MAUNA LOA CARBON DIOXIDE PROJECT
REPORT NO. 1
June 1, 1961

A Summary of Reference Gas Analyses with Applied Physics Corporation Infrared Gas Analyser No. 58 at Mauna Loa Observatory, Hawaii
March 27, 1958 to December 22, 1960

I. Introduction

This report presents a summary of measurements of the concentration of carbon dioxide in specially prepared mixtures in nitrogen gas. The measurements were obtained at Mauna Loa Observatory, Hawaii by personnel of the U.S. Weather Bureau under the direction of Mr. Jack C. Pales. The procedure follows that used at the Scripps Institution of Oceanography, La Jolla, California as described in Research Report No. 1, October 15, 1958, and Research Report Nos. 2 and 3, June 1, 1961 (referred to hereafter as "Report I", "Report II", and "Report III").*

Index values proportional to concentration have been calculated from observed differences in scale readings obtained using analyser No. 58.

The data are assembled in tables which follow this text.

II. Tables 1. and 2.

Data are presented in chronological order for all gas mixtures (called "reference gases") compared during the period of this report. Entries in columns 1, 2, 3, and 4 of Table 1 are taken from original Reference Gas Data Sheets listed by number on the right side of column 8. Entries in columns 1, 2, 3, and 4 of Table 2 are taken from daily atmospheric Carbon Dioxide Data Sheets listed by date in column 9. Entries in columns 5, 6, and 7 of both tables have been calculated with the aid of Tables 3 and 4.

In Table 1 data are assembled only for days on which the gas analyser was calibrated by comparing one or more pairs of reference gas standards reserved for this purpose. Index values are computed solely on the basis of the calibration for that day as expressed by the recorder scale factor listed in column 5.

* Copies may be obtained from Dr. Charles D. Keeling, Scripps Institution of Oceanography, La Jolla, California.

In Table 2 data are assembled for days in which no calibration was made. Index values are computed on the basis of an average or estimated calibration expressed by the daily recorder scale factors given in Table 4.

From March 27 to November 15, 1958 single comparisons were obtained almost every day in which the equipment operated. In Table 2 these are combined to form averages of not more than 15 comparisons each. (Only the single comparisons appear on the original data sheets.) The recorder scale factor for each combined set has been selected as that which applies for the date midway through the period averaged.

III. Recorder Scale Factor - Table 3.

A. Definition

Adopting the procedure used in Reports I, II, and III, the recorder scale factor is defined as the scale difference which would be obtained for two reference gases having an index difference of 18.00 p.p.m. (parts per million of carbon dioxide in nitrogen). For example, on April 3, 1958, Tank 4284 and Tank 4287 with an index difference of 15.25 p.p.m. had an observed scale difference of 14.83 p.p.m. The recorder scale factor is therefore:

$$14.83 \times \frac{18.00}{15.25} = 17.50$$

The selection of a factor 18.00, although arbitrary, was originally convenient because it was the index difference for the two principle calibrating reference gases at Scripps. For the sake of consistency this usage is continued here, although it may appear somewhat esoteric to those unfamiliar with its blessings.

B. Calculation of Three Mutually Compared Tanks ("Tank Triangle")

The following has been adopted as the standard presentation when two reference gases with final assigned index values A and B ("primary standards") are each compared to a gas, X, without such assignment:

Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons
A	**X**	**X - A**	a
B	**X**	**X - B**	b
A	B	Y*	(a or b)*

Where Y = **(X - A) - (X - B) = (B - A)**.

The symbol* indicates a calculated value. The number of comparisons assigned to Y is a or b, whichever is smaller.

The above format has been exactly followed for Tank Triangles involving Tanks 4284, 4287, and 4297. For other combinations of tanks, B versus **X** is placed before **A** versus **X** in order to preserve chronological order. As an aid to reading, the comparisons and calculated values of a given group of three tanks are set off in the table by boxes.

C. Determination of Index Differences

Index Differences in column 5 which were obtained from index values of the separate tanks are as follows:

4277	vs. 4297	345.84 - 305.78 = 40.06
4277	vs. 6051	345.84 - 310.07 = 35.77
4277	vs. 7344	345.84 - 314.34 = 31.50

The index values quoted above are based on comparisons at the Scripps Institution of Oceanography, as follows:

Tank No.	At SIO Before Use at Mauna Loa		At SIO After Use at Mauna Loa		Weighted Average	
	No. of Comparisons	Index	No. of Comparisons	Index	No. of Comparisons	Index
4277	63	345.84	-	-	63	345.84
4297	-	-	49	305.78	49	305.78
6051	10	310.04	52	310.12	62	310.07
7344	375	314.34	-	-	375	314.34

Except for the index of Tank 4277 which appears in Report II, all the above data are taken from Report III.

The index difference used in Table 3 for Tank 4284 versus Tank 4287 is not based on comparisons at Scripps but rather on an intercomparison with Tank 4297

versus Tank 4277 which took place between February 22 and September 20, 1959 (See Table 3a). Because the average scale difference for Tank 4284 versus Tank 4287 was 16.22, while the recorder scale factor based on Tank 4297 versus Tank 4277 was 19.14 the computed index difference for Tank 4284 versus Tank 4287 is:

$$16.22 \times \frac{18.00}{19.14} = 15.25$$

IV. Daily Recorder Scale Factor - Table 4.

Interpolated values of the recorder scale factor for the period from April 13 to November 22, 1958 are presented in this table. From April 13 to September 3, 1958 a leaking detector cell in the analyser caused a persistent decline in recorder sensitivity. In order to compute daily recorder scale factors, a linear drift is assumed between days (shown by underlined values) in which the recorder scale factor was directly determined.

Because of a higher recorder scale factor on July 5 than on May 21, contrary to the prevailing decline, and because the analyser operated for only a few days between these dates, the value for May 21 was used for the period May 21 to May 25 rather than an interpolated value. Lack of a calibration between August 8 and mid-September, when the analyser was repaired, leaves in doubt what factor to use from August 8 to 15 and August 29 to September 3. Therefore, a constant factor is again adopted. Because the calibration on November 6 does not agree well with calibrations on November 22 and after, interpolation is adopted for this period. During the period from November 22, 1958 until December 22, 1960 the recorder scale factor was found to be reasonably constant. The factor 19.24, the average of all data in the above period, is used as the daily recorder scale factor for the entire period of the report commencing with November 22.

V. Reference Gas Substandards - Table 5.

In this table index values are assembled for Tanks 4297, 6051 and A-17 as calculated in Table 1. The assignment of standard tanks has been altered from that originally adopted in order to make the best use of the data obtained at

Scripps.

The comparisons obtained at Scripps on tanks originally assigned as primary or span tanks but used as secondary tanks in this report are as follows:

Tank No.	At SIO Before Use at Mauna Loa		At SIO After Use at Mauna Loa		Weighted Average	
	No. of Comparisons	Index	No. of Comparisons	Index	No. of Comparisons	Index
4284	12	308.80	34	308.97	46	308.93
4287	14	293.80	12	293.62	26	293.72
A-17	21	310.09	-	-	21	310.09

Index values obtained before use at Mauna Loa appear in Report I for Tanks 4284 and 4287, in Report II for Tank A-17. The values obtained after use at Mauna Loa appear in Report III. Only the first set of comparisons after use at Mauna Loa are quoted for Tank 4287. Additional comparisons at Scripps made a year later do not agree well with the index value obtained soon after the tank was returned to Scripps and are omitted.

Comparing these data with those in Section III-C, it is evident that Tanks 4284 and A-17 were less well determined at Scripps than Tanks 4297, 6051, and 7344. Therefore the latter have been raised to the status of primary standards, while Tanks 4284 and A-17 have been degraded to the status of secondary standards. Tank 4277 is the only span tank well determined at Scripps. In order to obtain a reliable value for span Tank 4287 the following procedure is adopted in this report:

1. The index difference between 4284 and 4287 was determined to be 15.25 p.p.m. (see Section III-C).

2. Index values for Tank 4297 were calculated in Table 5 from comparisons with Tanks 4284 and 4287 assuming the index for Tank 4284 of 308.93 as determined at Scripps, and an index for 4287 consistent with step 1.:

$$308.93 - 15.25 = 293.68$$

The average index for Tank 4297 was computed to be 305.62.

3. In order to yield the Scripps index for Tank 4297 of 305.78 the index values for Tanks 4284 and 4287 must be raised by:

$$305.78 - 305.62 = 0.16$$

Making these corrections:

Tank 4284 = 308.93 + 0.16 = 309.09
Tank 4287 = 293.68 + 0.16 = 393.84

For Tank 4284 this corrected value agrees well with that obtained in Table 6 during March, 1959 when Tank 4284 was used as a working tank (index of 309.16). The corrected value for Tank 4287 is used to compute an index value for Tank 4286 on April 19, 1958 (see Table 1).

Index values are assembled for Tank A-17 based on comparisons with all three primary tanks. The final averages are:

	No. of Determinations	Index
versus 4277 and 4297	227	310.25
versus 4277 and 6051	239	310.33
versus 4277 and 7344	422	310.37

The agreement is satisfactory and indicates no serious discrepancies between the assigned values of the primary tanks. The value based on Tank 4297 appears to be too low. However, an even lower value would result if Tank 4297 had been determined from Tanks 4284 and 4287, as shown in Table 5.

In Table 5 index values are also assembled of Primary Tanks, 4297 and 6051 compared with each other and with Tank 7344. The agreement with assigned index values is satisfactory in all cases, a proof that no serious discrepancies exist in the assigned index values of the primary tanks.

VI. Index Values of Working Tanks - Tables 6 and 7

In Table 6 are assembled the index values for working tanks (i.e. tanks compared with air samples). Index values are taken from Tables 1 and 2. The weighted averages computed in this table are reproduced in Table 7 together with

index values based on comparisons at Scripps. Final weighted average index values based on both the Scripps and Mauna Loa data are given in column 10 of Table 7 for use in computing index values for air.

During March, 1959, Tank 4284 was used as a working tank. The index values so determined (see Table 2) are used to compute an average index value independent of that obtained in Section V. For purposes of computing air data, the index for Tank 4284 will be used as recorded in Table 7 where the data of Table 6 is combined with the Scripps data in the same manner as for other working tanks. The index value obtained (309.01) is in satisfactory agreement with the value deduced in Section V (309.09).

