

THE CLIMATE OF BANGKOK.

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The following notes upon temperature and rainfall are offered as a small contribution towards the complete study of all the climatic conditions which obtain in the City of Bangkok. They are based upon daily records taken during the last ten years, that is 1902 to 1911 inclusive. During the majority of these years, the instruments have been located in the compound of the Police Hospital. The daily readings have been taken by Mr. E. A. Bryan, the Resident Surgeon, and I am glad to have this opportunity of thanking him for his very valuable assistance.

The thermometers are all "Kew-tested" and can be relied upon, and those for recording shade temperatures are kept in a double roofed louvred box, four feet above the ground, on the lawn of the hospital.

GENERAL CONSIDERATIONS.

Bangkok, the Capital of Siam, is situated on both banks of the river Menam Chou Phya, some forty Kilometers above the bar following the windings of the river, but only 22.5 Kilometres in a direct line from the bar, in latitude $13^{\circ} 58'$ N., and longitude $100^{\circ} 34'$ E.

The mean level of the city is only about 4.25 metres above mean sea level

The numerous canals which intersect it show a difference between ordinary high and low tides of only 1.8 metre and at Spring Tides of 2 metres.

During the high tides of November, December and January, considerable portions of the city are subject to inundation, especially during years of heavy rainfall.

The Monsoons naturally divide the year into a dry and a wet season. The South-West Monsoon is said to blow from April to September, but in Bangkok, its onset with the accompanying rains is

somewhat variable as may be shown by the following data giving the advent of the rains during the ten years under review:—

Approximate Dates upon which the Rains commenced.

Year	Date
1902	2nd May
1903	8th „
1904	2nd „
1905	11th „
1906	10th „
1907	2nd „
1908	10th „
1909	30th April
1910	11th May
1911	4th „

During several of these years, frequent showers during April preceded the real advent of the rains, and in fact about the 20th April, one or more heavy showers of rain accompanied by thunder may be expected. As a rule, from this date until the rains break, the climate of Bangkok is at its worst. The temperature during the twenty-four hours is high, the air is humid, and breezes are light or absent. The onset of the rains may be fairly sudden, and after several weeks of rainless hot days the first heavy shower often occurs during the night. This was particularly the case in May, 1903, when after a complete absence of rain during March and April, a fall of 4.5 inches was recorded from about 10 p. m. on the 7th. until 5 a. m. on the 8th. In Bangkok it may be said that the South-West Monsoon lasts from the end of April or beginning of May until the end of October, which period coincides with the rainy season. During this season, the temperature tends to be more uniform than during the dry season, the daily maxima are lower, the minima higher, and naturally the range is less, giving therefore a greater monotony of climate.

During November, the actual date varying considerably, the North-East Monsoon sets in in Bangkok, and may continue to blow fairly regularly during December and January and perhaps a greater

portion of February. It is during this period that our much appreciated "Cool Season" is experienced. In the minds of dwellers in Singapore and other adjacent countries, our cool season still remains somewhat of a myth. True it is that in some years, the temperature fails to fall to reasonable figures for a longer period than a week or two, but on the other hand during a normal December and January, the climate of Bangkok is a very agreeable one.

The mean temperature in the shade for the ten years is 82.98° F (28.3° C) while the highest figure in the shade was 106° F (41.1° C). This temperature was recorded during the year 1906 on four occasions, *i. e.* on the 26th February, the 8th and 19th April and the 7th May as may be seen from Chart I.

The lowest temperature in the shade was recorded on the 21st December 1907 and amounted to 52° F (11.1° C). We have thus an absolute range of shade temperatures of 54° F or 30° C.

The maximum of the daily solar radiation temperatures ranged from 169° F (76.1° C) on the 1st August 1911 to 82° F (27.8° C) on the 14th May 1908.

The mean rainfall for the ten years is 57.139 inches (1450.8 m.m.), the range being from 45.95 inches (1167.1 m.m.) in 1906 to 72.13 inches (1831.8 m.m.) in 1908. May and September are the two wettest months of the year as a rule.*

Hail fell on the 7th April 1904, a phenomenon which is said to occur only once in ten years in Bangkok.

Towards the beginning and the end of the South-West Monsoon, the frequent heavy showers of rain are usually preceded and accompanied by fairly strong winds and by thunder and lightning.

