



Bermuda Meteorological Office
Technical Note No. 9

Pressure at Mean Sea Level
at Bermuda

by

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1. INTRODUCTION

Observations of Atmospheric pressure have been made in Bermuda since 1836 and published in various forms. As errors were known or suspected in some of these printings the rechecking of all the past records was undertaken in an attempt to obtain a consistent series for further study.

A considerable amount had been completed by 1955 when a fire destroyed all the original records since 1891. However, a copy of the corrected monthly means for 1891 to 1931 was saved and the errors are known in the annual summaries for later years.

The work on the older data has continued since the fire and in view of the closing of the meteorological office in early 1959 the purpose of this note is to present the corrected monthly means and the small amount of other data which is available.

2. SOURCES OF DATA

1836 - 1851. The data for these years has been obtained entirely from newspapers and old almanacs. For the $2\frac{1}{2}$ years, November 1836 to April, 1839, summaries giving monthly means were published at six monthly intervals. From June, 1839, a weekly tabulation was published giving daily values. These tables were the sole source until April, 1852 and until 1871 were used to fill in gaps in the more official records.

1852 - 1886. The original monthly forms giving usually two daily observations in manuscript are filed in the Meteorological Office, London. Photostat copies of these records were used.

1887 - 1890. The values were computed from the figures in World Weather Records, Vol. 79 of Smithsonian Collections, which had been computed in Meteorological Office, London, partly from Army records and partly from Data supplied by the Canadian Meteorological Office.

1880 and 1887. May and June, 1880, and January and February, 1887, which were missing from the other sources were obtained from daily values for Gibbs Hill which were given in the Newspapers. These were corrected by comparison with Prospect in adjacent months when there were simultaneous observations.

1891 - 1932. These are based on the original manuscript records forwarded to Canada and returned to Bermuda in 1940. These records showed the individual corrections applied for index, temperature and altitude but were all destroyed in the 1955 fire. These corrections were all checked and the figures given here are taken from a copy of the final corrected values which was fortunately saved. They have been further adjusted for the change in gravity correction which came into force after they were originally completed in 1954.

1932 - 1953. These are taken from the Annual Summaries of Bermuda Observations with corrections known to be necessary.

3. LOCATION OF STATION

The co-ordinates of the main stations as shown by the Admiralty maps corrected to 1955 are given below.

St. George, Engineers and Medical	32° 22' 59" N 64° 40' 11" W
Fort George and Central Signal Station.....	32° 22' 49" N 64° 40' 55" W
Prospect Hospital.....	32° 18' 24" N 64° 46' 4" W
Prospect Observatory.....	32° 18' 3" N 64° 46' 7" W
Hamilton Hotel.....	32° 17' 38" N 64° 47' 9" W
Darrell's Island.....	32° 16' 34" N 64° 49' 4" W
Manor Cottage, Belmont.....	32° 16' 33" N 64° 47' 54" W

4. NOTES ON STATIONS

St. George, 1836 - 39.

The exact location of this station is not given but observations were taken by or under the close supervision of Lt. Page, R.E. The altitude was given as 50 or 60 feet and the altitude correction for 61 feet has been applied. There were two observations a day at about 9 a.m. and 4 p.m. local time.

Central Signal Station, 1839 - 71.

A statement of the location of this station has not been found, but the altitude was given as 134 feet throughout. This would limit it to one of the high points in St. George, and as one map has a marking of 'signalling station' on the slope of Fort George hill it is assumed that this was the location. The weekly tables gave daily noon values of pressure, temperature, wind and weather. The one temperature reading was used both for temperature correction, assuming that the barometer was a Fortin, and to determine the correction for altitude.

By comparison with the official Royal Engineers' readings which were simultaneous from 1852 a correction of + 1.7 mb was deduced and this has been added to all Central Signal Station readings included up to July, 1855.

The observations became careless in 1862 as shown by readings to only 0.5 inch on many occasions and very erratic movements of an inch or more from day to day. This continued through the period when no other official readings were taken to the end of 1865 and there was rapid improvement in 1866 when the new series of observations began under medical control.

The Central Signal Station observations are used for the 4 months, November, 1869, to March, 1870. which were missing from the Medical Department

record because of the transfer from St. George to Prospect. The correction deduced by comparison with simultaneous readings before and after this gap was + 5.8 mbs.

Royal Engineers, St. George, 1852 - 62.

The exact location of this station is not known but its stated altitude puts it in the higher part of the barrack area, probably close to Royal Engineer headquarters.

