Reader and Punch, approximately 1½ minutes is required for onemonths calculations.

Subroutines: Channel 46 is the routine I - 31 adapted for use as a subrouhine. The program uses also routine I - 35 stored in channel 12.

NOTE -- PROGRAM II

Several one-word changes are incorporated in a second program tape marked Tide Table Correction Program II. These changes enable the program to be used for the situation in which the height correction is of the form

$$h_{corrected} = ah_{original} + b$$

and a, b, are constants identical for both high and low tides. For this situation the input format is precisely the same as for program I, except that the character (space or 'r') indicating whether the correction is additive or multiplicative must be a space, and the entries

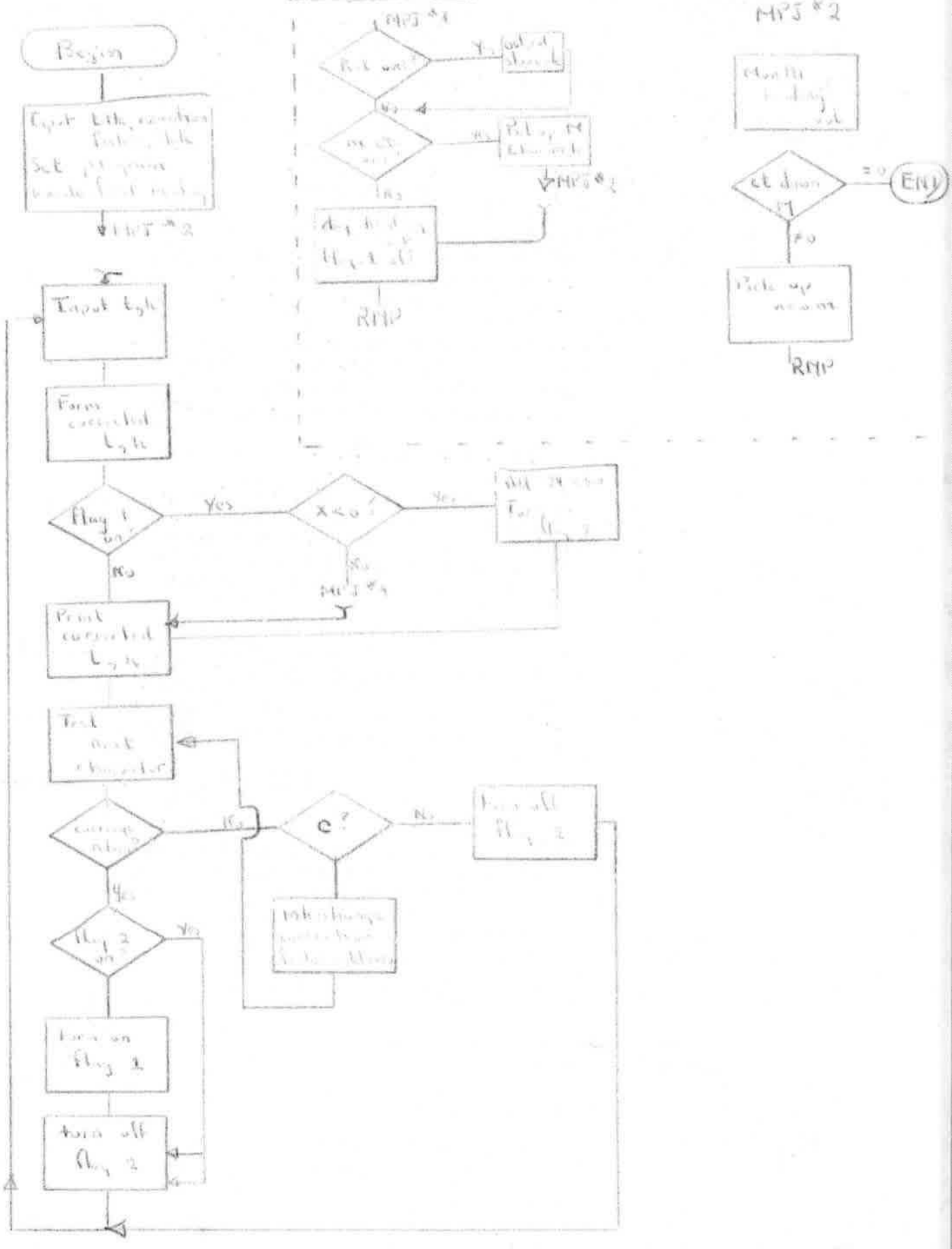
e_3' and e_4' of Program I

should be replaced by the quantities

$$a' = 100a \quad \text{and} \quad b' = 100b$$

respectively. The method of use is identical for both programs.