Typhoons are unknown in Bangkok, but on one occasion in the writer's experience, a tornado of limited area, but of considerable force, was experienced in Bangkok. This was on the 31st March 1911 when at about 1.30 p.m., heavy clouds were seen to bank up towards the North and North-East, and strong winds began to blow, at first from the North-East. The storm passed across the compound of the Police School with considerable violence but doing no damage at this time,

* See Charts I., II., III. and Frontispiece.

and then seems to have described a circle, passing westwards over the Suan Luang to Pomprab district, thence North-West to Nang Lerng District, East to Khor Sua and back South-East to the Police School again when it seems to have attained its maximum violence. At the School there is a double row of three barracks running West and East each raised on wooden pillars ten feet from the ground. Of the northern row, barracks No. 1 and 2, counting from the Western end, were lifted from their foundations and overturned and the same fate befel No. 2 of the Southern row. Number one of this row was badly shaken and was left standing at a considerable angle from the perpendicular. All the other buildings were left intact although the nearest was less than fifty yards from those blown down.

Three men were killed by the falling buildings and over twenty constables sustained injuries of a more or less serious nature.

PREVIOUS METEOROLOGICAL RECORDS.

The only previous records of temperature and rainfall known to me are two, namely those compiled by the Rev. Jesse Caswell, an American Missionary, and those recorded by Dr. James Campbell—Physician to the British Legation. In the “Bangkok Calendar” for 1860, the Rev. Dr. D. B. Bradley, the Editor, writes as follows under the heading “Meteorological Tables” :—

“The four following tables were prepared by the Rev. Jesse Caswell, formerly a Missionary of the A. B. C. F. M., but afterwards under the patronage of the American Missionary Association, New York. The compiler can testify from personal knowledge, that the observations were made with great care and labor, but for the want of a self-registering instrument, it was impossible for him to make them as accurate as the tables following them, made by Dr. Campbell.”

In the same number of the Calendar, Doctor Campbell writes thus to Dr. Bradley.

Bangkok January 1st. 1859

My Dear Doctor,

“Enclosed I send you the various items I record, condensed into monthly tables and think them to be as copious as you will require for the object in view.

“ The temperatures I believe to be the most correct of any recorded for Bangkok : for I take it those hitherto noted were not from self-registering instruments, or if so, that they were not so accurate as those now made.

“ My thermometers were tested at Kew and Greenwich observatories. The same remarks apply to the Hygrometer.”

With regard to the Rev. Mr. Caswell's data which cover the year 1840-47 inclusive, one cannot but commend the indefatigable labour and care taken in the recording of these figures.

In the absence of self-registering instruments, it is difficult to imagine how with his ordinary duties to perform, Mr. Caswell could find time to make such careful records. His mean temperature for eight years is 81.14° F, that of Dr. Campbell for 10 years 1858 to 1868 (circa), is 80.1° F, and my mean for 10 years 1902 to 1911 is 82.9° F, all closely approximating.

It may be further noted that Mr. Caswell's extremes were 97° F and 54° F, a range of 43° F, which is 11° F below my extreme range. Taken under such difficulties, it would be useless to form any definite conclusions upon Mr. Caswell's figures.

With regard to Dr. Campbell's data, however, the facts are reliable, taken as they were by a careful observer with self-registering instruments previously tested at Kew and Greenwich Observatories.

In a former publication on “ Climate and Health in Bangkok ” read before the Siam Society, I referred to ten years records of Dr. Campbell in the possession of the Royal Meteorological Society of England, and hazarded the opinion that considering their lesser range than my figures, the location of the instruments might possibly have been a shaded verandah in place of in the open air under the shade of the regulation double-roofed louvred box in which my instruments have always been kept.

Unfortunately, we have no records of Dr. Campbell's extremes of maxima and minima but on looking at Chart I, it will be seen that his figures show a lesser range generally than mine. The only exceptions are that his mean of minima for November and December are slightly lower than mine. There is a difference, too, in the rainfall

averages (see Chart II) Dr. Campbell's being 67.04 inches, mine being 57.14 inches.

One might well ask has the climate of Bangkok changed during the last forty to fifty years?

The two periods in question are not long enough to enable one to make any reliable comparison, but it should be at least noted that the lesser range of temperature in Dr. Campbell's records is accompanied by a higher rainfall, while my ten years' averages give a higher range of temperature and a rainfall lower by ten inches.