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Compari-sons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.	Date of Analysis
Span 463								1958
4284	4287	-14.83	9	17.50	-	-	3 1	Apr. 3
4284	4297	-2.98	6		-3.07	305.86	5 1	
4297	4285	2.30	4		2.37	308.15	6 1	
Span 485								
4284	4287	-15.77	16	18.61	-	-	3 2	Apr. 13
4284	4297	-3.44	14		-3.33	305.60	5 2	
4297	4285	2.79	7		2.70	308.48	6 2	
4284	4287	-15.53	9	18.33	-	-	3 3	Apr. 19
4284	4297	-3.68	8		-3.61	305.32	5 3	
4297	4285	2.83	6		2.78	308.56	6 3	
4287	4286	15.53	6		15.25	309.09	6 3	
4284	4287	-15.34	8	18.11	-	-	3 4	Apr. 24
4284	4297	-3.49	9		-3.47	305.46	5 4	
4297	4286	3.49	8		3.47	309.25	6 4	
4284	4287	-15.03	7	17.74	-	-	3 5	May 21
4284	4297	-3.30	8		-3.35	305.58	5 5	
4297	4286	3.43	9		3.48	309.26	6 5	
4284	4287	-15.17	11	17.90	-	-	3 6	July 3
4284	4297	-3.29	11		-3.31	305.62	5 6	
4297	4286	3.35	11		3.37	309.15	6 6	
4297	2423	1.21	9		1.22	307.00	6 6	
4284	4287	-14.39	10	17.08	-	-	3 7	Aug. 8
4284	4297	-3.16	9		-3.33	305.60	5 7	
4287	4297	11.41	8		12.02	305.70	5 7	
4297	2423	1.13	9		1.19	306.97	6 7	
4297	2426	0.83	9		0.87	306.65	6 7	

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Col: 1	2	3	4	5	6	7	8	9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.	Date of Analysis
Span 485								1958
4284	4287	-15.22	10	18.15	-	-	3 8	Nov. 6
4284	4297	-3.51	8		-3.48	305.45	5 8	
4287	4297	12.06	9		11.96	305.64	5 8	
4297	2426	0.91	7		0.90	306.68	6 8	
4284	4287	-16.25	10	19.15	-	-	3 9	Nov. 22
4284	4297	-3.52	14		-3.31	305.62	5 9	
4287	4297	12.69	11		11.93	305.61	5 9	
4297	2426	0.96	9		0.90	306.68	6 9	
4284	4287	-16.31	9	19.24	-	-	3 10	Nov. 26
4284	4297	-3.51	10		-3.28	305.65	5 10	
4287	4297	12.79	12		11.97	305.65	5 10	
4297	2426	0.93	9		0.87	306.65	6 10	
4297	2425	1.23	10		1.15	306.93	6 10	
4284	4287	-16.35	10	19.28	-	-	3 11	Dec. 9
4284	4297	-3.48	10		-3.25	305.68	5 11	
4287	4297	12.85	10		12.00	305.68	5 11	
4297	2425	1.12	9		1.05	306.83	6 11	
4284	4287	-16.32	10	19.21	-	-	3 12	Dec. 20-21
4284	4297	-3.45	10		-3.23	305.70	5 12	
4287	4297	12.78	10		11.97	305.65	5 12	
4297	2425	1.30	9		1.22	307.00	6 12	
4297	4295	-8.09	9		-7.58	298.20	6 12	
4284	4287	-16.19	10	19.20	-	-	3 13	Dec. 31
4284	4297	-3.48	9		-3.26	305.67	5 13	
4287	4297	12.88	9		12.08	305.76	5 13	
4297	4295	-8.06	11		-7.56	298.22	6 13	

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MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Compari-sons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis 1959
Span 485									
4284	4287	-16.32	9	19.25	-	-	3	14	Jan. 14
4284	4297	-3.44	9		-3.22	305.71	5	14	
4287	4297	12.87	9		12.03	305.71	5	14	
4297	4295	-8.10	9		-7.57	293.21	6	14	
4297	4292	-10.27	9		-9.60	296.18	6	14	
4284	4287	-16.30	9	19.22	-	-	3	15	Jan. 21
4284	4297	-3.48	10		-3.26	305.67	5	15	
4287	4297	12.78	8		11.97	305.65	5	15	
4297	4292	-10.24	8		-9.59	296.19	6	15	
4284	4287	-16.50	11	19.49	-	-	3	16	Feb. 22
4284	4297	-3.57	11		-3.30	305.63	5	16	
4287	4297	12.96	9		11.97	305.65	5	16	
4297	4292	-10.26	9		-9.48	296.30	6	16	
4277	A-17	-38.33	10	19.34	-35.67	310.17	5	17	Mar. 20
4297	A-17	4.67	10		4.35	310.13	5	17	
4297	4277	43.09	9		-	-	3	17	
4284	4287	-16.34	8		-	-	3	17	
4297	2420	1.88	10		1.75	307.53	6	17	
4277	A-17	-38.12	9	19.26	-35.63	310.21	5	18	Apr 3
4297	A-17	4.68	10		4.37	310.15	5	18	
4297	4277	42.92	9		-	-	3	18	
4297	2420	1.99	9		1.86	307.64	6	18	
4284	4287	-16.26	10		-	-	3	18	
4284	4287	-16.32	10	19.28	-	-	3	19	Apr. 16
4287	4297	12.81	9		11.96	305.64	5	19	
4284	4297	-3.55	10		-3.31	305.62	5	19	
4297	2420	2.01	10		1.88	307.66	6	19	
4297	4283	13.69	12		12.78	318.56	6	19	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Compari-sons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis
Span 485									1959
4277	A-17	-37.90	10	19.15	-35.62	310.22	5	20	Apr. 28
4297	A-17	4.71	8		4.43	310.21	5	20	
4297	4277	42.63	10		-	-	3	20	
4297	4283	13.75	11		12.92	318.70	6	20	
4284	4287	-16.18	8		-	-	3	20	
4284	4287	-15.65	12	18.55	-	-	3	21	May 15
4287	4297	12.36	9		11.99	305.67	5	21	
4284	4297	-3.44	10		-3.34	305.59	5	21	
4297	4283	13.23	10		12.84	318.62	6	21	
4297	2418	6.61	9		6.41	312.19	6	21	
4277	A-17	-37.64	11	18.96	-35.73	310.11	5	22	June 3
4297	A-17	4.73	10		4.49	310.27	5	22	
4297	4277	42.01	11		-	-	3	22	
4297	2418	6.78	10		6.44	312.22	6	22	
4284	4287	-16.08	11		-	-	3	22	
4284	4287	-16.02	10	18.86	-	-	3	23	June 11
4287	4297	12.52	10		11.95	305.63	5	23	
4284	4297	-3.41	8		-3.25	305.68	5	23	
4297	2418	-6.84	10		6.53	312.31	6	23	
4297	2423	12.08	9		11.53	317.31	6	23	
4277	A-17	-37.13	9	18.81	-35.53	310.31	5	24	July 2
4297	A-17	4.67	11		4.47	310.25	5	24	
4297	4277	41.92	10		-	-	3	24	
4297	2423	12.16	9		11.64	317.42	6	24	
4284	4287	-16.30	9	19.21	-	-	3	25	July 8
4287	4297	12.76	11		11.96	305.64	5	25	
4284	4297	-3.50	10		-3.28	305.65	5	25	
4297	2423	12.21	10		11.44	317.22	6	25	
4297	4286	11.70	9		10.96	316.74	6	25	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis
Span 485									1959
4277	A-17	-38.14	9	19.26	-35.64	310.20	5	26	July 13
4297	A-17	4.80	10		4.49	310.27	5	26	
4297	4277	42.77	9		-	-	3	26	
4297	4286	11.86	9		11.08	316.86	6	26	
4284	4287	-16.15	8		-	-	3	26	
4277	A-17	-37.99	9	19.25	-35.52	310.32	5	27	July 16
4297	A-17	4.81	8		4.50	310.28	5	27	
4297	4277	42.86	9		-	-	3	27	
4297	4286	11.93	8		11.16	316.94	6	27	
4284	4287	-16.24	9		-	-	3	27	
4284	4287	-16.40	8	19.30	-	-	3	28	July 27
4287	4297	12.80	10		11.94	305.62	5	28	
4284	4297	-3.51	8		-3.27	305.66	5	28	
4297	4286	12.05	10		11.24	317.02	6	28	
4297	4285	-2.73	9		-2.55	303.23	6	28	
4284	4287	-16.31	10	19.13	-	-	3	29	Aug. 1
4277	A-17	-37.90	10		-35.66	310.18	5	29	
4297	A-17	4.70	10		4.42	310.20	5	29	
4297	4277	42.58	11		-	-	3	29	
4297	4285	-2.62	9		-2.47	303.31	6	29	
4284	4287	-16.38	10	19.43	-	-	3	30	Aug. 8
4287	4297	12.77	10		11.83	305.51	5	30	
4284	4297	-3.78	10		-3.50	305.43	5	30	
4297	4285	-2.72	6		-2.52	303.26	6	30	
4284	4287	-16.71	10	19.68	-	-	3	31	Aug. 22
4287	4297	13.02	10		11.91	305.59	5	31	
4284	4297	-3.62	10		-3.31	305.62	5	31	
4297	6074	0.75	8		0.69	306.47	6	31	