These observations were part of the series begun at this time by Royal Engineers at stations throughout the world. They appear to have continued for 10 years and then to have stopped. The records begin in May, 1852, but October, 1852, March and April, 1853, and the period August, 1853 to July, 1855, are missing and have been filled in from the Central Signal Station record.

Army Medical Department, St. George, 1866 - 69.

These observations were presumably taken near the hospital and are complete until November, 1869, when the hospital was moved to Prospect and there was a gap of 4 months before observations recommenced at the new station.

Army Medical Department, Prospect, 1870 - 1932.

These observations were taken at Observatory Cottage with the barometer at an elevation of 151 feet until late March, 1927, when the barometer was moved to the hospital at an elevation of 125 feet although the other instruments were kept at Observatory Cottage.

The monthly record sheets from March, 1870, until August, 1873, gave the elevation as 120 feet although there is no other indication of a transfer of the barometer in 1873. Comparison with the overlapping Central Signal Station observations in 1870 and in 1869, before the move from St. George, indicate that the apparent error in the Central Signal Station observations was about one millibar less after the move than before, the official barometer being the same in each case. It is reasonable to assume, therefore, that the barometer height actually was 151 feet not 120 as entered.

The move of the barometer in 1927 was not recorded at the time and the altitude correction for 151 feet continued to be used incorrectly from the time of the move until September, 1929.

Bermuda Meteorological Station, 1932 - 53.

The official Bermuda Meteorological Service began observations in April, 1932, when the Fort George site was opened and continued until December, 1955, when the office and observing station on Hamilton Hotel were destroyed by fire. The records for 1954 and 1955 were lost in the fire.

The office was moved from Fort George to Manor Cottage, Warwick, in August, 1941, to Darrell's Island in September, 1944 and finally to Hamilton Hotel in June, 1946.

The records for these years up to 1953 were published in Annual Summaries but only since 1949 did these contain hourly readings of pressure. The hourly values from 1932 to 1954 were extracted for this note and although the original tabulations were lost a copy of the means at each hour over the whole period for each calendar month was saved.

Owing to the changes in site and barometers especially during the war there were several minor errors not detected when the yearly summaries were prepared. These have been corrected.

5. TIME OF OBSERVATION

Throughout most of the period no more than 2 observations were made per day. The means given in this note are all corrected to 24-hourly observations using corrections based on the average hourly departures from mean in each month given in Table 7.

6. STANDARD OF TIME

At 2 a.m. on 1st January, 1930, the Bermuda Zone Time Act came into force and throughout Bermuda the standard of Time became that of 60 Degrees West, namely 4 hours slow on Greenwich.

Prior to this date local mean time was used and slightly different time was shown by the official clocks in St. George, Hamilton and Somerset. The actual times do not seem to have been covered by any Act of the Legislature and were presumably determined for each place by military or naval authorities. However, Bermuda lies entirely between $64^{\circ} 38'30''$ and $64^{\circ} 53'30''$ West so the greatest difference was less than one minute.

The military stations at St. George were each given as $64^{\circ} 40' 0''$ West giving a time 4 hours 18 mins. 40 secs. slow on GMT. Prospect was placed at $64^{\circ} 47'$ West giving a local mean time 4 hours 19 mins. 28 secs. slow on GMT which time was apparently also adopted for Hamilton although Hamilton was 1' further West. There was, therefore, a change of about 19 minutes when clocks were adjusted on 1st January, 1930.

The International Time Zone agreement was made in 1884 and although it was not adopted in Bermuda for 45 years the times of observations from 1890 onward were mainly 8.41 a.m. and 8.41 p.m. Local Mean Time these being equivalent to 9 a.m. and 9 p.m. Zone 60 Degree time.

Daylight saving was in force for a time during the 1914-18 war and also in the 1939-45 war and some years since.

Throughout this note all times are those of 60 degrees Zone time unless otherwise stated.

7. CORRECTION TO STANDARD GRAVITY

No correction for variation from standard gravity was made in the older records and the 1500 observation on 15th September, 1929, was the first to be corrected for gravity at the time of observation.

From this date a correction of -0.033 inch or -1.12 millibar was applied to all barometer readings, this being the standard correction for the latitude of Bermuda under the then existing international agreement.