If it could be proven that any great extent of destruction of forests had taken place during the past fifty years around Bangkok, then such a change in climate would be just what one would expect; for it is well known that in forest districts, the minima are constantly higher and the maxima constantly lower, and that the range is consequently less than in regions not covered with wood, and that the rainfall is greater than over ground bare of trees. Unfortunately I have been unable to obtain reliable data with regard to any extensive disafforestation in and around Bangkok within the period about mentioned. Until reliable records have been taken during many more decades, it will be impossible to make any emphatic statement as to any local change of climate.

To those who do not care to consult the tables of temperature and rainfall provided as appendices, the following abstract of the climatic conditions for each month may be of interest.

MONTHLY ABSTRACT OF CLIMATIC CONDITIONS IN BANGKOK.

January. The mean temperature in the shade is 79.° F or 26.1° C, the mean of the maxima 92.1° F (33.3° C), the mean of the minima 66.7° F (19.3° C), the mean daily range 25.4° F (14.1° C) while the mean solar radiation temperature amounts to 139° F (59° C) During this month, the highest temperature in the shade was 100° F (37.8° C) during five days in 1906 and on one day in 1907 and the lowest in the shade 54.° F (12.6° C) on the 22nd., 1904. This is the month during which we experience the greatest mean daily range between the maximum and minimum shade temperatures. The maximum range for the month was 40.° F (22.2.° C) in 1907, while the minimum was 14.° F (7.7° C) in 1907.

This month is also marked by the least mean rainfall, the mean for the 10 years being 0.25 inch (6.4 millimetres). The average number of days on which rain falls is 1.5 and the greatest rainfall in any 24 hours during this month amounted to 0.98 inch (25. m.m.) and was recorded on the 24th., 1910.

As might be expected with such slight rain, the mean relative atmospheric humidity for the month is only 68 per centum.

The wind is generally from the N., N. N. E and sometimes S. S. W,—S.

February. The mean shade temperature is 81. 2° F (27. 3° C), the mean of the maxima 93° F (33.9° C), the mean of the minima 70.2° F (21.2° C), while the mean solar radiation figure is 138° F (58.8° C). The extremes are 106° F (41.1° C) in the shade in 1906 and 56° F (13.3° C) in 1902.

The mean daily range is 22.7° F (12.6° C), less than January. The greatest range recorded during the ten years was that of 41° F. (22.7° C) on the 3rd February 1908.

During this month we also find the least range recorded—namely 3° F. (1.6° C) on the 4th of 1902. On the previous day, there had been a few drops of rain with a maximum of 84° F. in the shade. On this the 4th, rain fell in a drizzle to the extent of 0.4 inch. The solar radiation figure was only 87° F. (30.6° C), the maximum in shade 68° F. (20° C) and the mean for 24 hours 65.8° F. (18.7° C).

The mean rainfall is slightly over that of the previous month being 0.67 inch (17 m.m.) and the mean number of days on which rain falls is two. This rainfall is generally limited to a few slight showers—the well known “Mango Showers”—but occasionally quite a heavy fall has been recorded, as for example 1.65 inch (41.9 m.m.) on the 21st of 1911 and 2.47 inch (62.8 m. m.) on the 25th of 1910

The mean relative atmospheric humidity is 60.4 %.

The wind blows from the N. E., E, or S. S. E. and rarely from the South.

March. Higher than in January, or February, the mean temperature is 84.7° F (29.3° C), the mean of maxima 94.7° F (34.8° C),

and the mean of minima 73.2°F (23°C), all shade readings. The mean solar radiation temperature is 143°F , the highest being 162°F in 1903 and the lowest 87°F in 1907.

The highest maximum in the shade was 103°F (39.4°C) on the 31st of 1903, the lowest minimum 62°F (16.7°C) on the 22nd of 1908.

The daily range is lessening, the mean being 20.6°F . (11.4°C) the greatest 37°F (20.5°C) and the least 7°F (3.7°C).

This is still a very dry month with a mean of 2.6 rainy days and a mean fall of 1.35 inch (34.3 m. m.).

The total amount for the month has varied during the ten years from *nil* in 1903 and 1906 to 6.18 inches in 1907. The highest fall on any one day was 2 62 inches (66 m.m.) on the 1st of 1907.*

The mean relative humidity is 62.8 %.

The wind varies from the E. N. E., to N. E., S. S. E., and S., or S. S. W. The last mentioned is the "Lom Wow" or kite flying breeze which during this month begins to blow regularly throughout the day. The occurrence of a tornado during this month has already been referred to under "General considerations."