Table 1. Reference Gas Comparisons with Analyser No. 28

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1. (Sub) Standard Tank No.	2 Compared Tank No.	3 Observed Scale Difference	4 No. Of Comparisons	5 Recorder Scale Factor	6 Computed Index Difference	7 Computed Index	8 Table and Sheet No.		9 Date of Analysis
Span 485									1959
4277	A-17	-38.34	8	19.41	-35.55	310.29	5	32	Sept. 1
4297	A-17	4.81	11		4.46	310.24	5	32	
4297	4277	43.22	9		-	-	3	32	
4297	6074	0.79	9		0.73	306.51	6	32	
4284	4287	-16.38	6		-	-	3	32	
4284	4287	-16.21	9	19.20	-	-	3	33	Sept. 10
4287	4297	12.64	8		11.85	305.53	5	33	
4284	4297	-3.69	10		-3.46	305.47	5	33	
4297	6074	0.76	10		0.71	306.49	6	33	
4297	6081	-1.94	9		-1.82	303.96	6	33	
4277	A-17	-37.33	9	18.94	-35.48	310.36	5	34	Sept. 20
4297	A-17	4.74	10		4.50	310.28	5	34	
4297	4277	42.22	9		-	-	3	34	
4297	6081	-1.78	9		-1.69	304.09	6	34	
4284	4287	-16.01	7		-	-	3	34	
4277	A-17	-37.46	10	19.04	-35.41	310.43	5	35	Oct. 2
4297	A-17	4.87	9		4.60	310.38	5	35	
4297	4277	42.41	9		-	-	3	35	
4297	6081	-1.65	10		-1.56	304.22	6	35	
4297	6067	2.05	8		1.94	307.72	6	35	
4277	A-17	-38.11	9	19.28	-35.58	310.26	5	36	Oct. 12
4297	A-17	4.83	7		4.51	310.29	5	36	
4297	4277	42.91	10		-	-	3	36	
4297	6067	2.18	10		2.04	307.82	6	36	
4277	A-17	-37.79	9	19.15	-35.52	310.32	5	37	Oct. 26
6051	A-17	0.30	8		0.28	310.35	5	37	
6051	4277	38.04	10		-	-	3	37	
6051	6067	-2.33	9		-2.19	307.88	6	37	
6051	3759	0.30	8		0.28	310.35	6	37	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis
Span 485									1959
4277	A-17	-37.70	9	19.08	-35.57	310.27	5	38	Nov. 7
6051	A-17	0.27	10		0.25	310.32	5	38	
6051	4277	37.85	10		-	-	3	38	
6051	3759	0.28	9		0.26	310.33	6	38	
6051	4297	-4.48	9		-4.23	305.84	5	38	
4277	A-17	-37.60	5	19.12	-35.40	310.44	5	39	Nov. 21
6051	A-17	0.34	7		0.32	310.39	5	39	
6051	4277	38.03	6		-	-	3	39	
6051	3759	0.36	5		0.34	310.41	6	39	
6051	4288	1.47	6		1.38	311.45	6	39	
4277	A-17	-37.93	6	19.18	-35.60	310.24	5	40	Nov. 27
6051	A-17	0.36	5		0.34	310.41	5	40	
6051	4277	37.93	6		-	-	3	40	
6051	4288	1.67	6		1.57	311.64	6	40	
6051	4297	-4.59	8		-4.31	305.76	5	40	
4277	A-17	-37.39	9	18.90	-35.61	310.23	5	41	Dec. 3
6051	A-17	0.26	8		0.25	310.32	5	41	
6051	4277	37.46	9		-	-	3	41	
6051	4288	1.66	9		1.58	311.65	6	41	
6051	4274	-8.91	10		-8.49	301.58	6	41	
4277	A-17	-37.73	9	19.15	-35.46	310.38	5	42	Dec. 10
6051	A-17	0.31	10		0.29	310.36	5	42	
6051	4277	38.05	10		-	-	3	42	
6051	4274	-9.03	8		-8.49	301.58	6	42	
6051	4297	-4.60	9		-4.32	305.75	5	42	
4277	A-17	-38.16	9	19.32	-35.55	310.29	5	43	Dec. 19
6051	A-17	0.25	10		0.23	310.30	5	43	
6051	4277	38.38	10		-	-	3	43	
6051	4274	-8.99	10		-8.38	301.69	6	43	
6051	3753	16.53	9		15.40	325.47	6	43	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.	Date of Analysis
Span 485								1959
4277	A-17	-37.67	9	19.07	-35.56	310.28	5 44	Dec. 28
6051	A-17	0.31	9		0.29	310.36	5 44	
6051	4277	37.82	11		-	-	3 44	
6051	3753	16.42	9		15.50	325.57	6 44	
6051	4297	-4.50	8		-4.25	305.82	5 44	
								1960
4277	A-17	-37.99	9	19.25	-35.52	310.32	5 45	Jan. 8
6051	A-17	0.31	11		0.29	310.36	5 45	
6051	4277	38.22	10		-	-	3 45	
6051	3753	16.79	9		15.70	325.77	6 45	
6051	2418	-3.96	10		-3.70	306.37	6 45	
4277	A-17	-38.14	9	19.34	-35.50	310.34	5 46	Jan. 16
6051	A-17	0.33	9		0.31	310.38	5 46	
6051	4277	38.41	11		-	-	3 46	
6051	2418	-4.07	9		-3.79	306.28	6 46	
6051	4297	-4.67	10		-4.35	305.72	5 46	
4277	A-17	-37.86	9	19.17	-35.55	310.29	5 47	Jan. 30
6051	A-17	0.30	9		0.28	310.35	5 47	
6051	4277	38.01	8		-	-	3 47	
6051	2418	-3.96	10		-3.72	306.35	6 47	
6051	7361	10.59	8		9.94	320.01	6 47	
4277	A-17	-39.57	9	20.02	-35.58	310.26	5 48	Feb. 17
6051	A-17	0.25	2		0.22	310.29	5 48	
6051	4277	39.78	10		-	-	3 48	
6051	7361	11.02	9		9.91	319.98	6 48	
6051	4297	-4.86	9		-4.37	305.70	5 48	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Compari-sons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis 1960
Span 485									
4277	A-17	-38.13	11	19.30	-35.56	310.28	5	49	Mar. 3
6051	A-17	0.30	11		0.28	310.35	5	49	
6051	4277	38.26	11		-	-	3	49	
6051	7361	10.75	10		10.03	320.10	6	49	
6051	7362	-9.37	11		-8.74	301.33	6	49	
4277	A-17	-38.21	10	19.41	-35.43	310.41	5	50	Mar. 21
6051	A-17	0.36	8		0.33	310.40	5	50	
6051	4277	38.58	11		-	-	3	50	
6051	7362	-9.24	11		-8.57	301.50	6	50	
6051	4297	-4.72	10		-4.38	305.69	5	50	
4277	A-17	-38.67	11	19.52	-35.66	310.18	5	51	Mar. 29
7344	A-17	-4.42	10		-4.08	310.26	5	51	
7344	4277	34.20	9		-	-	3	51	
7344	6051	-4.68	9		-4.32	310.02	5	51	
7344	4297	-9.53	9		-8.79	305.55	5	51	
7344	6051	-4.76	10		-4.39	309.95	5	52	
7344	4297	-9.50	11		-8.76	305.58	5	52	
7344	A-17	-4.44	11		-4.09	310.25	5	52	
4277	A-17	-38.48	11		-35.48	310.36	5	52	
4277	A-17	-38.26	10	19.44	-35.43	310.41	5	53	Mar. 30
7344	A-17	-4.27	10		-3.95	310.39	5	53	
7344	4277	34.07	10		-	-	3	53	
7344	7362	-13.78	10		-12.76	301.58	6	53	
7344	4275	-11.89	10		-11.01	303.33	6	53	
4277	A-17	-38.11	10	19.33	-35.49	310.35	5	54	Apr. 16
7344	A-17	-4.25	10		-3.96	310.38	5	54	
7344	4277	33.79	10		-	-	3	54	
7344	4275	-11.71	10		-10.90	303.44	6	54	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis
Span 485									1960
4277	A-17	-38.04	9	19.30	-35.48	310.36	5	55	May 3
7344	A-17	-4.21	10		-3.93	310.41	5	55	
7344	4277	33.74	10		-	-	3	55	
7344	4275	-11.57	9		-10.79	303.55	6	55	
7344	4272	-14.66	9		-13.67	300.67	6	55	
4277	A-17	-38.23	10	19.40	-35.47	310.37	5	56	May 19
7344	A-17	-4.31	10		-4.00	310.34	5	56	
7344	4277	33.98	10		-	-	3	56	
7344	4272	-14.73	10		-13.68	300.66	6	56	
4277	A-17	-38.29	10	19.43	-35.47	310.37	5	57	June 3
7344	A-17	-4.32	10		-4.00	310.34	5	57	
7344	4277	34.03	10		-	-	3	57	
7344	4272	-14.54	9		-13.47	300.87	6	57	
7344	7366	-9.04	10		-8.37	305.97	6	57	
4277	A-17	-37.93	10	19.23	-35.50	310.34	6	58	June 23
7344	A-17	-4.35	10		-4.07	310.27	6	58	
7344	4277	33.73	10		-	-	3	58	
7344	7366	-9.20	10		-8.61	305.73	6	58	
4277	A-17	-37.82	10	19.16	-35.53	310.31	5	59	July 4
7344	A-17	-4.28	10		-4.02	310.33	5	59	
7344	4277	33.53	10		-	-	3	59	
7344	7366	-9.06	10		-8.51	305.83	6	59	
7344	3758	-12.52	10		-11.76	302.58	6	59	
4277	A-17	-37.94	10	19.22	-35.53	310.31	5	60	July 19
7344	A-17	-4.23	10		-3.96	310.38	5	60	
7344	4277	-33.59	10		-	-	3	60	
7344	3758	-12.51	10		-11.72	302.62	6	60	

Table 1. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis
Span 485									1960
4277	A-17	-38.17	10	19.39	-35.43	310.41	5	61	Aug. 2
7344	A-17	-4.15	10		-3.85	310.49	5	61	
7344	4277	33.84	10		-	-	3	61	
7344	3758	-12.51	10		-11.61	302.73	6	61	
7344	6081	-8.38	10		-7.78	306.56	6	61	
4277	A-17	-38.12	10	19.38	-35.41	310.43	5	62	Aug. 14
7344	A-17	-4.19	10		-3.89	310.45	5	62	
7344	4277	33.91	10		-	-	3	62	
7344	6081	-8.19	10		-7.61	306.73	6	62	
4277	A-17	-37.79	10	19.18	-35.46	310.38	5	63	Aug. 27
7344	A-17	-4.15	10		-3.89	310.45	5	63	
7344	4277	33.49	10		-	-	3	63	
7344	6081	-7.91	10		-7.42	306.92	6	63	
7344	148	-12.17	10		-11.42	302.92	6	63	
4277	A-17	-38.00	10	19.30	-35.44	310.40	5	64	Sept. 13
7344	A-17	-4.23	10		-3.95	310.39	5	64	
7344	4277	33.77	10		-	-	3	64	
7344	148	-12.31	10		-11.48	302.86	6	64	
4277	A-17	-37.80	10	19.17	-35.49	310.35	5	65	Sept. 26
7344	A-17	-4.25	10		-3.99	310.35	5	65	
7344	4277	33.55	10		-	-	3	65	
7344	148	-12.05	10		-11.31	303.03	6	65	
7344	7366	3.41	10		3.20	317.54	6	65	
4277	A-17	-38.13	10	19.35	-35.47	310.37	5	66	Oct. 12
7344	A-17	-4.23	10		-3.93	310.41	5	66	
7344	4277	33.82	10		-	-	3	66	
7344	7366	3.49	10		3.25	317.59	6	66	