With the introduction of the 1955 Meteorological Gravity System this theoretical correction would have changed but about the same time measured values of gravity for Bermuda became available, as a result of a gravity survey by N. C. Harding which was part of the global gravity programme of Professor G. P. Woollard. I am indebted to the latter for many of the individual observations from which in conjunction with Woollard's Isoanomaly map of Bermuda

(Proc. Roy. Sec. A Vol. 22, p373, 1954) the value of gravity has been calculated for each barometer site. The readings being on the Potsdam system were converted to the Meteorological Gravity System by subtracting 0.0130 cm per sec. per sec. and then the correction to allow for departure from standard 980.665 cm per sec. per sec. was calculated. The values of gravity and the corrections required at each observing site are given in Table 1.

It is seen that in each case the correction is between -0.8 and -0.9 mbs whereas in all pressures since September, 1929 a gravity correction of -1.12 mb was applied. Consequently all such pressure values, which includes all values published in annual summaries from 1932 to 1953, should have a further correction applied as given in Table 2.

8. UNITS

The unit of pressure used is the millibar. All readings prior to the opening of Fort George in 1932 were made in inches. These have been converted to millibars at the factor of 1 inch equals 33.8639 millibars.

All figures given are corrected to Mean Sea Level.

Site	Altitude Feet	Gravity cms/sec ² Met Gravity System	Correction to observed		
			1000 mbs	1010 mbs	1020 mbs
St. George Hospital.....	61	979.8075	-0.87	-0.88	-0.89
St. George Engineers.....	123	979.8058	-0.88	-0.88	-0.89
Central Signal Station.....	134	979.8041	-0.88	-0.89	-0.90
Fort George.....	158	979.8027	-0.88	-0.89	-0.90
Prospect Hospital.....	125	979.8262	-0.86	-0.86	-0.87
Prospect Observatory.....	151	979.8236	-0.86	-0.87	-0.88
Hamilton Hotel.....	108	979.8392	-0.84	-0.85	-0.86
Belmont.....	100	979.8439	-0.84	-0.85	-0.85
Darrell's Island.....	17	979.8534	-0.83	-0.84	-0.84

TABLE 1. Acceleration of Gravity on Meteorological Gravity System at Bermuda Barometer Stations and resultant corrections to observations.

	Correction to		
	1000 mbs	1010 mbs	1020 mbs
Fort George.....	0.24	0.23	0.22
Prospect Hospital.....	0.26	0.25	0.25
Prospect Observatory.....	0.26	0.25	0.24
Hamilton Hotel.....	0.27	0.27	0.26
Belmont.....	0.28	0.27	0.26
Darrell's Island.....	0.29	0.28	0.27

TABLE 2. Correction required to pressures corrected with pre 1955 gravity correction in order to bring into Meteorological Gravity System. Corrections positive.

TABLE 3. Mean Monthly Pressures. 1000 millibars plus.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
1836	—	—	—	—	—	—	—	—	—	—	16.9	22.2	
1837	9.3	19.4	17.2	16.8	21.9	17.4	18.2	19.5	21.1	16.3	20.7	18.3	18.0
1838	23.1	15.5	15.1	18.4	17.2	22.7	19.9	20.1	19.9	17.6	19.9	19.3	19.0
1839	16.0	22.6	20.6	16.3	—	20.6	21.8	21.7	19.3	16.3	17.3	12.2	18.6
1840	21.2	17.6	16.6	23.3	17.4	21.9	25.3	21.2	18.0	19.7	13.4	19.9	19.6
1841	23.3	15.3	19.7	20.0	18.6	18.5	19.4	22.9	17.3	18.0	16.6	19.1	19.1
1842	21.6	22.9	21.9	21.1	19.8	21.6	25.2	21.2	18.2	16.9	19.0	19.6	20.7
1843	19.0	18.3	17.1	17.8	18.5	22.0	21.0	21.4	19.4	19.1	18.3	19.2	19.3
1844	16.4	16.5	21.3	21.7	24.8	23.1	20.1	20.3	16.8	17.7	19.1	18.5	19.7
1845	18.6	20.0	19.2	19.4	21.9	16.5	18.2	21.7	20.1	18.9	18.8	18.2	19.3
1846	18.0	17.1	14.7	20.6	16.7	19.2	20.7	19.5	16.7	17.7	15.0	20.4	18.0
1847	22.6	17.6	19.1	18.8	14.5	19.1	22.2	21.1	20.3	16.5	21.1	24.5	19.8
1848	18.8	15.2	17.9	18.5	20.4	19.7	20.9	18.6	16.3	16.3	17.5	23.3	18.6
1849	22.1	19.5	15.8	17.8	18.4	18.8	23.2	18.5	17.8	20.1	20.9	24.6	19.8
1850	24.1	18.3	12.9	13.2	15.4	17.9	17.3	15.3	15.4	14.7	15.6	18.7	16.6
1851	19.5	23.6	20.2	12.7	18.5	17.8	18.3	18.3	15.9	15.0	15.3	17.0	17.7
1852	15.3	16.1	16.2	10.3	16.9	17.2	18.9	18.0	15.1	14.3	13.0	21.5	16.1
1853	13.2	15.4	15.7	17.3	16.7	17.0	21.4	18.5	16.5	16.1	17.1	10.8	16.3
1854	22.9	20.4	17.3	18.2	16.7	16.7	19.5	18.9	17.4	14.4	15.3	17.0	17.9
1855	18.9	10.3	16.0	19.0	16.4	21.7	22.9	18.1	17.3	15.2	14.6	19.8	17.5