April is the hottest and most unpleasant month of the year. In the shade, the mean is 87°F (30.6°C), the mean of maxima 96.6°F (35.8°C) and the mean of minima 76.4°F (24.6°C). The mean solar radiation figure is 145°F (62.7°C) with a maximum for this month of 159°F (70.5°C) in the sun in 1910 and a minimum of 95°F (35°C) in the sun in 1908.

The extremes in the shade are 106°F (41.1°C) on the 7th in 1906 as a maximum and 68°F (20°C) as a minimum on the 6th in 1904.

The mean daily range is 20.1°F (11.1°C)

Rain falls on an average 5.1 days and the mean amount recorded is 2.03 inches (52 m.m.)

Here again the total fall has varied during the ten years from *nil* in 1903 to 5.71 inches (144.8 m.m.) in 1904. Whether

* See footnote to account for May

showers may be recorded during the earlier part of the month or not, it may be taken as a regular thing that there will be a heavy shower or two from the 18th. to the 21st. after which the climate is oppressive and damp until the rains properly set in.

Hail fell on the 7th. of 1904, an incident which is said to take place once in ten years in Bangkok. On this day, there was nothing else unusual, the solar radiation being 148° F, the shade maximum 96° F and the mean for the day 84.8° F. As just mentioned above, this was our wettest April. The relative humidity was 62.2% in 1911.

The prevailing wind begins to change from the N. E. to the S. W.

May is the month when the South West Monsoon sets in properly in Bangkok and the rains break. In the general survey of the climate, it has been shown that in nine out of the ten years, the rains set in somewhere between the 2nd. and 11th of the month.

The mean rainfall is 8.13 inches (206.5 m.m.) while the greatest amount for the month was 12.5 inches (318 m.m.) in 1904, and the least 3.15 inches (80 m.m.) in 1902. The average number of rainy days is 16.9.

The greatest rainfall recorded during any one day during these ten years was 4.5 inch (114.3 m.m.) on the 8th May 1903.*

The shade temperatures are as follows:—mean 85.9° F (30° C), mean of maxima 94.7° F (34.8° C), mean of minima 76.1° F (24.4° C), mean daily range 18.5° F (10.3° C), greatest daily range 30° F (16.6° C) and least daily range 5° F (2.7° C). The extremes range from 106° F (41.1° C) on the 7th. of 1906 to 72° F (22.2° C) on the 8th. of 1903 and the 4th, 14th and 26th. of 1904.

The mean maximum solar temperature is 145° F (62.7° C) with a maximum of 161° F (71.6° C) in 1910 and a minimum in the sun of 82° F (27.8° C) on the 14th. of 1908, the lowest figure recorded in the sun during the ten years.

* Since writing the above, the maximum rainfall on any one day has been exceeded by 0.7 inch. On the morning of the 31st March 1912, strong winds set in about 4 a. m. and were accompanied by heavy rain which started at about 4.45 a. m. and continued almost without intermission until 10 a. m. during which period a fall of 5.35 inches (135.9 m.m.) was recorded.

The prevailing winds are from the S. W. and S. and are gentle breezes as a rule, but every heavy shower, during this month, is usually preceded by strong winds which mark the month as one of squalls.

June. After the burst of the monsoon in May, the rains slacken off somewhat during June although the average number of rainy days is 17.4 just over that of the previous month.

The mean rainfall is 5.9 inches (149.9 m.m), with a total of 10.13 inches (257 m.m) in June 1910 falling to a total of 2.99 inches (76 m.m) in 1902.

The greatest amount in any one day was 1.7 inch (43.2 m.m.) on the 2nd. of 1903

The mean shade temperatures are :—

Mean 84.8° F (29.3° C), mean of maxima 92.6° F (33.6° C), mean of minima 76° F (24.4° C), mean daily range 16.5° F (9.1° C), greatest daily range 25° F (13.8° C) and least daily range 6° F (3.3° C).

The extreme shade temperatures were 100° F (37.8° C) on the 1st and 2nd of 1902, and the 20th of 1903, as maxima, and 70° F (21.1° C) as a minimum on the 10th of 1909.

The mean sun temperature is 143° F (61.5° C) with a maximum of 161° F (71.6° C) in 1911 and a minimum of 103° F (39.4° C) in 1903.

The average relative humidity is 69.4.°/.

The wind remains steady from the S. W. though it occasionally veers to the W. or S.

July. Temperatures and rainfall show little variation from those of June.