Table 1. Reference Gas Comparisons with Analyser No. 28

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8		9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.		Date of Analysis
Span 485									1960
4277	A-17	-38.01	10	19.31	-35.43	310.41	5	67	Oct. 26
7344	A-17	-4.10	10		-3.82	310.52	5	67	
7344	4277	33.67	10		-	-	3	67	
7344	7366	3.44	10		3.21	317.55	6	67	
7344	7361	8.27	10		7.71	322.05	6	67	
4277	A-17	-38.10	10	19.38	-35.39	310.45	5	68	Nov. 11
7344	A-17	-4.21	10		-3.91	310.43	5	68	
7344	4277	33.95	10		-	-	3	68	
7344	7361	8.55	10		7.94	322.28	6	68	
4277	A-17	-38.00	10	19.29	-35.46	310.38	5	69	Nov. 23
7344	A-17	-4.26	10		-3.98	310.36	5	69	
7344	4277	33.77	10		-	-	3	69	
7344	7361	8.53	10		7.96	322.30	6	69	
7344	7362	-14.34	10		-13.38	300.96	6	69	
4277	A-17	-38.26	10	19.42	-35.46	310.38	5	70	Dec. 8
7344	A-17	-4.28	10		-3.97	310.37	5	70	
7344	4277	33.97	10		-	-	3	70	
7344	7362	-14.35	10		-13.30	301.04	6	70	
4277	A-17	-37.69	10	19.14	-35.44	310.40	5	71	Dec. 22
7344	A-17	-4.10	10		-3.86	310.48	5	71	
7344	4277	33.43	10		-	-	3	71	
7344	7362	-13.86	10		-13.03	301.31	6	71	
7344	3758	-4.01	10		-3.77	310.57	6	71	

Table 2. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.	Date of Analysis
Span 463								1958
4297	4285	2.47	15	17.50	2.54	308.32	6	Mar. 27-Apr. 1
Span 485								
4297	4285	2.55	6	18.44	2.49	308.27	6	Apr. 14-19
4297	4286	3.35	4	18.22	3.31	309.09	6	Apr. 20-23
4297	4286	3.56	7	17.99	3.56	309.34	6	Apr. 30-May 6
4297	4286	3.65	2	17.44	3.70	309.48	6	May 22-24
4297	4286	3.66	5	17.83	3.69	309.47	6	July 4-8
4297	4286	3.45	2	17.71	3.51	309.29	6	July 11-12
4297	2423	1.16	8	17.62	1.19	306.97	6	July 12-19
4297	2423	1.26	9	17.38	1.30	307.08	6	July 22-31
4297	2423	1.18	6	17.14	1.24	307.02	6	Aug. 3-8
4297	2426	0.81	8	17.08	0.85	306.63	6	Aug. 9-Sept. 2
4297	2426	1.00	10	19.24**	0.94	306.72	6	Nov. 7-15
4297	2425	1.36	10		1.27	307.05	6	Dec. 3
4297	2425	1.27	11		1.19	306.97	6	Dec. 15
4297	4295	-8.03	9		-7.51	298.27	6	Dec. 26
								1959
4297	4295	-7.97	9		-7.46	298.32	6	Jan. 6
4297	4292	-10.24	8		-9.58	296.20	6	Jan. 20
4297	4292	-10.10	9		-9.45	296.33	6	Jan. 27
4297	4284	3.60	3		3.37	309.15	6	Mar. 1
4297	4284	3.61	8		3.38	309.16	6	Mar. 5
4297	4284	3.60	8		3.37	309.15	6	Mar. 9
4297	4284	3.59	8		3.36	309.14	6	Mar. 11
4297	2420	2.08	8		1.95	307.73	6	Mar. 30
4297	2420	2.11	9		1.97	307.75	6	Apr. 11
4297	4283	13.73	9		12.85	318.63	6	Apr. 23
4297	4283	13.66	9		12.78	318.56	6	May 4
4297	2418	6.76	8		6.32	312.10	6	May 22

* Comparisons on August 11 and 13 omitted from average.
** Recorder Scale Factor Constant after November 15, 1958

Table 2. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Comparisons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.	Date of Analysis
Span 485								1959
4297	2418	6.85	8	19.24	6.41	312.19	6	June 7
4297	2423	12.32	9		11.53	317.31	6	June 21
4297	2423	12.22	11		11.43	317.21	6	July 7
4297	4286	11.99	9		11.22	317.00	6	July 22
4297	4285	-2.53	9		-2.37	303.41	6	July 30
4297	4285	-2.39	8		-2.24	303.54	6	Aug. 5
4297	6074	0.70	9		0.65	306.43	6	Aug. 29
4297	6074	1.86	9		1.74	307.52	6	Sept. 5
4297	4281	-1.43	9		-1.34	304.44	6	Sept. 16
4297	4281	-1.46	9		-1.37	304.41	6	Sept. 27
4297	6067	2.13	9		1.99	307.77	6	Oct. 8
4297	6067	2.41	9		2.25	308.03	6	Oct. 19
6051	3759	0.50	9		0.47	310.54	6	Nov. 2
6051	3759	0.62	9		0.58	310.65	6	Nov. 15
6051	4288	1.83	10		1.71	311.78	6	Nov. 24
6051	4288	1.72	9		1.61	311.68	6	Nov. 30
6051	4274	-9.09	8		-8.50	301.57	6	Dec. 16
6051	3753	16.89	9		15.80	325.87	6	Dec. 24
								1960
6051	3753	17.06	9		15.96	326.03	6	Jan. 5
6051	2418	-4.22	9		-3.95	306.12	6	Jan. 11
6051	2418	-4.09	9		-3.83	306.24	6	Jan. 23
6051	7361	10.80	10		10.10	320.17	6	Feb. 10
6051	7361	10.94	10		10.23	320.30	6	Feb. 26
6051	7361	10.76	6		10.07	320.14	6	Mar. 2
6051	7361	10.77	6		10.08	320.15	6	Mar. 2
6051	7362	-8.72	9		-8.16	301.91	6	Mar. 14
6051	7362	-8.80	11		-8.23	301.84	6	Mar. 27
7344	4275	-11.48	9		-10.74	303.60	6	Apr. 8
7344	4275	-11.46	10		-10.72	303.62	6	Apr. 23

Table 2. Reference Gas Comparisons with Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. Of Compari-sons	Recorder Scale Factor	Computed Index Difference	Computed Index	Table and Sheet No.	Date of Analysis
Span 485								1960
7344	4272	-14.56	10	19.24	-13.62	300.72	6	May 13
7344	4272	-14.52	10		-13.58	300.76	6	May 27
7344	7366	-8.75	11		-8.19	306.15	6	June 12
7344	7366	-8.86	12		-8.29	306.05	6	June 29
7344	3758	-12.56	11		-11.75	302.59	6	July 13
7344	3758	-12.48	11		-11.68	302.66	6	July 26
7344	6081	-8.19	11		-7.66	306.68	6	Aug. 9
7344	6081	-8.23	11		-7.70	306.64	6	Aug. 21
7344	148	-12.19	9		-11.40	302.94	6	Sept. 7
7344	148	-12.22	11		-11.43	302.91	6	Sept. 20
7344	7366	3.94	12		3.69	318.03	6	Oct. 20
7344	7361	8.57	12		8.02	322.36	6	Nov. 4
7344	7361	8.43	11		7.89	322.23	6	Nov. 17
7344	7362	-14.33	10		-13.41	300.93	6	Dec. 1
7344	7362	-14.15	11		-13.24	301.10	6	Dec. 15