Flow Chart



Begin
MPJ #2
Input tgk
Form corrected tgk
Flag 1 on?
Yes
No
X<0?
Yes
No
MPJ #4
Print corrected tgk
Test next character
Carriage return?
No
Yes
C?
No
Flag 2 on?
Yes
Form on flag 2
Form off flag 2
MPJ #1
Yes
No
MPJ #2
RMP
MPJ #2
Month
Pick up new m
RMP
END

SAMPLE INPUT TAPE

```
4000
    AGGATIU ISLAND, OTKRITI BAY, 1961
-0 14 -0 13 r 103 103
15 h
mon 01 05
0339 26
1135 -05
1936 26
2328 23

0405 28
1216 -08
2029 27

0007 24
0437 29
1257 -10
2119 28 c

0051 30
1339 -10
2201 28

0139 25
0601 30
1424 -10
2237 28

0236 24
0655 29
1508 -08
2308 28
```

SAMPLE OUTPUT TAPE

AGGATU ISLAND, OTKRITI BAY, 1961

MAY

MON 01	0325	02.7
	1122	-00.5
	1922	02.7
	2315	02.4
TUE 02	0351	02.9
	1203	-00.8
	2015	02.8
	2354	02.5
WED 03	0423	03.0
	1244	-01.0
	2105	02.9
THU 04	0037	03.1
	1326	-01.0
	2147	02.9
FRI 05	0126	02.6
	0547	03.1
	1411	-01.0
	2223	02.9
SAT 06	0223	02.5
	0641	03.0
	1455	-00.8
	2254	02.9

COPY OF PROGRAMME

"=))

40 1

00	8342	8543	80	01	1710	5519	81	02	d901	f101	82	03	f904	f142	83
04	8746	5b11	84	05	2806	f301	85	06	6a8f	f303	86	07	6542	a710	87
08	11f3	8712	88	09	190d	d910	89	0a	a501	a707	8a	0b	300c	f101	8b
0c	c944	5519	8c	0d	9d60	ca8f	8d	0e	3132	6780	8e	0f	3200	3652	8f
10	f901	f141	90	11	170d	2888	91	12	1997	6d8e	92	13	8141	1100	93
14	3005	e78a	94	15	f142	4dc4	95	16	4dd4	f90b	96	17	0000	790e	97
18	f143	61bb	98	19	f302	a505	99	1a	f142	2400	9a	1b	6192	4d8e	9b
1c	caa0	f101	9c	1d	0400	1f82	9d	1e	a710	4d4e	9e	1f	3200	118e	9f

Σ b13281e1

41 1

00	d304	1147	80	01	f705	7980	81	02	4933	f301	82	03	3204	1120	83
04	d903	d188	84	05	f703	78a0	85	06	9d60	f5e1	86	07	6785	d910	87
08	9daa	9d8c	88	09	4dcc	c944	89	0a	000b	618e	8a	0b	1193	6185	8b
0c	118d	c945	8c	0d	9f00	d921	8d	0e	f5e2	0001	8e	0f	d910	119a	8f
10	1714	1190	90	11	2802	f141	91	12	6933	d113	92	13	1d8b	9d40	93
14	df58	e14a	94	15	f141	3008	95	16	5187	0209	96	17	d902	1116	97
18	7890	f705	98	19	e78a	f142	99	1a	1f07	300d	9a	1b	f301	1139	9b
1c	78a0	c947	9c	1d	619f	61b1	9d	1e	ef8f	4942	9e	1f	0000	0000	9f

Σ 93b39951

42 2

20	4121	eb83	a0	21	eb82	3204	a1	22	d326	d901	a2	23	a710	4d4e	a3
24	3205	f542	a4	25	f542	3008	a5	26	d920	1111	a6	27	df78	9d8c	a7
28	7942	412b	a8	29	280a	3e0c	a9	2a	0000	7943	aa	2b	11d4	d920	ab
2c	eb83	320f	ac	2d	f701	3200	ad	2e	691d	4943	ae	2f	618b	1115	af
30	f542	df58	b0	31	f541	df5b	b1	32	7953	690a	b2	33	0000	0000	b3
34	7933	d507	b4	35	df58	9daa	b5	36	4953	9f00	b6	37	1b5f	113a	b7
38	3009	ef9b	b8	39	280a	f141	b9	3a	df5b	554a	ba	3b	619c	19ab	bb
3c	3120	4130	bc	3d	6781	193b	bd	3e	2926	4d5e	be	3f	9daa	111b	bf