TABLE 3. Mean Monthly Pressures. 1000 millibars plus. (Contd.)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
1856	14.7	12.3	13.1	17.2	15.2	19.8	19.2	14.5	15.3	16.7	17.9	17.6	16.1
1857	17.0	23.1	16.5	14.8	17.1	16.5	21.0	19.2	18.3	13.7	18.8	19.4	17.9
1858	19.6	15.9	15.0	17.0	17.9	19.9	19.0	18.9	16.8	14.7	13.6	21.9	17.5
1859	22.6	18.7	18.0	15.6	16.2	22.4	18.8	19.0	18.0	15.1	19.2	17.8	18.5
1860	21.4	19.4	15.3	16.1	14.8	14.5	19.3	16.8	16.7	16.5	13.0	15.9	16.6
1861	19.8	21.3	19.6	16.6	15.7	17.8	20.4	18.5	18.1	16.6	11.6	18.0	17.8
1862	19.5	17.3	13.3	—	—	—	—	—	—	—	—	—	—
1863													
1864													
1865													
1866	20.3	23.5	17.4	19.5	14.4	20.2	19.2	17.3	17.9	14.7	16.4	18.9	18.3
1867	13.4	22.8	14.9	19.0	15.7	20.5	19.7	20.4	81.6	16.4	18.1	18.8	18.2
1868	19.1	20.0	17.6	21.3	17.4	21.4	19.0	20.8	18.0	17.8	17.2	18.1	19.0
1869	20.1	18.6	19.3	17.0	15.6	22.5	20.5	18.4	19.6	15.3	16.7	19.5	18.6
1870	25.1	15.5	14.9	16.0	18.6	19.8	22.3	18.2	16.7	17.9	17.6	16.6	18.3
1871	21.7	20.7	20.7	16.1	18.2	19.6	20.3	20.1	17.1	20.2	14.5	19.5	19.1
1872	16.4	13.2	15.9	17.9	19.6	18.0	18.8	17.5	15.6	13.6	17.3	21.1	17.1
1873	21.4	16.1	19.6	16.2	18.3	18.3	21.8	20.1	20.7	15.5	16.8	22.0	18.9
1874	22.5	20.1	16.7	21.4	19.1	19.8	21.8	18.8	17.2	16.8	19.4	20.4	19.5
1875	22.2	20.8	20.4	14.9	18.7	21.7	20.9	21.0	17.3	16.6	17.3	18.0	19.1
1876	23.5	20.7	16.8	17.9	19.8	20.3	20.4	17.8	16.4	15.1	13.4	15.8	18.2
1877	22.3	15.5	18.9	13.9	15.7	20.5	18.6	17.2	16.5	16.3	16.6	19.2	17.6
1878	18.9	14.9	18.6	11.4	15.1	17.9	19.2	16.8	17.8	14.2	16.6	17.6	16.6
1879	18.3	16.8	19.0	16.8	18.3	19.0	19.0	18.4	19.1	18.4	20.6	23.3	18.9
1880	21.3	21.9	20.7	22.0	21.0	28.4	19.6	18.1	17.2	15.8	21.8	14.1	19.3
1881	16.3	18.0	7.4	14.3	16.1	16.5	17.0	17.5	18.1	18.9	21.8	21.0	16.9
1882	22.8	21.1	16.9	17.5	18.9	20.2	23.1	20.1	15.8	16.9	14.0	18.0	18.8
1883	23.2	24.6	16.5	16.1	15.4	20.1	18.2	18.2	17.2	13.8	18.6	18.0	18.3
1884	21.4	21.4	19.1	10.8	17.4	17.7	17.6	19.3	17.4	15.1	18.2	20.3	18.0
1885	21.5	11.8	13.4	16.0	19.7	18.8	17.4	14.7	15.8	12.5	14.2	16.7	16.0
1886	17.6	17.1	15.3	17.0	16.6	16.0	18.5	18.4	18.6	15.1	20.7	22.6	17.8
1887	21.8	24.5	10.8	17.5	15.6	14.1	21.7	22.9	18.2	16.8	17.4	20.1	18.4
1888	20.2	17.4	18.3	16.3	20.5	17.3	18.5	19.6	16.3	18.2	18.7	18.4	18.3
1889	18.1	19.1	11.2	16.7	17.5	23.3	21.4	21.7	17.3	15.4	20.3	19.5	18.4
1890	24.2	20.0	19.0	19.7	19.6	18.8	21.4	21.5	20.5	13.9	17.5	17.0	19.4
1891	19.7	22.3	14.4	18.3	18.4	16.3	20.9	18.1	15.7	14.9	17.0	22.9	18.2
1892	17.8	14.5	15.8	20.2	20.4	22.7	22.1	18.2	19.0	14.2	18.3	16.0	18.3
1893	15.4	21.5	15.6	20.5	17.1	17.8	18.2	18.2	17.1	16.2	18.2	23.2	18.3
1894	18.2	21.8	20.0	17.5	18.8	22.3	22.4	18.6	18.3	15.3	20.4	18.8	19.4
1895	20.0	14.1	18.2	18.1	21.2	19.1	20.7	19.1	17.4	14.9	20.8	17.0	18.4