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 463							1958
4284	4287	-14.83	9	15.25	17.50		Apr. 3
Span 485							
4284	4287	-15.77	16	15.25	18.61		Apr. 13
4284	4287	-15.53	9	15.25	18.33		Apr. 19
4284	4287	-15.34	8	15.25	18.11		Apr. 24
4284	4287	-15.03	7	15.25	17.74		May 21
4284	4287	-15.17	11	15.25	17.90		July 3
4284	4287	-14.39	10	15.25	16.98		Aug. 8
4284	4297	-3.16	9				
4287	4297	-11.41	8				
4284	4287	-14.57*	8*	15.25	17.20		
			18			17.08	
4284	4287	-15.22	10	15.25	17.96		Nov. 6
4284	4297	-3.51	8				
4287	4297	12.06	9				
4284	4287	15.57*	8*	15.25	18.38		
			18			18.15	
4284	4287	-16.25	10	15.25	19.18		Nov. 22
4284	4297	-3.52	14				
4287	4297	12.69	11				
4284	4287	-16.21*	11*	15.25	19.13		
			21			19.15	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1958
4284	4287	-16.31	9	15.25	19.25		Nov. 26
4284	4297	-3.51	10				
4287	4297	12.79	12				
4284	4287	-16.30*	10*	15.25	19.24		
			19			19.24	
4284	4287	-16.35	10	15.25	19.30		Dec. 9
4284	4297	-3.48	10				
4287	4297	12.85	10				
4284	4287	-16.33*	10*	15.25	19.27		
			20			19.28	
4284	4287	-16.32	10	15.25	19.26		Dec. 20-21
4284	4297	-3.45	10				
4287	4297	12.78	10				
4284	4287	-16.23*	10*	15.25	19.16		
			20			19.21	
4284	4287	-16.19	10	15.25	19.11		Dec. 31
4284	4297	-3.48	10				
4287	4297	12.88	9				
4284	4287	-16.36*	9*	15.25	19.31		
			19			19.20	
							1959
4284	4287	-16.32	9	15.25	19.26		Jan. 14
4284	4297	-3.44	9				
4287	4297	12.87	9				
4284	4287	-16.31*	9*	15.25	19.25		
			18			19.25	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1959
4284	4287	-16.30	9	15.25	19.24		Jan. 21
4284	4297	-3.48	10				
4287	4297	12.78	8				
4284	4287	-16.26*	8*	15.25	19.19		
			17			19.22	
4284	4287	-16.50	11	15.25	19.48		Feb. 22
4284	4297	-3.57	11				
4287	4297	12.96	9				
4284	4287	-16.53*	9*	15.25	19.51		
			20			19.49	
4277	A-17	-38.33	10				Mar. 20
4297	A-17	4.67	10				
4297	4277	43.00*	10*	40.06	19.32		
4297	4277	43.09	9	40.06	19.36		
			19			19.34	
4277	A-17	-38.12	9				Apr. 3
4297	A-17	4.68	10				
4297	4277	42.80*	9*	40.06	19.23		
4297	4277	42.92	9	40.06	19.29		
			18			19.26	
4284	4287	-16.32	10	15.25	19.26		Apr. 16
4284	4297	-3.55	10				
4287	4297	12.81	9				
4284	4287	-16.36*	9*	15.25	19.31		
			19			19.28	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1959
4277	A-17	-37.90	10				Apr. 28
4297	A-17	4.71	8				
4297	4277	42.61*	8*	40.06	19.15		
4297	4277	42.63	10	40.06	19.15		
			18			19.15	
4284	4287	-15.65	12	15.25	18.47		May 15
4284	4297	-3.44	10				
4287	4297	12.36	9				
4284	4287	-15.80*	9*	15.25	18.65		
			21			18.55	
4277	A-17	-37.64	11				June 3
4297	A-17	4.73	10				
4297	4277	42.37*	10*	40.06	19.04		
4297	4277	42.01	11	40.06	18.88		
			21			18.96	
4284	4287	-16.02	10	15.25	18.91		June 11
4284	4297	-3.41	8				
4287	4297	12.52	10				
4284	4287	-15.93*	8*	15.25	18.80		
			18			18.86	
4277	A-17	-37.13	9				July 2
4297	A-17	4.67	11				
4297	4277	41.80*	9*	40.06	18.78		
4297	4277	41.92	10	40.06	18.84		
			19			18.81	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1959
4284	4287	-16.30	9	15.25	19.24		July 8
4284	4297	-3.50	10				
4287	4297	12.76	11				
4284	4287	-16.26*	10*	15.25	19.19		
			19			19.21	
4277	A-17	-38.14	9				July 13
4297	A-17	4.80	10				
4297	4277	42.94*	9*	40.06	19.29		
4297	4277	42.77	9	40.06	19.22		
			18			19.26	
4277	A-17	-37.99	9				July 16
4297	A-17	4.81	8				
4297	4277	42.80*	8*	40.06	19.23		
4297	4277	42.86	9	40.06	19.26		
			17			19.25	
4284	4287	-16.40	8	15.25	19.36		July 27
4284	4297	-3.51	8				
4287	4297	12.80	10				
4284	4287	-16.31*	8*	15.25	19.25		
			16			19.30	
4277	A-17	-37.90	10				Aug. 1
4297	A-17	4.70	10				
4297	4277	42.60*	10*	40.06	19.14		
4297	4277	42.58	11	40.06	19.13		
			21			19.13	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1959
4284	4287	-16.38	10	15.25	19.33		Aug. 8
4284	4297	-3.78	10				
4287	4297	12.77	10				
4284	4287	-16.55*	10*	15.25	19.53		
			10			19.43	
4284	4287	-16.71	10	15.25	19.72		Aug. 22
4284	4297	-3.62	10				
4287	4297	13.02	10				
4284	4287	-16.64*	10*	15.25	19.64		
			20			19.68	
4277	A-17	-38.34	8				Sept. 1
4297	A-17	4.81	11				
4297	4277	43.15*	8*	40.06	19.39		
4297	4277	43.22	9	40.06	19.42		
			17			19.41	
4284	4287	-16.21	9	15.25	19.13		Sept. 10
4284	4297	-3.69	10				
4287	4297	12.64	8				
4284	4287	-16.33*	8*	15.25	19.27		
			17			19.20	
4277	A-17	-37.33	9				Sept. 20
4297	A-17	4.74	10				
4297	4277	42.07*	9*	40.06	18.90		
4297	4277	42.22	9	40.06	18.97		
			18			18.94	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1959
4277	A-17	-37.46	10				Oct. 2
4297	A-17	4.87	9				
4297	4277	42.33*	9*	40.06	19.02		
4297	4277	42.41	9	40.06	19.06		
			18			19.04	
4277	A-17	-38.11	9				Oct. 12
4297	A-17	4.83	7				
4297	4277	42.94*	7*	40.06	19.29		
4297	4277	42.91	10	40.06	19.28		
			17			19.28	
4277	A-17	-37.79	9				Oct. 26
6051	A-17	0.30	8				
6051	4277	38.09*	8*	35.77	19.17		
6051	4277	38.04	10	35.77	19.14		
			18			19.15	
4277	A-17	-37.70	9				Nov. 7
6051	A-17	0.27	10				
6051	4277	37.97*	9*	35.77	19.11		
6051	4277	37.85	10	35.77	19.05		
			19			19.08	
4277	A-17	-37.60	5				Nov. 21
6051	A-17	0.34	7				
6051	4277	37.94*	5*	35.77	19.09		
6051	4277	38.03	6	35.77	19.14		
			11			19.12	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1959
4277	A-17	-37.93	6				Nov. 27
6051	A-17	0.36	5				
6051	4277	38.29*	5*	35.77	19.27		
6051	4277	37.93	6	35.77	19.09		
			11			19.18	
4277	A-17	-37.39	9				Dec. 3
6051	A-17	0.26	8				
6051	4277	37.65*	8*	35.77	18.95		
6051	4277	37.46	9	35.77	18.85		
			17			18.90	
4277	A-17	-37.73	9				Dec. 10
6051	A-17	0.31	10				
6051	4277	38.04*	9*	35.77	19.14		
6051	4277	38.05	10	35.77	19.15		
			19			19.15	
4277	A-17	-38.16	9				Dec. 19
6051	A-17	0.25	10				
6051	4277	38.41*	9*	35.77	19.33		
6051	4277	38.38	10	35.77	19.32		
			19			19.32	
4277	A-17	-37.67	9				Dec. 28
6051	A-17	0.31	9				
6051	4277	37.98*	9*	35.77	19.11		
6051	4277	37.82	11	35.77	19.03		
			20			19.07	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1960
4277	A-17	-37.99	9				Jan. 8
6051	A-17	0.31	11				
6051	4277	38.30*	9*	35.77	19.27		
6051	4277	38.22	10	35.77	19.23		
			19			19.25	
4277	A-17	-38.14	9				Jan. 16
6051	A-17	0.33	9				
6051	4277	38.47*	9*	35.77	19.36		
6051	4277	38.41	11	35.77	19.33		
			20			19.34	
4277	A-17	-37.86	9				Jan. 30
6051	A-17	0.30	9				
6051	4277	38.16*	9*	35.77	19.20		
6051	4277	38.01	8	35.77	19.13		
			17			19.17	
4277	A-17	-39.57	9				Feb. 17
6051	A-17	0.25	2				
6051	4277	39.82*	2*	35.77	20.04		
6051	4277	39.78	10	35.77	20.02		
			12			20.02	
4277	A-17	-38.13	11				Mar. 3
6051	A-17	0.30	11				
6051	4277	38.43*	11*	35.77	19.34		
6051	4277	38.26	11	35.77	19.25		
			22			19.30	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1960
4277	A-17	-38.21	10				Mar. 21
6051	A-17	0.36	8				
6051	4277	38.57*	8*	35.77	19.41		
6051	4277	38.58	11	35.77	19.41		
			19			19.41	
4277	A-17	-38.67	11				Mar. 29
7344	A-17	-4.42	10				
7344	4277	34.25*	10*	31.50	19.57		
7344	4277	34.20	9	31.50	19.54		
4277	A-17	-38.48	11				
7344	A-17	-4.44	11				
7344	4277	34.04*	11*	31.50	19.45		
			30			19.52	
4277	A-17	-38.26	10				Mar. 30
7344	A-17	-4.27	10				
7344	4277	33.99*	10*	31.50	19.42		
7344	4277	34.07	10	31.50	19.47		
			20			19.44	
4277	A-17	-38.11	10				Apr. 16
7344	A-17	-4.25	10				
7344	4277	33.86*	10*	31.50	19.35		
7344	4277	33.79	10	31.50	19.31		
			20			19.33	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1960
4277	A-17	-38.04	9				May 3
7344	A-17	-4.21	10				
7344	4277	33.83*	9*	31.50	19.33		
7344	4277	33.74	10	31.50	19.28		
			19			19.30	
4277	A-17	-38.23	10				May 19
7344	A-17	-4.31	10				
7344	4277	33.92*	10*	31.50	19.38		
7344	4277	33.98	10	31.50	19.42		
			20			19.40	
4277	A-17	-38.29	10				June 3
7344	A-17	-4.32	10				
7344	4277	33.97*	10*	31.50	19.41		
7344	4277	34.03	10	31.50	19.45		
			20			19.43	
4277	A-17	-37.93	10				June 23
7344	A-17	-4.35	10				
7344	4277	33.58*	10*	31.50	19.19		
7344	4277	33.73	10	31.50	19.27		
			20			19.23	
4277	A-17	-37.82	10				July 4
7344	A-17	-4.28	10				
7344	4277	33.54*	10*	31.50	19.17		
7344	4277	33.53	10	31.50	19.16		
			20			19.16	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1960
4277	A-17	-37.94	10				July 19
7344	A-17	-4.23	10				
7344	4277	33.71*	10*	31.50	19.26		
7344	4277	33.59	10	31.50	19.19		
			20			19.22	
4277	A-17	-38.17	10				Aug. 2
7344	A-17	-4.15	10				
7344	4277	34.02*	10*	31.50	19.44		
7344	4277	33.84	10	31.50	19.34		
			20			19.39	
4277	A-17	-38.12	10				Aug. 14
7344	A-17	-4.19	10				
7344	4277	33.93*	10*	31.50	19.39		
7344	4277	33.91	10	31.50	19.38		
			20			19.38	
4277	A-17	-37.79	10				Aug. 27
7344	A-17	-4.15	10				
7344	4277	33.64*	10*	31.50	19.22		
7344	4277	33.49	10	31.50	19.14		
			20			19.18	
4277	A-17	-38.00	10				Sept. 13
7344	A-17	-4.23	10				
7344	4277	33.77*	10*	31.50	19.30		
7344	4277	33.77	10	31.50	19.30		
			20			19.30	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1960
4277	A-17	-37.80	10				Sept. 26
7344	A-17	-4.25	10				
7344	4277	33.55*	10*	31.50	19.17		
7344	4277	33.55	10	31.50	19.17		
			20			19.17	
4277	A-17	-38.13	10				Oct. 12
7344	A-17	-4.23	10				
7344	4277	33.90*	10*	31.50	19.37		
7344	4277	33.82	10	31.50	19.33		
			20			19.35	
4277	A-17	-38.01	10				Oct. 26
7344	A-17	-4.10	10				
7344	4277	33.91*	10*	31.50	19.38		
7344	4277	33.67	10	31.50	19.24		
			20			19.31	
4277	A-17	-38.10	10				Nov. 11
7344	A-17	-4.21	10				
7344	4277	33.89*	10*	31.50	19.37		
7344	4277	33.95	10	31.50	19.40		
			20			19.38	
4277	A-17	-38.00	10				Nov. 23
7344	A-17	-4.26	10				
7344	4277	33.74*	10*	31.50	19.28		
7344	4277	33.77	10	31.50	19.30		
			20			19.29	