Σ 009ffb2b

43 3

40	4942	555e	c0	41	6192	6795	c1	42	0000	000e	c2	43	619e	61b1	c3
44	0005	9600	c4	45	1949	6192	c5	46	490e	1104	c6	47	7957	490a	c7
48	1f56	c15e	c8	49	6195	7595	c9	4a	0000	0000	ca	4b	7952	4953	cb
4c	554e	9600	cc	4d	4dd4	794e	cd	4e	0000	0000	ce	4f	795b	1146	cf
50	1f37	c14e	d0	51	a510	4114	d1	52	300b	e78d	d2	53	000b	618d	d3
54	0005	7900	d4	55	eb86	3208	d5	56	2800	4f5e	d6	57	300b	e78e	d7
58	df5b	f705	d8	59	f542	df58	d9	5a	df78	114c	da	5b	320f	0001	db
5c	df50	7954	dc	5d	7942	1117	dd	5e	0000	0000	de	5f	8740	1100	df

Σ fcd3c1bb

44 1

00	5396	9180	80	01	0000	000d	81	02	0000	03e8	82	03	0000	0064	83
04	5314	9180	84	05	0000	05a0	85	06	0000	0064	86	07	0000	05a0	87
08	539e	8700	88	09	0000	03e8	89	0a	0000	003c	8a	0b	0000	000c	8b
0c	53b1	e680	8c	0d	0000	0067	8d	0e	0000	0067	8e	0f	0000	003c	8f
10	539a	3a00	90	11	0000	0000	91	12	0000	0004	92	13	0000	0000	93
14	527c	e900	94	15	0005	799c	95	16	8541	8d48	96	17	0000	0000	97
18	5391	5980	98	19	0000	0000	99	1a	8140	1100	9a	1b	0000	03e8	9b
1c	0000	0001	9c	1d	0000	003c	9d	1e	-0000	000e	9e	1f	-0000	000d	9f

Σ 4e2b1e2c

45 1

00	0000	0000	80	01	0000	0000	81	02	0000	0000	82	03	0000	0000	83
04	52f9	51e8	84	05	5279	e5ce	85	06	5311	5398	86	07	5254	b3a4	87
08	5311	5c00	88	09	52fe	919c	89	0a	52fe	90f0	8a	0b	5256	8868	8b
0c	5391	d2e6	8c	0d	5321	99c8	8d	0e	531c	9a9c	8e	0f	5269	c61c	8f
10	-0005	0000	90	11	0000	0000	91	12	0000	0000	92	13	0000	0000	93
14	153f	0000	94	15	6854	fc00	95	16	2200	0000	96	17	4200	0000	97
18	0000	0000	98	19	0000	0000	99	1a	0000	0000	9a	1b	6598	0000	9b
1c	1d11	674e	9c	1d	1674	e000	9d	1e	4459	d380	9e	1f	4459	d380	9f

Σ e5d8dd9f

46 4

60	8903	c363	e0	61	497a	a710	e1	62	df5b	1100	e2	63	0000	3200	e3
64	5b7b	556d	e4	65	3600	797a	e5	66	8101	1100	e6	67	1768	797a	e7
68	f301	3132	e8	69	2600	4ded	e9	6a	2800	617d	ea	6b	2600	4def	eb
6c	717d	537f	ec	6d	0005	7800	ed	6e	17ea	4df2	ee	6f	497a	c500	ef
70	1fe3	3000	f0	71	f705	17ed	f1	72	0000	a300	f2	73	11e4	3800	f3
74	2530	176a	f4	75	8103	5763	f5	76	1178	0000	f6	77	4de2	1160	f7
78	797a	2600	f8	79	2800	4ffa	f9	7a	0000	0000	fa	7b	ffff	ff80	fb
7c	4dfc	c500	fc	7d	0000	0006	fd	7e	0000	0000	fe	7f	0000	005b	ff