The means in the shade are as follows :—absolute mean 84.4° F (29.2° C), mean of maxima 92.3° F (33.5° C), mean of minima 75.7° F (24.3° C) and mean daily range 16.6° F (9.2° C).

The extremes in the shade were a maximum of 101° F (38.3° C) on the 7th and 8th., 1908, a minimum of 71° F (21.7° C)

on the 12th 1908, and on the 8th, 1911, a maximum daily range of 25° F (13.8° C) on the 7th and 8th 1908, and on the 30th. 1910, and a minimum daily range of 8° F (4.4° C) on the 3rd, 1910.

The mean temperature of solar radiation for this month is 142° F (61.1° C), the highest in the sun being 161° F (71.6° C), in 1910 and in 1911 and the lowest 95° F (35° C) in 1907

The mean rainfall is 5.43 inches (138 m.m) with a mean of rainy days of 17.2.

The highest rainfall recorded on any day was 1.9 inch (48.3 m.m) on the 25th of 1906.

The relative humidity for the month is 67.6 per cent.

The winds continue from the S. W.

August. Shows a distinct increase in rainfall, the mean being 7.45 inches (189.2 m.m.) with 18.6 as the average number of rainy days.

During the ten years, the rainfall has varied as much as from 2.8 inches (71.1 m.m.) in 1904 to 12.65 inches (321.3 m.m.) in 1910.

The greatest fall on any one day was 2.24 inches (57. m.m.) on the 28th of 1910. The relative humidity is 65.9 per cent.

The shade temperatures are:—mean 84.1° F (28.9° C), mean of maxima 92.1° F (33.3° C), mean of minima 75.5° F (24.2° C), mean daily range 16.5° F (9.1° C), the highest recorded being 99° F (37.2° C) on the 10th, 1906, the lowest 72° F (22.2° C) on the 9th, 1911, the greatest daily range being 24° F, (13.3° C) in 1906 and the least daily range being 6° F (3.3° C) in 1908.

In the sun, the mean is 141° F, (60.5° C) the highest being 169° F (76.1° C) on the 1st of 1911 which is the highest record in the sun during the ten years.

The lowest sun temperature for this month was 97° F (36.1° C) in 1908.

The breezes are still like those of July from the S. W.

September has been uniformly throughout these ten years the wettest month, the mean being 13.65 inches (346.7 m.m.). The

range has varied between 6.8 inches (160 m.m. in 1907 and 16.64 inches (422.4 m.m.) in 1902.

The mean of rainy days is 21.6 and the relative humidity 73.1 per cent. The greatest fall on one day was 3.7 inches (94 m.m.) on the 15th of 1909.

As for the temperature, the means in the shade are as follows:—absolute mean 83.2° F (28.4° C), mean of maxima 90.9° F (32.8° C), mean of minima 75.3° F (24.1° C) and the mean daily range 15.4° F (8.5° C). The extremes in the shade were:—highest 98° F (36.7° C) on the 7th. of 1906, lowest 70° F (21.1° C) on the 26th. of 1902, greatest daily range 24° F (13.3° C) on the 17th. of 1908, and the least daily range 6° F (3.3° C) on the 22nd. of 1908.

The temperature of solar radiation is 141° F (60.5° C) as a mean, while the maximum recorded was 161° F (71.6° C) in 1911, and the minimum in the sun was 90° F (32.2° C) in 1908.

The breezes nearly all come from the W. S. W., N W., and S.

October. The rains are now lessening and in fact, although November may occasionally show a considerable rainfall, this month ends the real rainy season. The average fall for the ten years is 9.04 inches (229.5 m.m) with a mean number of rainy days of 18.7, and a relative humidity of 74.1 per cent.

The highest rainfall on one day was 2.75 inches (69.8 m.m) on the 7th. of 1911.

Throughout the ten years, the total rainfall for the month has varied from 4.58 inches (123.2 m.m.) in 1906 to 13.41 inches (340.4 m.m.) in 1911.

The temperatures are generally slightly less than during the preceding month although the climate is still muggy and damp.

The shade temperatures are as follows:—mean 82.7° F (28.2° C), mean of maxima 90.8° F (32.7° C), mean of minima 74.8° F (23.8° C), mean daily range 16.1° F (8.9° C), highest recorded 100° F (37.8° C) on the 30th. of 1906, lowest recorded 64° F (17.8° C) on the 23rd. of 1906, the greatest daily range 27° F (15° C) on the 23rd. of 1906 and the least daily range being 5° F (2.7° C) on the 2nd. of 1903.