TABLE 3. Mean Monthly Pressures. 1000 millibars plus. (Contd.)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
1896	17.4	15.6	16.4	20.1	18.6	20.1	23.6	18.4	18.3	16.0	23.2	17.8	18.8
1897	16.6	18.4	19.0	19.8	19.1	18.3	20.5	19.7	18.9	15.7	19.9	20.0	18.8
1898	17.6	17.1	19.2	17.5	15.2	17.3	20.2	20.8	18.0	19.1	17.1	20.5	18.3
1899	22.1	19.8	19.3	16.4	17.4	20.6	21.2	15.7	17.2	18.1	15.9	17.1	18.4
1900	20.1	18.1	17.1	17.6	19.3	18.9	20.8	18.1	17.4	18.3	19.4	18.2	18.6
1901	15.0	11.3	18.6	11.0	15.3	18.5	18.9	18.9	15.2	16.3	11.9	19.6	15.9
1902	18.2	11.5	17.3	16.7	17.4	17.8	19.1	16.2	17.4	15.9	16.7	18.1	16.9
1903	17.8	21.3	21.2	13.4	16.8	16.7	19.2	18.2	18.7	15.1	16.3	17.2	17.7
1904	19.1	19.3	19.0	18.3	17.1	19.0	20.7	21.6	19.2	14.3	15.9	18.5	18.5
1905	20.3	20.9	20.6	17.0	20.1	17.6	20.4	19.4	18.0	17.4	16.3	19.9	19.0
1906	21.0	17.8	20.6	17.8	19.9	18.2	22.7	20.3	16.5	15.2	17.5	20.0	19.0
1907	23.2	19.8	18.6	16.5	19.2	17.2	19.8	20.3	19.5	16.1	18.7	20.4	19.1
1908	18.8	20.6	22.6	19.4	19.4	20.6	20.7	19.1	16.7	14.9	19.7	20.1	19.4
1909	18.5	21.7	14.1	22.3	17.5	21.1	19.9	18.2	17.1	17.7	19.4	12.6	18.3
1910	23.2	23.2	19.9	18.3	20.1	21.0	22.3	21.4	17.4	17.0	11.3	18.8	19.5
1911	24.8	20.3	19.1	21.2	20.1	18.4	21.3	19.2	18.4	16.8	18.7	20.8	19.9
1912	18.2	15.3	22.7	22.0	20.5	20.3	20.0	19.3	16.7	17.7	19.8	22.6	19.6
1913	25.9	18.6	27.3	19.1	18.7	20.5	21.3	20.1	19.0	16.6	18.7	17.6	20.3
1914	15.3	20.1	18.1	19.7	21.2	20.8	21.4	22.0	18.4	17.7	19.7	19.7	19.5
1915	20.7	17.6	9.4	18.3	16.7	17.0	20.3	17.6	12.5	17.7	17.3	17.4	16.9
1916	25.9	18.9	14.5	15.1	17.7	17.8	20.7	18.6	17.5	18.7	19.3	17.1	18.5
1917	19.9	19.4	21.4	15.3	15.4	22.6	22.7	19.7	17.6	17.9	16.0	16.0	18.7
1918	14.1	23.0	18.6	17.7	21.7	16.9	19.8	18.5	17.0	18.7	14.7	20.2	18.4
1919	18.6	13.9	18.1	17.9	18.2	19.4	21.5	19.1	16.0	19.9	15.4	19.6	18.1
1920	21.5	17.9	20.2	15.9	15.4	20.2	24.2	21.8	17.4	16.7	19.8	18.2	19.1
1921	20.5	18.9	25.3	21.5	17.5	16.6	24.0	20.1	17.2	16.6	20.5	17.4	19.7
1922	19.5	23.6	22.7	19.7	19.6	21.3	24.2	21.5	18.2	16.0	16.7	22.1	20.4
1923	20.6	20.6	21.7	18.9	16.3	19.5	21.5	19.9	17.4	16.8	14.1	19.2	18.9
1924	24.1	17.1	9.3	17.3	18.3	18.7	20.9	19.2	18.4	17.4	18.3	23.7	18.6
1925	22.6	20.0	18.5	17.3	18.4	22.3	21.0	19.1	17.5	17.6	19.8	16.3	19.2
1926	21.5	17.4	17.7	19.3	15.9	21.1	21.7	19.7	17.5	16.4	20.7	19.1	19.0
1927	22.2	21.3	20.2	18.3	19.2	18.0	22.8	18.8	15.1	16.1	21.4	17.7	19.3
1928	21.5	20.9	17.8	19.5	16.9	19.0	21.0	19.3	18.4	19.4	19.4	20.6	19.5
1929	20.5	19.6	19.0	19.4	23.7	20.1	23.2	19.7	19.7	17.9	18.4	22.7	20.3
1930	24.2	19.9	15.4	19.5	19.9	20.9	21.2	18.6	18.7	14.4	20.5	15.7	19.1
1931	18.0	14.7	12.3	20.0	17.6	17.7	18.9	20.4	18.3	18.3	21.0	21.0	18.2
1932	23.6	16.7	12.3	15.7	19.2	19.1	17.1	17.3	16.2	16.8	18.0	21.8	17.8
1933	16.0	18.4	17.2	15.6	17.6	16.5	21.2	18.2	17.3	15.6	17.0	20.3	17.6
1934	20.3	18.9	22.5	17.6	20.1	19.2	20.8	20.7	19.9	14.8	18.2	18.4	19.3
1935	18.7	20.0	21.3	13.8	17.6	18.8	21.4	17.6	17.7	17.5	15.1	15.0	17.9