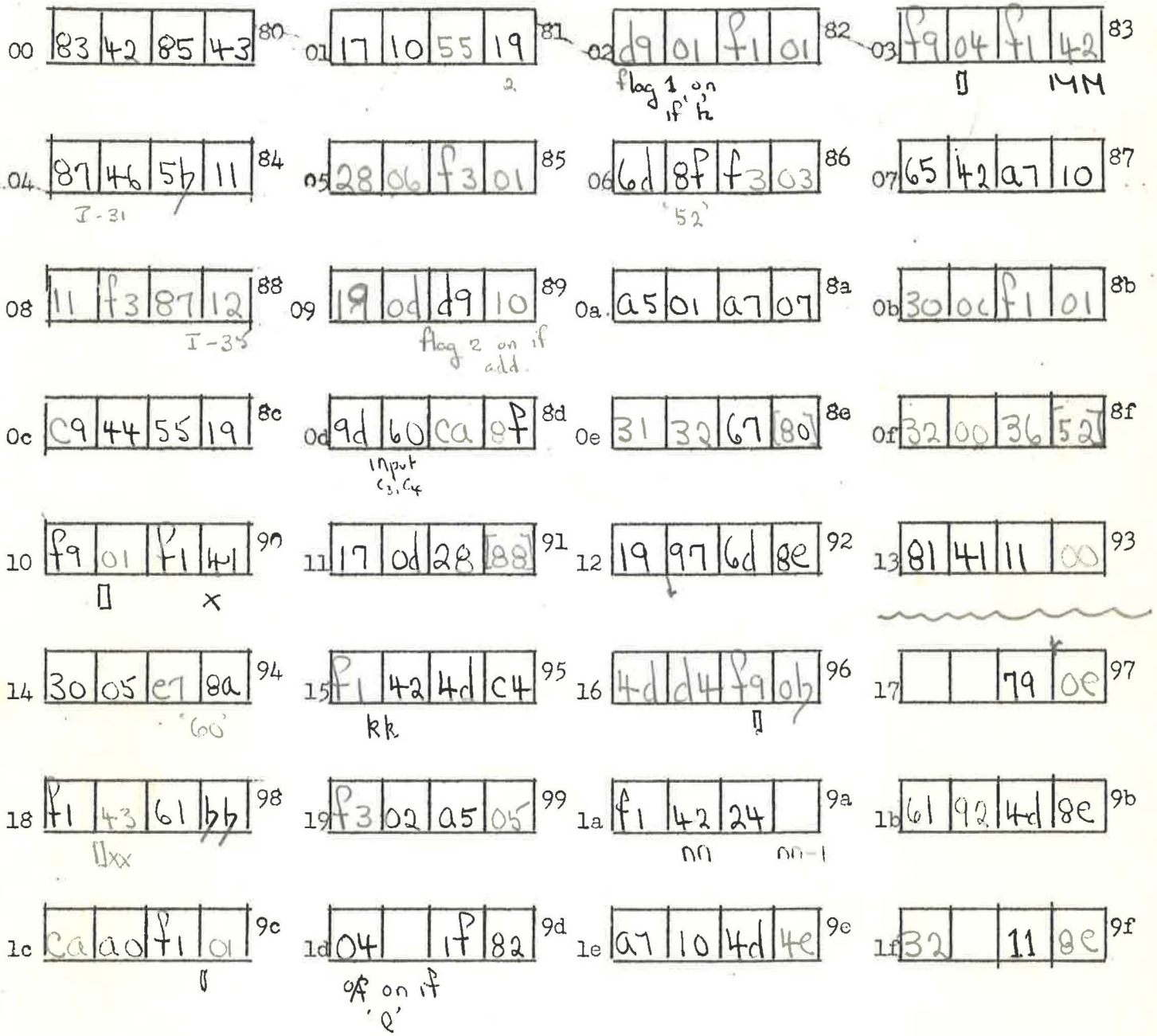
Σ 337af1ce

47 1

00	516d	a000	80	01	0000	1992	81	02	112c	7919	82	03	6f0f	4f02	83
04	f144	a712	84	05	c450	7921	85	06	a710	6711	86	07	112b	f301	87
08	4941	2800	88	09	2600	4921	89	0a	8561	11b2	8a	0b	2800	1790	8b
0c	f301	4940	8c	0d	5120	1f8b	8d	0e	0000	0000	8e	0f	f303	7912	8f
10	551d	6c40	90	11	2860	f301	91	12	4f2e	791a	92	13	f783	1b2c	93
14	0000	001f	94	15	0000	001c	95	16	0000	001f	96	17	0000	001e	97
18	0000	001f	98	19	0000	001e	99	1a	0000	001f	9a	1b	0000	001f	9b
1c	0000	001e	9c	1d	0000	001f	9d	1e	0000	001e	9e	1f	0000	001f	9f