Table 3. Recorder Scale Factors of Analyser No. 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8
(Sub) Standard Tank No.	Compared Tank No.	Observed Scale Difference	No. of Comparisons	Index Difference	Recorder Scale Factor: Single Set	Recorder Scale Factor: Wt'd Average	Date of Analysis
Span 485							1960
4277	A-17	-38.26	10				Dec. 8
7344	A-17	-4.28	10				
7344	4277	33.98*	10*	31.50	19.42		
7344	4277	33.97	10	31.50	19.41		
			20			19.42	
4277	A-17	-37.69	10				Dec. 22
7344	A-17	-4.10	10				
7344	4277	33.59*	10*	31.50	19.19		
7344	4277	33.43	10	31.50	19.10		
			20			19.14	

Table 3a. Intercomparison of Old and New Standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6
(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Observed Scale Difference	Recorded Scale Factor	Date of Analysis
					1959
4284	4287	11	-16.50		Feb. 22
		9	-16.53		Feb. 22
		8	-16.34		Mar. 20
		10	-16.26		Apr. 3
		10	-16.32		Apr. 16
		9	-16.36		Apr. 16
		8	-16.18		Apr. 28
		12	-15.65		May 15
		9	-15.80		May 15
		11	-16.08		June 3
		10	-16.02		June 11
		8	-15.93		June 11
		9	-16.30		July 8
		10	-16.26		July 8
		8	-16.15		July 13
		9	-16.24		July 16
		8	-16.40		July 27
		8	-16.31		July 27
		10	-16.31		Aug. 1
		10	-16.38		Aug. 8
		10	-16.55		Aug. 8
		6	-16.38		Sept. 1
		7	-16.01		Sept. 20
Wt'd. Av.		210	-16.22		
4297	4277	19	19.34		Mar. 20
		18	19.26		Apr. 3
		18	19.15		Apr. 28
		21	18.96		June 3
		19	18.81		July 2
		18	19.26		July 13
		17	19.25		July 16
		21	19.13		Aug. 1
		17	19.41		Sept. 1
		18	18.94		Sept. 20
Wt'd. Av.		186	19.14		

Table 4. Daily Recorder Scale Factors for Analyser 58

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	1	2	1	2	1	2
Date	Recorder Scale Factor	Date	Recorder Scale Factor	Date	Recorder Scale Factor	Date	Recorder Scale Factor
Span 485							
1958							
Apr. 13	18.61	May 14	-	July 21	17.49	Sept. 3	17.08
14	18.56	15	-	22	17.47		
15	18.52	16	-	23	17.44	Nov. 6	18.15
16	18.47	17	-	24	17.42	7	18.22
17	18.42	18	-	25	17.40	8	18.29
18	18.38	19	-	26	17.38	9	18.35
19	18.33	20	-	27	17.35	10	18.44
20	18.29	May 21	17.74	28	17.33	11	18.49
21	18.24	22	"	29	17.31	12	18.56
22	18.20	23	"	30	17.29	13	18.03
23	18.15	24	"	31	17.26	14	18.70
24	18.11	25	"	Aug. 1	17.24	15	18.76
25	18.10			2	17.22	16	18.83
26	18.08	July 3	17.90	3	17.19	17	18.90
27	18.07	4	17.88	4	17.17	18	18.97
28	18.06	5	17.85	5	17.15	19	19.04
29	18.04	6	17.83	6	17.13	20	19.10
30	18.03	7	17.81	7	17.10	21	19.17
May 1	18.01	8	17.78	8	17.08	22	19.24**
2	18.00	9	17.76	9	"		
3	17.99	10	17.74	10	"		
4	17.97	11	17.72	11	"		
5	17.96	12	17.70	12	"		
6	17.95	13	17.67	13	"		
7	17.93	14	17.65	14	"		
8	- *	15	17.63	15	"		
9	-	16	17.60	29	"		
10	-	17	17.58	30	"		
11	-	18	17.56	31	"		
12	-	19	17.54	Sept. 1	"		
13	-	20	17.51	2	"		

* Analyser not operated May 8 - 20.

** Nov. 22, 1958 to Dec. 22, 1960: 19.24

Table 5. Index Values of Standards and Substandards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Compari-sons	Index	No. of Compari-sons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1958	
	4284	4297	6	305.86			-	-	Apr. 3	
	4284	4297	14	305.60			-	-	Apr. 13	
	4284	4297	8	305.32			-	-	Apr. 19	
	4284	4297	9	305.46			-	-	Apr. 24	
	4284	4297	8	305.58			-	-	May 21	
	4284	4297	11	305.62			-	-	July 3	
	4284	4297	9	305.60			2020	1875	Aug. 8	
	4287	4297	8	305.70			2120	1875	Aug. 8	
	4284	4297	8	305.45			1990	1800	Nov. 6	
	4287	4297	9	305.64			2000	1800	Nov. 6	
	4284	4297	14	305.62			1970	1700	Nov. 22	
	4287	4297	11	305.61			2010	1700	Nov. 22	
	4284	4297	10	305.65			1970	1700	Nov. 26	
	4287	4297	12	305.65			2010	1700	Nov. 26	
	4284	4297	10	305.68			1920	1680	Dec. 9	
	4287	4297	10	305.68			1970	1680	Dec. 9	
	4284	4297	10	305.70			1920	1650	Dec. 20-21	
	4287	4297	10	305.65			2010	1650	Dec. 20-21	
	4284	4297	9	305.67			1920	1600	Dec. 31	
	4287	4297	9	305.76			1980	1600	Dec. 31	
									1959	
	4284	4297	9	305.71			1860	1540	Jan. 14	
	4287	4297	9	305.71			1900	1540	Jan. 14	
	4284	4297	10	305.67			1880	1520	Jan. 21	
	4287	4297	8	305.65			1950	1520	Jan. 21	
	4284	4297	11	305.63			1820	1470	Feb. 22	
	4287	4297	9	305.65			1920	1470	Feb. 22	
	4287	4297	9	305.64			1900	1280	Apr. 16	
	4284	4297	10	305.62			530	1280	Apr. 16	
	4287	4297	9	305.67			1830	1200	May 15	
	4284	4297	10	305.59			510	1200	May 15	

Table 5. Index Values of Standards and Substandards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Compari-sons	Index	No. of Compari-sons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1959	
	4287	4297	10	305.63				1820 1090	June 11	
	4284	4297	8	305.68				490 1090	June 11	
	4287	4297	11	305.64				1810 1000	July 8	
	4284	4297	10	305.65				480 1000	July 8	
	4287	4297	10	305.62				1760 930	July 27	
	4284	4297	8	305.66				400 930	July 27	
	4287	4297	10	305.51				1710 850	Aug. 8	
	4284	4297	10	305.43				400 850	Aug. 8	
	4287	4297	10	305.59				1700 810	Aug. 22	
	4284	4297	10	305.62				400 810	Aug. 22	
	4287	4297	8	305.53				1690 770	Sept. 10	
	4284	4297	10	305.47				375 770	Sept. 10	
	Versus	4284:			232	305.60				
	Versus	4287:			172	305.64				
	Wt'd. Av:				404	305.62	4297			
	4277	A-17	10	310.17				2180 2200	Mar. 20	
	4297	A-17	10	310.13				1320 2200	Mar. 20	
	4277	A-17	9	310.21				2170 2200	Apr. 3	
	4297	A-17	10	310.15				1310 2200	Apr. 3	
	4277	A-17	10	310.22				2100 2200	Apr. 28	
	4297	A-17	8	310.21				1200 2200	Apr. 28	
	4277	A-17	11	310.11				2100 2130	June 3	
	4297	A-17	10	310.27				1170 2130	June 3	
	4277	A-17	9	310.31				2100 2120	July 2	
	4297	A-17	11	310.25				1080 2120	July 2	
	4277	A-17	9	310.20				2020 2110	July 13	
	4297	A-17	10	310.27				960 2110	July 13	
	4277	A-17	9	310.32				2020 2110	July 16	
	4297	A-17	8	310.28				950 2110	July 16	
	4277	A-17	10	310.18				2010 2100	Aug. 1	
	4297	A-17	10	310.20				900 2100	Aug. 1	