The mean temperature of solar radiation is 139° F, (59.4° C) the maximum being 163° F (72.7° C) in 1910 and the minimum in the sun being 86° F. (30° C) in 1903.

Towards the end of the month, the winds are variable and may blow from the N. N. W., E. S. E., or W. until the N. E. monsoon is established.

November. The North-East monsoon sets in during this month. If early, the month is a very pleasant one with bright clear skies, cool nights and still cooler mornings. In Bangkok, however, the break of the monsoon may be delayed till the end of this month, the wind occasionally blowing from the S. W. and making it, therefore, a very hot and unpleasant period.

A few showers of rain still tend to fall during the early part of the month, the mean fall being 2.84 inches (72.4 m.m) and the mean number of rainy days being 5.8. The highest record on one day was 2.75 inches (69.8 m.m.) on the 4th of 1905. During the ten years under review, the rainfall for this month has varied from 0.4 inch (10.2 m.m.) in 1903 to as much as 8.14 inch (207 m.m) in 1909.

It is well, however, to have all water tanks filled up by the end of October.

The temperature records show an improvement during this month, the mean shade reading being 80.4° F (26.9° C). The other shade temperatures are as follows:—mean of maxima 89.3° F (31.8° C), mean of minima 71.3° F (21.8° C), the mean daily range 18.5° F (10.3° C), the highest reading being 99° F (37.2° C) in 1907 and the lowest 56° F (13.3° C) in 1906, the greatest daily range 31° F (17.2° C) on the 18th November 1906, and the least daily range 6° F (3.3° C) on the 28th of 1909.

In the sun, the mean maximum is 138° F (58.8° C) with an actual maximum of 160° F (71.1° C) in 1909 and an actual minimum of 100° F (37.8° C) in 1903.

The relative humidity is 68.2 per cent.

December is the coolest month of the year, showing a mean temperature of 78° F (25.6° C) in the shade. The other shade readings are these—mean of maxima 88.9° F (31.6° C), mean of minima 66.8° F (19.3° C), mean daily range 22.1° F (12.2° C), highest recorded being 100° F (37.8° C) in 1906 and the lowest being 52° F (11.1° C) the actual lowest record during these ten years. This was on the 21st. December 1907, and was followed on the 22nd. and 23rd. of the same month by readings of 53° F (11.7° C) and 56° F (13.3° C) respectively.

A minimum of 53° F was again registered on the 26th of 1910. The extremes of daily range vary from 33° F (18.3° C) in 1906 to 6° F (3.3° C) in 1904.

The maxima in the sun give a mean of 137 F (58.3° C) and a range between 157° F (70° C) and 90° F (32.2° C). The mean rainfall is only 0.37 inches (9.5 m.m.) with a mean of 1.7 rainy days and a relative humidity of 66.7 per cent. The greatest rainfall on one day was measured on the 15th of 1903 and amounted to 0.92 inch (23.4 m.m).

Although the N. E. monsoon prevails, yet the wind is often from the E., S. S. E., and S. and sometimes as far round as the S. S. W. when the clear dry weather typical of this month gives place to cloudy and warm weather accompanied by a few showers

APPENDICES.

APPENDIX I.

Mean and Extreme Temperature in shade in Bangkok during 10 years, 1902-1911.

MONTH.	MEANS								EXTREMES									
	Mean.		Mean of						Greatest Daily Range		Least Daily Range.		Highest Maximum		Lowest Minimum			
			Maxima.		Minima		Daily Range						Year	Degrees	Year	Degrees		
	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.		
Jan.	79.0	26.1	92.1	33.3	66.7	19.3	25.4	14.1	40	22.2	14	7.7	1906-07	100	37.8	1907	54	12.6
Feb.	81.2	27.3	93.0	33.9	70.2	21.2	22.7	12.6	41	22.7	3	1.6	1906	106	41.1	1902	56	13.3
March	84.7	29.3	94.7	34.8	73.3	23.0	20.6	11.4	37	20.5	7	3.7	1903	103	39.4	1908	62	16.7
April	87.0	30.6	96.6	35.8	76.4	24.6	20.1	11.1	32	17.7	8	4.4	1906	106	41.1	1904	68	20.0
May	85.9	30.0	94.7	34.8	76.1	24.4	18.5	10.3	30	16.6	5	2.7	1906	106	41.1	1903-04	72	22.2
June	84.8	29.3	92.6	33.6	76.0	24.4	16.5	9.1	25	13.8	6	3.3	1902-03	100	37.8	1909	70	21.1
July	84.4	29.2	92.3	33.5	75.7	24.3	16.6	9.2	25	13.8	8	4.4	1908	101	38.3	1908-11	71	21.7
Aug.	84.1	28.9	92.1	33.3	75.5	24.2	16.5	9.1	24	13.3	6	3.3	1906	99	37.2	1911	72	22.2
Sept.	83.2	28.4	90.9	32.8	75.3	24.1	15.4	8.5	24	13.3	6	3.3	1906	98	36.7	1902	70	21.1
Oct.	82.7	28.2	90.8	32.7	74.8	23.8	16.1	8.9	27	15.0	5	2.7	1906	100	37.8	1906	64	17.8
Nov.	80.4	26.9	89.3	31.8	71.3	21.8	18.5	10.3	31	17.2	6	3.3	1907	99	37.2	1906	56	13.3
Dec.	78.0	25.6	88.9	31.6	66.8	19.3	22.1	12.2	33	18.3	6	3.3	1906	100	37.8	1907	52	11.1