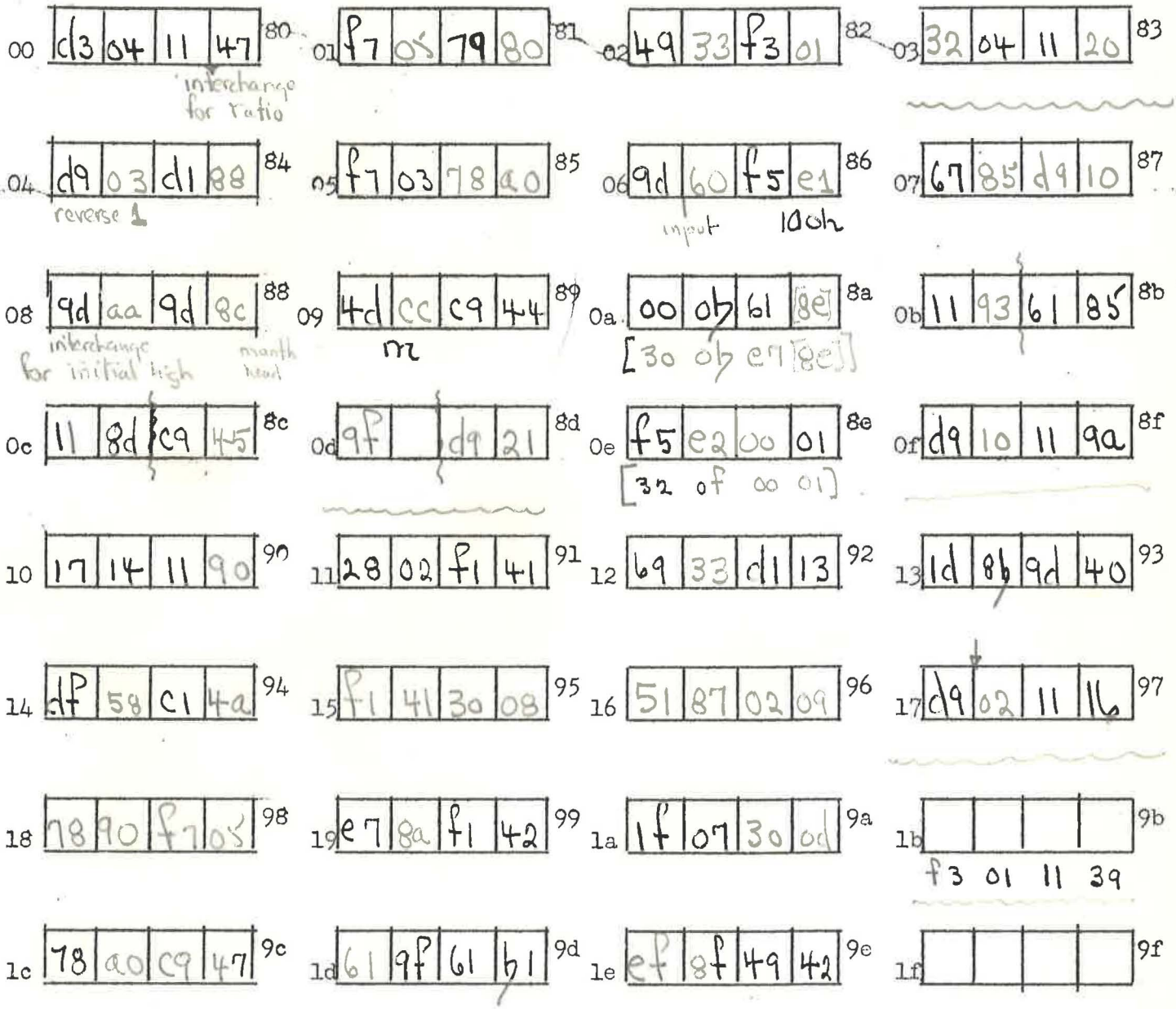
Σ 57726d2e

WORKING CHANNEL I



H1

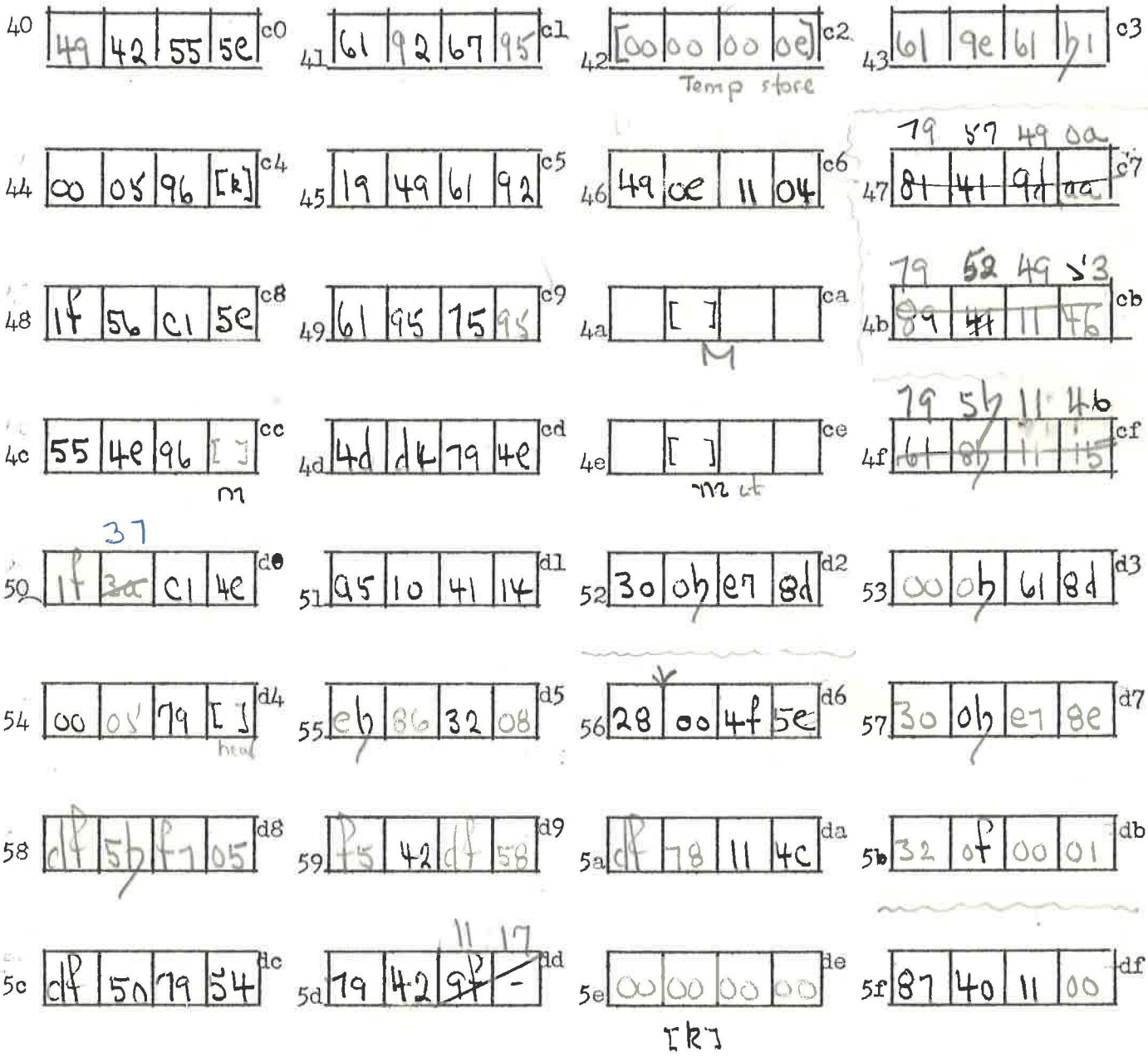
WORKING CHANNEL I



WORKING CHANNEL II

43

WORKING CHANNEL III

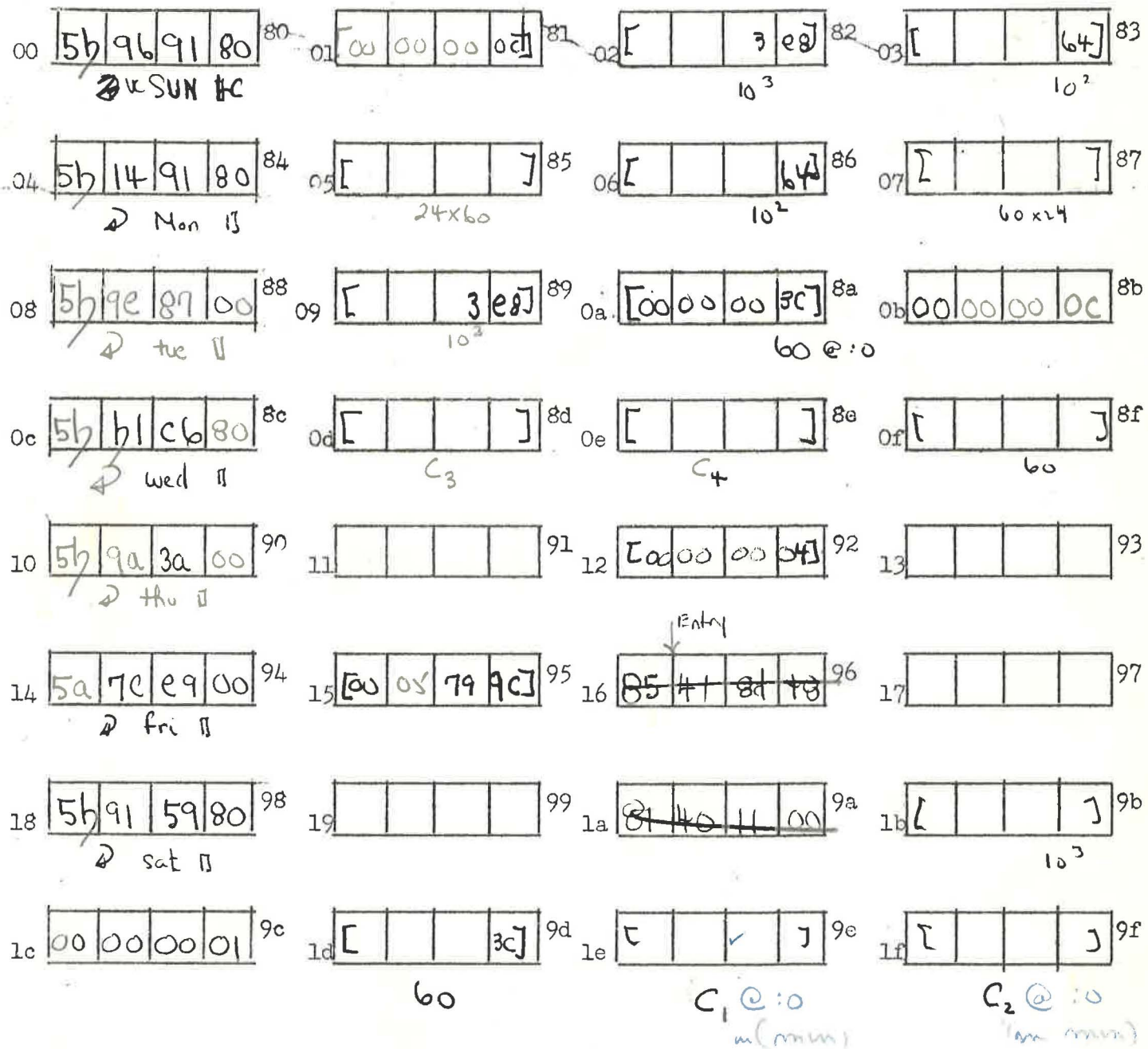


46, 56

47, 46, 45

44

WORKING CHANNEL I



Change

9c =
8b

45 = Month at
46 = I-31
47 = Month #

45 Month Headings

WORKING CHANNEL I

00					80	01					81	02					82	03					83
04	58	f9	81	e8	84	05	58	79	c5	ce	85	06	59	11	53	98	86	07	58	54	b3	a4	87
08	59	11	5c	00	88	09	58	fe	91	9c	89	0a	58	fe	90	f0	8a	0b	58	56	88	68	8b