Table 5. Index Values of Standards and Substandards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
	(Sub)		Single Set		Wt'd.Av.		Compared Tank			
Analyser	Standard Tank No.	Compared Tank No.	No. of Compari-sons	Index	No. of Compari-sons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1959	
	4277	A-17	8	310.29				1950 2040	Sept. 1	
	4297	A-17	11	310.24				780 2040	Sept. 1	
	4277	A-17	9	310.36				2000 2020	Sept. 20	
	4297	A-17	10	310.28				730 2020	Sept. 20	
	4277	A-17	10	310.43				1980 2100	Oct. 2	
	4297	A-17	9	310.38				700 2100	Oct. 2	
	4277	A-17	9	310.26				1980 2000	Oct. 12	
	4297	A-17	7	310.29				680 2000	Oct. 12	
	Versus	4297:			114	310.24				
	Versus	4277:			113	310.25				
	Wt'd. Av:				227	310.25	A-17			
	6051	4297	9	305.84				2100 -	Nov. 7	
	6051	4297	8	305.76				- -	Nov. 27	
	6051	4297	9	305.75				1940 650	Dec. 10	
	6051	4297	8	305.82				1800 620	Dec. 28	
									1960	
	6051	4297	10	305.72				1720 620	Jan. 16	
	6051	4297	9	305.70				1600 610	Feb. 17	
	6051	4297	10	305.09				1580 610	Mar. 21	
	Versus	6051:			63	305.75	4297			
	7344	4297	9	305.55				1310 600	Mar. 29	
	7344	4297	11	305.58				1360 600	Mar. 29	
	Versus	7344:			20	305.57	4297			
	7344	6051	9	310.02				1310 910	Mar. 29	
	7344	6051	10	309.95				1360 -	Mar. 29	
	Versus	7344:			19	309.98	6051			

Table 5. Index Values of Standards and Substandards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
	(Sub)		Single Set		Wt'd.Av.		Compared Tank			
Analyser	Standard Tank No.	Compared Tank No.	No. of Compari-sons	Index	No. of Compari-sons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1959	
	4277	A-17	9	310.32				1950 1980	Oct. 26	
	6051	A-17	8	310.35				2100 1980	Oct. 26	
	4277	A-17	9	310.27				1940 1990	Nov. 7	
	6051	A-17	10	310.32				2100 1990	Nov. 7	
	4277	A-17	5	310.44				1900 1930	Nov. 21	
	6051	A-17	7	310.39				2000 1930	Nov. 21	
	4277	A-17	6	310.24				1870 1950	Nov. 27	
	6051	A-17	5	310.41				- 1950	Nov. 27	
	4277	A-17	9	310.23				1860 1950	Dec. 3	
	6051	A-17	8	310.32				1920 1950	Dec. 3	
	4277	A-17	9	310.38				1860 1970	Dec. 10	
	6051	A-17	10	310.36				1940 1970	Dec. 10	
	4277	A-17	9	310.29				1750 1800	Dec. 19	
	6051	A-17	10	310.30				1790 1800	Dec. 19	
	4277	A-17	9	310.28				1780 1880	Dec. 28	
	6051	A-17	9	310.36				1800 1880	Dec. 28	
									1960	
	4277	A-17	9	310.32				1800 1850	Jan. 8	
	6051	A-17	11	310.36				1780 1850	Jan. 8	
	4277	A-17	9	310.34				1760 1860	Jan. 16	
	6051	A-17	9	310.38				1720 1860	Jan. 16	
	4277	A-17	9	310.29				1740 1810	Jan. 30	
	6051	A-17	9	310.35				1670 1810	Jan. 30	
	4277	A-17	9	310.26				1710 1780	Feb. 17	
	6051	A-17	2	310.29				1600 1780	Feb. 17	
	4277	A-17	11	310.28				1700 1800	Mar. 3	
	6051	A-17	11	310.35				1590 1800	Mar. 3	
	4277	A-17	10	310.41				1740 1800	Mar. 21	
	6051	A-17	8	310.40				1580 1800	Mar. 21	
	Versus	6051:			117	310.35				
	Versus	4277:			122	310.31				
	Wt'd. Av.				239	310.33	A-17			

Table 5. Index Values of Standards and Substandards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1960	
	4277	A-17	11	310.18			1640	1770	Mar. 29	
	7344	A-17	10	310.26			1310	1770	Mar. 29	
	7344	A-17	11	310.25			1360	1790	Mar. 29	
	4277	A-17	11	310.36			1700	1790	Mar. 29	
	4277	A-17	10	310.41			1700	1780	Mar. 30	
	7344	A-17	10	310.39			-	1780	Mar. 30	
	4277	A-17	10	310.35			1700	1780	Apr. 16	
	7344	A-17	10	310.38			1310	1780	Apr. 16	
	4277	A-17	9	310.36			1610	1730	May 3	
	7344	A-17	10	310.41			1380	1730	May 3	
	4277	A-17	10	310.37			1650	1750	May 19	
	7344	A-17	10	310.34			1230	1750	May 19	
	4277	A-17	10	310.37			1620	1700	June 3	
	7344	A-17	10	310.34			1230	1700	June 3	
	4277	A-17	10	310.34			1620	1750	June 23	
	7344	A-17	10	310.27			1200	1750	June 23	
	4277	A-17	10	310.31			1620	1750	July 4	
	7344	A-17	10	310.33			1180	1750	July 4	
	4277	A-17	10	310.31			1600	1680	July 19	
	7344	A-17	10	310.38			1150	1680	July 19	
	4277	A-17	10	310.41			1600	1680	Aug. 2	
	7344	A-17	10	310.49			1130	1680	Aug. 2	
	4277	A-17	10	310.43			1520	1650	Aug. 14	
	7344	A-17	10	310.45			1090	1650	Aug. 14	
	4277	A-17	10	310.38			1540	1640	Aug. 27	
	7344	A-17	10	310.45			1090	1640	Aug. 27	
	4277	A-17	10	310.40			1500	1650	Sept. 13	
	7344	A-17	10	310.39			1040	1650	Sept. 13	
	4277	A-17	10	310.35			1500	1630	Sept. 26	
	7344	A-17	10	310.35			1040	1630	Sept. 26	

Table 5. Index Values of Standards and Substandards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
	(Sub)		Single Set		Wt'd.Av.		Compared Tank			
Analyser	Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1960	
	4277	A-17	10	310.37				1500 1620	Oct. 12	
	7344	A-17	10	310.41				1000 1620	Oct. 12	
	4277	A-17	10	310.41				1500 1600	Oct. 26	
	7344	A-17	10	310.52				1000 1600	Oct. 26	
	4277	A-17	10	310.45				1480 1590	Nov. 11	
	7344	A-17	10	310.43				950 1590	Nov. 11	
	4277	A-17	10	310.38				1450 1600	Nov. 23	
	7344	A-17	10	310.36				930 1600	Nov. 23	
	4277	A-17	10	310.38				1440 1550	Dec. 8	
	7344	A-17	10	310.37				910 1550	Dec. 8	
	4277	A-17	10	310.40				1420 1560	Dec. 22	
	7344	A-17	10	310.48				890 1560	Dec. 22	
	Versus	7344:			211	310.38				
	Versus	4277:			211	310.37				
	Wt'd. Av.				422	310.37	A-17*			

* Set is incomplete

Table 6. Index Values of Working Reference Gases and Retired (Sub)standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Us
58									1958	
	4297	4285	4	308.15				-	Apr. 3	
			15	308.32*				-	Mar. 27-Apr. 11	
			7	308.48				-	Apr. 13	
			6	308.27*				-	Apr. 14-19	
			6	308.56	38	308.36	4285	-	Apr. 19	
	4297	4286	6	309.09				-	Apr. 19	
			4	309.09*				-	Apr. 20-23	
			8	309.25				-	Apr. 24	
			7	309.34*				-	Apr. 30-May 6	
			9	309.26				-	May 21	
			2	309.48*				-	May 22;24	
			11	309.15				-	July 3	
			5	309.47*				-	July 4-8	
			2	309.29*	54	309.24	4286	-	July 11-12	
	4297	2423	9	307.00				-	July 3	
			8	306.97*				-	July 12-19	
			9	307.08*				-	July 22-31	
			6	307.02*				-	Aug. 3-8	
			9	306.97	41	307.01	2423	400	Aug. 8	
	4297	2426	9	306.65				2100	Aug. 8	
			8	306.63*				-	Aug. 9-Sept. 2	
			7	306.68				1420	Nov. 6	
			10	306.72*				-	Nov. 7-15	
			9	306.68				600	Nov. 22	
			9	306.65	52	306.67	2426	330	Nov. 26	
	4297	2425	10	306.93				2030	Nov. 26	
			10	307.05*				-	Dec. 3	
			9	306.83				1110	Dec. 9	
			11	306.97*				-	Dec. 15	
			9	307.00	49	306.96	2425	420	Dec. 20-21	

* Special Tank Checks

Table 6. Index Values of Working Reference Gases and Retired (Sub)standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1958	
	4297	4295	9	298.20				2170	Dec. 20-21	
			9	298.27*				-	Dec. 26	
			11	298.22				1115	Dec. 31	
									1959	
			9	298.32*				-	Jan. 6	
			9	298.21	47	298.24	4295	175	Jan. 14	
	4297	4292	9	296.18				2195	Jan. 14	
			8	296.20*				-	Jan. 20	
			8	296.19				1150	Jan. 21	
			9	296.33*				-	Jan. 27	
			9	296.30	43	296.24	4292	380	Feb. 22	
	4297	4284	3	309.15*				-	Mar. 1	
			8	309.16*				-	Mar. 5	
			8	309.15*				-	Mar. 9	
			8	309.14*	27	309.15	4284	-	Mar. 11	
	4297	2420	10	307.53				2130	Mar. 20	
			8	307.73*				-	Mar. 30	
			9	307.64				1250	Apr. 3	
			9	307.75*				-	Apr. 11	
			10	307.66	46	307.66	2420	400	Apr. 16	
	4297	4283	12	318.56				2220	Apr. 16	
			9	318.63*				-	Apr. 23	
			11	318.70				1200	Apr. 28	
			9	318.56*				-	May 4	
			10	318.62	51	318.61	4283	320	May 15	
	4297	2418	9	312.19				2140	May 15	
			8	312.10*				-	May 22	
			10	312.22				1140	June 3	
			8	312.19*				-	June 7	