TABLE 3. Mean Monthly Pressures. 1000 millibars plus. (Contd.)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
1936	18.5	17.6	17.5	20.5	17.5	17.1	20.2	19.5	18.9	18.9	19.6	22.7	19.0
1937	26.7	15.7	15.1	17.8	17.6	18.4	21.8	22.1	15.8	17.4	18.0	17.7	18.7
1938	18.5	21.9	19.9	20.9	18.0	22.6	22.9	19.8	18.5	15.3	21.5	18.6	19.9
1939	19.4	24.6	21.5	20.8	19.5	18.3	20.6	18.0	17.3	17.6	17.7	15.7	19.3
1940	14.6	14.5	15.6	16.1	18.6	19.0	20.9	19.7	15.9	16.2	20.7	21.3	17.8
1941	17.3	12.1	14.8	18.6	16.8	20.7	22.4	17.9	19.1	20.0	19.4	18.5	18.1
1942	19.2	11.6	17.9	17.9	20.5	18.2	20.1	19.5	16.2	15.4	18.2	19.1	17.8
1943	20.0	19.9	22.3	18.8	22.2	20.6	22.1	17.4	16.3	15.2	18.6	17.8	19.3
1944	18.1	18.2	19.6	19.2	20.5	17.3	20.9	19.6	18.0	16.7	12.9	19.0	18.3
1945	17.2	21.6	20.3	21.9	18.1	19.6	23.8	20.4	22.0	16.3	18.3	17.6	19.8
1946	22.4	20.7	20.0	18.0	21.5	23.3	22.5	20.5	19.5	15.4	18.3	20.4	20.2
1947	22.6	11.5	15.5	23.4	21.1	18.8	22.8	21.3	20.1	18.3	14.7	16.4	18.9
1948	18.5	21.0	21.9	20.4	17.9	19.1	21.2	19.8	15.8	15.3	20.7	18.3	19.2
1949	21.4	22.6	17.6	18.4	19.9	21.3	21.5	20.4	18.5	19.1	18.5	22.3	20.1
1950	28.9	20.9	19.9	19.8	18.3	19.9	22.9	19.1	15.5	16.4	17.6	17.9	19.8
1951	21.1	18.0	16.1	18.2	15.9	17.6	21.6	18.4	18.4	18.1	18.2	21.8	18.6
1952	20.5	15.6	15.2	19.3	16.9	17.4	21.6	19.4	18.2	17.6	17.5	17.6	18.1
1953	21.7	20.3	20.2	15.5	17.1	20.8	21.8	20.4	17.7	16.4	19.9	20.7	19.4