0c	59	91	d2	e6	8c	0d	59	21	99	c8	8d	0e	59	1c	9a	9c	8e	0f	58	69	c6	1c	8f
10					90	11					91	12					92	13					93
14	15	3f	00	5a	94	15	68	54	fc	5a	95	16	22	00	00	5a	96	17	42	00	00	5a	97
18	00	00	00	54	98	19	00	00	00	5a	99	1a	00	00	00	5a	9a	1b	65	98	00	5a	9b
1c	1d	11	73	da	9c	1d	16	74	e0	5a	9d	1e	44	59	d3	da	9e	1f	44	59	d3	da	9f

22 35

HERBERT ISLAND, WEST SIDE, 1961

-1 40 -1 44 05 -01

15

1 fri 16 06

1237	-01	L	1053	0.0
2104	38	H	2000	4.3
1315	01	L	1131	0.0
2130	38	H	1950	4.3
1352	03	L	1208	0.2
2151	37	H	2011	4.2
0454	21	L	0310	2.0
0723	22	H	0543	2.7
1426	06	L	1242	0.5
2207	36	H	2027	4.1
0508	18	L	0324	1.7
0849	21	H	0709	2.6
1459	09	L	1315	0.8
2222	35	H	2042	4.0

AGATTU ISLAND, OTKRITI BAY, 1961

-0 14 -01 13 r103 103

15

h mon 01 05

0339	2.6	H	0325	2.7
1135	-05	L	1122	-0.6
1936	26	H	1922	2.7
2328	23	L	2315	2.4
0405	28	H	0351	2.9
1216	-08	L	1203	
2029	27	H	2015	2.8
0007	24	L	2354	2.5
0437	29	H	0423	3.0
1257	-10	L	1244	-1.0
2119	28	H	2105	2.9
0051	30	H	0037	3.1
1339	-10	L	1326	-1.0
2201	28	H	2147	2.9
0139	25	L	0126	2.6
0601	30	H	0547	3.1
1424	-10	L	1411	-1.0
2237	28	H	2223	2.9