*Special Tank Checks

Table 6. Index Values of Working Reference Gases and Retired (Sub)standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1959	
	4297	2418	10	312.31	45	312.21	2418	410	June 11	
	4297	2423	9	317.31				2090	June 11	
			9	317.31*				-	June 21	
			9	317.42				1200	July 2	
			11	317.21*				-	July 7	
			10	317.22	48	317.29	2423	550	July 8	
	4297	4286	9	316.74				2180	July 8	
			9	316.86				-	July 13	
			8	316.94				1210	July 16	
			9	317.00*				-	July 22	
			10	317.02	45	316.91	4286	375	July 27	
	4297	4285	9	303.23				2210	July 27	
			9	303.41*				-	July 30	
			9	303.31				1210	Aug. 1	
			8	303.54*				-	Aug. 5	
			6	303.26	41	303.35	4285	460	Aug. 8	
	4297	6074	8	306.47				2110	Aug. 22	
			9	306.43*				-	Aug. 29	
			9	306.51				1170	Sept. 1	
			9	307.52*				-	Sept. 5	
			10	306.49	45	306.48	4274	400	Sept. 10	
	4297	6081	9	303.96				2180	Sept. 10	
			9	304.44*				-	Sept. 16	
			9	304.09				1230	Sept. 20	
			9	304.41*				-	Sept. 27	
			10	304.22	46	304.22	6081	400	Oct. 2	
	4297	6067	8	307.72				2410	Oct. 2	
			9	307.77*				-	Oct. 8	
			10	307.82				1250	Oct. 12	
			9	308.03*				-	Oct. 19	

*Special Tank Checks

Table 6. Index Values of Working Reference Gases and Retired (Sub)standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1959	
	6051	6067	9	307.88	45	307.85	6067	400	Oct. 26	
	6051	3759	8	310.35				2100	Oct. 26	
			9	310.54*				-	Nov. 2	
			9	310.33				1110	Nov. 7	
			9	310.65*				-	Nov. 15	
			5	310.41	40	310.46	3759	280	Nov. 21	
	6051	4288	6	311.45				2150	Nov. 21	
			10	311.78*				-	Nov. 24	
			6	311.64				1130	Nov. 27	
			9	311.68*				-	Nov. 30	
			9	311.65	40	311.66	4288	375	Dec. 3	
	6051	4274	10	301.58				2180	Dec. 3	
			8	301.58				1250	Dec. 10	
			8	301.57*				-	Dec. 16	
			10	301.69	36	301.61	4274	390	Dec. 19	
	6051	3753	9	325.47				2080	Dec. 19	
			9	325.87*				-	Dec. 24	
			9	325.57				1180	Dec. 28	
									1960	
			9	326.03*				-	Jan. 5	
			9	325.77	45	325.74	3753	420	Jan. 8	
	6051	2418	10	306.37				1800	Jan. 8	
			9	306.12*				-	Jan. 11	
			9	306.28				1160	Jan. 16	
			9	306.24*				-	Jan. 23	
			10	306.35	47	306.28	2418	375	Jan. 30	
	6051	7361	8	320.01				2220	Jan. 30	
			10	320.17*				-	Feb. 10	

*Special Tank Checks

Table 6. Index Values of Working Reference Gases and Retired (Sub)standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Comparisons	Index	No. of Comparisons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1960	
	6051	7361	9	319.98				1200	Feb. 17	
			10	320.30*				-	Feb. 26	
			6	320.14*				-	Mar. 2	
			6	320.15*				-	Mar. 2	
			10	320.10	59	320.12	7361	430	Mar. 3	
	6051	7362	11	301.33				2140	Mar. 3	
			9	301.91*				-	Mar. 14	
			11	301.50				1180	Mar. 21	
			11	301.84*				-	Mar. 27	
	7344	7362	10	301.58	52	301.62	7362	620	Mar. 30	
	7344	4275	10	303.33				2080	Mar. 30	
			9	303.60*				-	Apr. 8	
			10	303.44				1170	Apr. 16	
			10	303.62*				-	Apr. 23	
			9	303.55	48	303.51	4275	400	May 3	
	7344	4272	9	300.67				2110	May 3	
			10	300.72*				-	May 13	
			10	300.66				1200	May 19	
			10	300.76*				-	May 27	
			9	300.87	48	300.73	4272	380	June 3	
	7344	7366	10	305.97				2150	June 3	
			11	306.16*				-	June 12	
			10	305.73				1050	June 23	
			12	306.05*				-	June 29	
			10	305.83	53	305.96	7366	400	July 4	
	7344	3758	10	302.58				2160	July 4	
			11	302.59*				-	July 13	
			10	302.62				1220	July 19	
			11	302.66*				-	July 26	
			10	302.73	52	302.64	3758	375	Aug. 2	

*Special Tank Checks

Table 6. Index Values of Working Reference Gases and Retired (Sub)standards

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11
			Single Set		Wt'd.Av.		Compared Tank			
Analyser	(Sub) Standard Tank No.	Compared Tank No.	No. of Compari-sons	Index	No. of Compari-sons	Index	No.	Pressure (P.S.I.)	Date of Analysis	Dates of Use
58									1960	
	7344	6081	10	306.56				2160	Aug. 2	
			11	306.68*				-	Aug. 9	
			10	306.73				1220	Aug. 14	
			11	306.64*				-	Aug. 21	
			10	306.92	52	306.70	6081	380	Aug. 27	
	7344	148	10	302.92				2230	Aug. 27	
			9	302.94*				-	Sept. 7	
			10	302.86				1210	Sept. 13	
			11	302.91*				-	Sept. 20	
			10	303.03	50	302.93	148	450	Sept. 26	
	7344	7366	10	317.54				2180	Sept. 26	
			10	317.59				1200	Oct. 12	
			12	318.03*				-	Oct. 20	
			10	317.55	42	317.69	7366	400	Oct. 26	
	7344	7361	10	322.05				2120	Oct. 26	
			12	322.36*				-	Nov. 4	
			10	322.28				1150	Nov. 11	
			11	322.23*				-	Nov. 17	
			10	322.30	53	322.25	7361	400	Nov. 23	
	7344	7362	10	300.96				2150	Nov. 23	
			10	300.93*				-	Dec. 1	
			10	301.04				1220	Dec. 8	
			11	301.10*				-	Dec. 15	
			10	301.31	51	301.07	7362	360	Dec. 22	
	7344	3758	10	310.57	Incomplete			2140	Dec. 22	

*Special Tank Checks

Table 7. Combined Scripps and Mauna Loa Index Values of Working Reference Cases

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11	12
Tank No.	At Scripps Prior to Use		At Mauna Loa		At Scripps After Use			Wt'd. Average		Tank No.	Date Use Began
	No. of Comparisons	Index	No. of Comparisons	Index	No. of Comparisons	Index	Pressure (P.S.I.)	No. of Comparisons	Index		
											1958
4285	-	-	38	308.36	10	309.49*	220	38	308.36	4285	Apr. 3
4286	-	-	54	309.24	10	310.46*	240	54	309.24	4286	Apr. 19
2423	2	306.58	41	307.01	11	306.93	360	54	306.98	2423	July 3
2426	2	306.33	44	306.67	10	306.56	300	56	306.64	2426	Aug. 8
2425	2	306.67	49	306.96	10	306.97	400	61	306.95	2425	Nov. 26
4295	12	298.09	47	298.24	10	298.31	200	69	298.22	4295	Dec. 20
											1959
4292	13	296.07	43	296.24	10	296.56	270	66	296.26	4292	Jan. 14
4284	12	308.80	27	309.15	34	308.97	200	73	309.01	4284	Mar. 1
2420	25	307.57	46	307.66	10	307.60	370	81	307.62	2420	Mar. 20
4283	14	318.59	51	318.61	10	318.66	300	75	318.61	4283	Apr. 16
2418	10	312.17	45	312.21	10	312.30	400	65	312.22	2418	May 15
2423	21	317.49	48	317.29	10	317.21	520	79	317.33	2423	June 11
4286	10	317.23	45	316.91	9	317.10	370	64	316.99	4286	July 8
4285	10	303.14	41	303.35	18	303.33	410	69	303.31	4285	July 27
6074	10	306.30	45	306.48	10	306.37	370	65	306.44	6074	Aug. 22
6081	10	304.24	46	304.22	10	304.30	375	66	304.24	6081	Sept. 10
6057**	10	304.39									-
6067	10	307.67	45	307.85	10	307.74	300	65	307.81	6067	Oct. 2
3759	10	310.05	40	310.46	10	310.51	200	60	310.40	3759	Oct. 26
4288	10	311.47	40	311.66	12	311.59	325	62	311.62	4288	Nov. 21
4274	10	301.54	36	301.61	10	301.65	280	56	301.60	4274	Dec. 3
3753	10	325.46	45	325.74	10	325.86	350	65	325.72	3753	Dec. 19
											1960
2418	12	306.23	47	306.28	10	306.59	300	69	306.32	2418	Jan. 8
7361	16	320.04	59	320.12	11	320.22	400	86	320.12	7361	Jan. 30

* Omitted from wt'd. average.

** Lost by shipper en route to Mauna Loa

Table 7. Combined Scripps and Mauna Loa Index Values of Working Reference Gases

MAUNA LOA CARBON DIOXIDE PROJECT

Col: 1	2	3	4	5	6	7	8	9	10	11	12
Tank No.	At Scripps Prior to Use		At Mauna Loa		At Scripps After Use			Wt'd. Average		Tank No.	Date Use Began
	No. of Comparisons	Index	No. of Comparisons	Index	No. of Comparisons	Index	Pressure (P.S.I.)	No. of Comparisons	Index		1960
7362	10	301.97	52	301.62	10	301.66	590	72	301.67	7362	Mar. 3
7362**	10	309.96	-	-	10	309.98	2200				
4275	10	303.51	48	303.51	10	303.59	400	68	303.52	4275	Mar. 30
4272	12	300.88	48	300.73	12	300.91	250	72	300.78	4272	May 3
7366	14	306.23	53	305.96	9	306.04	380	76	306.02	7366	June 3
3758	10	302.74	52	302.64	10	302.72	330	72	302.67	3758	July 4
6081	12	306.64	52	306.70	10	306.73	270	74	306.69	6081	Aug. 2
148	8	302.85	50	302.93	10	302.94	370	68	302.92	148	Aug. 27
7366	10	317.39	42	317.69	12	318.13	270	64	317.73	7366	Sept. 26
7361	10	322.27	53	322.25	10	322.63	390	73	322.30	7361	Oct. 26
7362	10	301.26	51	301.07	9	301.86*	-	61	301.10	7362	Nov. 23

* Omitted from wt'd. average

** Tanks accidently not used at Mauna Loa at station during July, 1960