	Average	Highest	Lowest
January.....	1020.1	1028.9 1950	1009.3 1837
February.....	1018.6	1024.6 1883, 1939	1010.3 1855
March.....	1017.8	1027.3 1913	1007.4 1881
April.....	1017.9	1023.4 1947	1010.3 1852
May.....	1018.2	1024.8 1844	1014.4 1866
June.....	1019.2	1028.4 1880	1014.1 1887
July.....	1020.8	1025.3 1840	1017.0 1881
August.....	1019.2	1022.9 1841, 1887	1014.5 1856
September.....	1017.6	1022.0 1945	1012.5 1915
October.....	1016.6	1020.2 1871	1012.5 1885
November.....	1017.7	1023.2 1896	1011.3 1910
December.....	1019.1	1024.6 1849	1012.2 1839
Year.....	1018.6	1020.7 1842	1015.9 1901

TABLE 4. Mean monthly pressures.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1007			1									
1008			-									
1009			2									
1010		1	1	2								1
1011		5	1	2							3	-
1012		2	2	-					1	1	1	1
1013	2	2	3	3					-	4	4	-
1014	3	5	6	3	2	2		2	-	12	7	1
1015	4	8	12	7	14	-		1	12	21	5	5
1016	4	4	9	14	13	9		3	14	29	10	6
1017	9	10	11	22	20	17	4	10	31	16	17	20
1018	16	12	11	13	18	19	10	30	28	11	22	19
1019	10	9	17	17	16	17	15	27	10	4	15	14
1020	13	19	11	8	9	19	24	16	3	2	10	14
1021	14	12	6	5	6	8	26	8	-		5	8
1022	11	3	5	3	1	7	14	3	1		-	8
1023	5	5	-	1	1	2	4				1	3
1024	4	3	-				3					
1025	3		1									
1026	2		-									
1027			1									

TABLE 5. Percentage of occasions when Monthly Mean Pressure fell within limit o value stated to 0.9 millibar above. 1852 - 1953.

	DECILES								
	1	2	3	4	5	6	7	8	9
Jan.	16.3	17.9	18.5	19.1	20.1	20.9	21.5	22.5	23.5
Feb.	13.8	15.6	17.1	18.1	19.0	20.0	20.5	21.3	22.3
Mar.	13.4	15.3	16.1	17.3	18.1	18.9	19.4	20.2	21.4
Apr.	14.9	16.1	16.7	17.3	17.9	18.3	19.2	19.7	20.8
May	15.7	16.4	17.0	17.5	18.1	18.6	19.2	19.9	20.5
Jun.	16.7	17.4	18.0	18.6	19.0	19.8	20.2	20.8	21.8
Jul.	18.8	19.2	20.0	20.5	20.9	21.2	21.5	22.1	22.9
Aug.	17.5	18.1	18.3	18.6	19.1	19.4	19.8	20.4	21.4
Sep.	15.8	16.5	17.1	17.3	17.5	18.0	18.3	18.6	19.2
Oct.	14.4	15.1	15.4	16.1	16.4	16.7	17.4	17.9	18.7
Nov.	14.1	15.9	16.8	17.5	18.1	18.4	19.3	19.8	20.7
Dec.	16.0	17.2	17.8	18.2	18.8	19.5	20.1	20.8	22.1