Mean temperature in shade for 10 years 82.98 F or 28.3 C.

(16)

APPENDIX II.

Mean and extreme Rainfall in Bangkok during 10 years, 1902 to 1911.

MONTH.	MEANS			EXTREMES.		
	Rainfall during month in		Number of days on which rain fell.	Greatest rainfall in 24 hours.		
	Inches	Millimetres		Inches.	Millimetres	Date.
January	0.25	6.4	1.5	0.98	25.0	24th of 1910
February	0.67	17.0	2.0	2.47	62.8	25th „ 1910
March	1.35	34.3	2.6	2.62	66.5	1st „ 1907
April	2.03	52.0	5.1	2.13	54.0	18th „ 1904
May	8.13	206.5	16.9	4.5	114.3	8th „ 1903
June	5.90	149.9	17.4	1.7	43.2	2nd „ 1903
July	5.43	138.0	17.2	1.9	48.3	25th „ 1906
August	7.45	189.2	18.6	2.24	57.0	28th „ 1910
September	13.65	346.7	21.6	3.7	94.0	15th „ 1909
October	9.04	229.5	18.7	2.75	69.8	7th „ 1911
November	2.84	72.4	5.8	2.75	69.8	4th „ 1905
December	0.37	9.5	1.7	0.92	23.4	15th „ 1903

Mean Rainfall for 10 years = 57.14 inches or 1451.5 millimetres.

APPENDIX III.

A Comparison of Dr. Campbell's and Dr. Hight's figures for 10 years.
1858-1868 (circa) and 1902-1911.

MONTH.	TEMPERATURE IN SHADE (FAHRENHEIT SCALE).								Rainfall in inches.		Number of rainy days.	
	Mean.		Mean of Maxima		Mean of Minima.		Mean Daily Range.		C.	H.	C.	H.
	C.*	H.*	C.	H.	C.	H.	C.	H.				
January ...	76.1	79.0	87.7	92.1	69.4	66.7	...	25.4	0.09	0.25	2	1.5
February .	79.1	81.2	88.6	93.0	74.1	70.2	...	22.7	0.56	0.67	7	2.
March ...	82.5	84.7	93.0	94.7	74.5	73.3	...	20.6	0.83	1.35	1	2.6
April ...	83.4	87.0	94.1	96.6	79.0	76.4	...	20.1	2.42	2.03	10	5.1
May ...	82.3	85.9	89.7	94.7	76.8	76.1	...	18.5	10.54	8.13	20	16.9
June ...	82.3	84.8	89.4	92.6	78.1	76.0	...	16.5	7.72	5.90	16	17.4
July ...	81.4	84.4	88.1	92.3	76.2	75.7	...	16.6	8.02	5.43	26	17.2
August ...	81.4	84.1	89.0	92.1	76.2	75.5	...	16.5	5.65	7.45	17	18.6
September ...	80.3	83.2	88.6	90.9	76.7	75.3	...	15.4	11.30	13.65	22	21.6
October ...	80.1	82.7	87.3	90.8	75.1	74.8	...	16.1	7.46	9.04	14	18.7
November ...	76.8	80.4	83.7	89.3	70.3	71.3	...	18.5	2.36	2.84	6	5.8
December ...	74.8	78.0	81.6	88.9	63.3	66.8	..	22.1	0.09	0.37	2	1.7
	80.1	82.9	—	—	—	—	...	—	67.04	57.14	143	129.1

* C.=Dr. Campbell's figures ; H.=Dr. Hight's figures,

APPENDIX IV.