0236	24		0223	2,5
0655	29		0641	3,0
1508	-08		1455	-0,8
2308	28		2254	2,9

34
436
327
3706

tape 40-47
s - xs

2b00
40 1 41 1 42 2 43 3 44 1 45 1 46 4 47 1

4104 0a 300b798e 0e f5e2e38d 12 11b2d113
4204 32 9f003000 36 69331192

4108 0a 300b798e 0e f5e2e38d 12 11b2d113 44208 32 9f003000 36 693311

tape 40-47
s - xs

4000

AKUTAN ISLAND - 1961

-0 17 0 00 30 10
11 h
thu 01 06
4000
4000
4000

4104 0a 300b798e 0e f5e2e38d 12 11b2d113
4204 32 9f003000 36 69331192

4108 0a 300b798e 0e f5e2e38d 12 11b2d113 4208 32 9f003000 36 69331192

4000

NIKOLSKI, BERING ISLAND - 1961

-0 17 0 50 082
120
11 h
thu 01 06

4000 NIKOLSKI, BERING ISLAND - 1961
-0 17 0 50 082 120
11 h
thu 01 06

4104 0a 000b618e 0e f5e20001 12 6933d113
4204 32 7953690a 36 49539f00

4000

KISKA HARBOR - 1961

0 24 -0 13 r 97 97
11 h
thu 01 06

OTKRITI BAY, AGATTU ISLAND - 1961

JUNE

THU 01	0337	03.5
	1220	-01.2
	2056	03.2
FRI 02	0022	03.0
	0430	03.4
	1305	-01.1
	2122	03.2
SAT 03	0130	02.8
	0529	03.2
	1347	-00.9
	2146	03.3
SUN 04	0239	02.5
	0638	02.9
	1431	-00.5
	2211	03.3
MON 05	0347	02.1
	0757	02.6
	1515	-00.1
	2238	03.3
TUE 06	0454	01.5
	0928	02.3
	1558	00.4
	2309	03.4
WED 07	0602	01.0
	1113	02.1
	1644	00.9
	2339	03.5
THU 08	0702	00.5
	1308	02.0
	1731	01.5
FRI 09	0014	03.5
	0758	00.1
	1504	02.2
	1824	02.0
SAT 10	0049	03.6
	0850	-00.3
	1642	02.5
	1928	02.4
SUN 11	0126	03.5
	0940	-00.6
	1755	02.8
	2044	02.7
MON 12	0205	03.5
	1027	-00.8
	1853	03.0
	2206	02.9

TUE 13	0241	03.4
	1110	-00.8
	1938	03.2
	2323	02.9
WED 14	0318	03.2
	1149	-00.8
	2017	03.3
THU 15	0033	02.9
	0351	03.1
	1225	-00.7
	2049	03.3
FRI 16	0137	02.8
	0426	02.9
	1259	-00.5
	2120	03.3
SAT 17	0235	02.7
	0503	02.8
	1331	-00.3
	2145	03.3
SUN 18	0327	02.5
	0546	02.6
	1403	00.0
	2207	03.3
MON 19	0411	02.3
	0645	02.4
	1432	00.2
	2223	03.2
TUE 20	0450	02.0
	0757	02.2
	1503	00.6
	2237	03.2
WED 21	0529	01.6
	0922	02.0
	1529	00.9
	2252	03.2
THU 22	0611	01.2
	1107	01.9
	1553	01.3
	2308	03.2
FRI 23	0651	00.8
	1313	01.9
	1610	01.8
	2324	03.3
SAT 24	0735	00.4
	2345	03.5
SUN 25	0818	-00.1
MON 26	0012	03.6
	0903	-00.5
TUE 27	0045	03.8
	0947	-00.8
WED 28	0129	03.9

1032 -01.0

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KISKA HARBOR - 1961
0 24 -0 13 r 97 97
11 h
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CONSTANTINE HARBOR, AMCHITKA ISLAND, - 1961
0 19 -0 06 r 76 76
11 h
thu 01 06

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ATKA ISLAND, NAZAN BAY - 1961
0 21 0 22 r 89 89
11 h
thu 01 06
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KANAGA ISLAND, KANAGA BAY - 1961
-1 39 -1 44 r 105 105
11 h
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TANAGA ISLAND, LASH BAY - 1961

-0 56 -1 39 r 114 114
11 h
thu 01 06

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CANOE BAY - 1961

1 36 1 30 r 76 76
11 h
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