TABLE 6. Mean Monthly Pressure. Deciles of Frequency Distribution in 1000 millibars plus value stated.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
0	16	36	22	28	27	7	19	27	24	19	19	10
1	-12	13	4	-9	-13	-19	-12	-6	2	1	-7	-18
2	-21	-13	-30	-54	-49	-45	-44	-39	-31	-30	-28	-30
3	-36	-45	-73	-88	-70	-62	-64	-62	-59	-63	-47	-38
4	-61	-68	-95	-103	-80	-67	-68	-71	-72	-74	-62	-58
5	-75	-67	-82	-93	-67	-50	-49	-60	-60	-59	-58	-68
6	-57	-44	-50	-48	-30	-23	-22	-29	-30	-34	-35	-48
7	-19	-10	-13	1	4	7	8	5	2	0	5	-9
8	27	30	31	26	32	32	32	28	33	46	46	31
9	79	72	66	53	48	38	38	44	63	78	84	81
10	122	96	85	76	60	49	50	64	82	90	103	118
11	107	103	84	78	69	57	55	66	76	83	89	100
12	40	68	64	59	54	51	49	51	55	47	35	30
13	-41	0	21	36	36	32	31	30	20	-10	-29	-38
14	-76	-52	-28	4	10	10	10	2	-17	-47	-65	-73
15	-81	-74	-55	-34	-23	-13	-13	-26	-47	-62	-76	-76
16	-62	-71	-62	-50	-38	-30	-30	-40	-55	-61	-65	-60
17	-42	-56	-53	-42	-44	-42	-44	-44	-50	-51	-48	-41
18	-15	-28	-27	-33	-41	-35	-40	-42	-39	-29	-25	-16
19	18	0	-2	-8	-16	-16	-21	-22	-23	-2	8	18
20	40	21	27	24	6	1	-1	4	11	24	28	40
21	52	35	55	61	38	29	29	38	35	45	42	50
22	56	41	63	65	51	47	46	47	39	53	46	53
23	45	33	53	52	42	42	40	38	33	44	37	46
24	19	16	33	34	21	20	18	19	17	23	16	19

TABLE 7. Departure of mean pressure at each hour from daily mean. Period 1932 - 54.
Unit 0.01 millibar. Time Zone 60° West.

	a1	A1		a2	A2		a3	A3		a4	A4	
	mb	Deg.	Min.	mb	Deg.	Min.	mb	Deg.	Min.	mb	Deg.	Min.
Jan.	.044	300	48	.746	154	20	.282	346	37	.131	198	17
Feb.	.101	277	0	.726	145	47	.182	341	22	.050	123	21
Mar.	.127	256	11	.738	143	1	.074	359	32	.034	51	26
Apr.	.229	236	50	.719	142	7	.060	135	53	.037	38	56
May	.218	250	59	.588	140	46	.101	152	59	.022	65	20
Jun.	.195	271	37	.472	139	23	.102	157	49	.018	71	45
Jul.	.187	263	35	.491	139	13	.125	153	42	.019	83	26
Aug.	.178	257	0	.566	139	58	.076	152	46	.013	109	6
Sep.	.168	279	40	.625	143	7	.027	27	24	.017	94	56
Oct.	.144	303	9	.694	151	38	.106	9	9	.026	162	36
Nov.	.108	320	43	.703	157	19	.180	357	4	.064	190	10
Dec.	.072	319	3	.712	157	13	.246	349	15	.140	213	51

TABLE 8. First four components of the diurnal variation of Mean Sea Level Pressure. August, 1932 to March, 1954.

9. MONTHLY MEAN PRESSURE

Table 3 gives the mean values of Mean Sea Level Pressure month by month over the period deduced as stated above. Table 4 gives the average and extremes while Table 5 gives the percentage of occasions on which the mean monthly pressure fell within the values stated. Table 6 gives the frequency distribution as shown by the deciles.

10. DIURNAL VARIATION OF PRESSURE

Table 7 gives the average departure over the 22 years, August 1932 to March, 1954; of the mean pressure at each hour in each month from the daily mean for the same period.

This table was the basis of all the corrections made to monthly means which were derived from less than 24 daily observations. After correction for non cyclic variation an Harmonic Analysis was made of the data in Table 7, and Table 8 gives the first four components.

It was planned to make a much more detailed analysis and discussions of Bermuda pressure but it now seems that this may not be possible for a considerable time and this note has been prepared to record data which might well be lost when the office is closed.

Meteorological Office,
Hamilton.
December, 1958.