Mean Temperatures for the Month.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean for Year.
1902	77.1	77.0	84.8	86.1	85.8	86.5	84.9	84.1	82.4	82.7	81.4	81.2	82.83
1903	80.6	80.7	87.0	88.6	87.1	83.2	84.0	82.7	81.7	81.5	78.4	72.4	82.32
1904	73.9	78.3	83.9	84.7	85.4	84.7	84.2	84.4	83.6	83.3	79.6	76.3	81.86
1905	81.4	84.8	86.0	88.8	85.8	84.8	84.8	85.4	83.9	83.7	82.2	85.2	84.73
1906	83.6	85.5	86.4	90.3	88.6	86.1	85.3	85.1	84.7	82.5	79.5	79.2	84.72
1907	78.7	82.5	83.2	86.2	84.7	84.3	84.2	83.1	83.3	82.5	81.3	74.8	82.40
1908	78.6	81.3	84.0	86.6	85.3	84.7	84.3	83.4	83.2	82.9	78.3	78.2	82.56
1909	79.0	82.3	84.4	86.2	85.0	84.9	83.8	84.1	83.4	83.3	79.0	76.1	82.60
1910	80.4	80.0	82.9	86.1	85.3	84.1	84.6	84.1	82.0	82.2	80.7	75.4	82.30
1911	77.5	80.4	84.4	87.1	86.0	84.8	84.5	85.0	83.9	83.3	84.3	81.4	83.55
Mean for } 10 years. }	79.0	81.28	84.70	87.07	85.90	84.81	84.46	84.14	83.21	82.79	80.47	78.02	82.98

APPENDIX V.

Mean of Maxima for the Month.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902	89.7	87.7	93.0	94.5	94.3	95.5	92.7	92.2	90.5	90.0	89.7	90.8
1903	91.1	92.0	97.4	99.0	97.5	90.8	92.4	90.6	88.2	88.0	86.0	82.2
1904	87.9	92.3	93.2	93.8	93.4	90.2	90.2	90.8	90.4	90.9	88.1	87.3
1905	93.1	94.0	94.0	97.5	93.2	90.6	91.4	92.3	90.5	89.7	89.9	93.4
1906	95.1	97.6	96.6	100.6	97.1	94.6	93.6	93.1	92.8	92.0	90.9	93.6
1907	93.1	93.5	94.1	95.4	93.0	92.6	92.7	91.0	92.2	91.5	92.7	87.2
1908	93.6	95.0	95.9	96.0	95.0	93.6	93.7	91.5	91.1	90.9	86.2	88.3
1909	93.0	93.9	95.9	97.3	94.5	94.1	91.7	93.2	91.7	92.9	87.2	87.0
1910	92.6	92.3	93.0	95.9	95.0	92.6	93.9	93.0	90.2	90.9	89.7	86.8
1911	92.1	92.3	94.3	96.5	94.4	92.3	91.6	93.3	91.7	91.2	94.1	93.0
Mean for 10 years.	92.13	93.06	94.74	96.65	94.74	92.69	92.39	92.1	90.93	90.8	89.35	88.96

APPENDIX VI.

Mean of Minima.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902	65.1	66.4	72.5	76.6	76.8	77.2	76.4	76.3	75.3	75.0	72.6	72.0
1903	69.5	72.0	76.5	79.3	77.3	76.7	77.0	76.4	76.1	75.6	71.4	65.0
1904	64.7	66.9	73.6	74.3	75.0	76.2	75.5	75.5	75.0	74.4	70.4	63.8
1905	67.0	71.1	73.2	77.7	76.7	76.6	76.0	76.1	75.2	75.2	69.2	69.8
1906	70.1	72.2	75.1	77.6	78.0	75.9	76.1	75.3	75.5	72.2	66.7	65.0
1907	64.8	72.1	73.4	76.2	76.7	76.0	75.1	75.5	75.5	75.9	72.4	65.0
1908	65.7	71.0	73.0	77.0	76.0	75.3	75.0	75.3	76.1	75.6	70.6	69.3
1909	68.0	72.2	74.4	75.6	76.3	75.4	75.5	75.3	74.9	75.2	75.0	65.4
1910	69.6	69.8	70.0	75.5	75.6	75.5	75.2	74.9	74.7	74.8	71.9	64.2
1911	63.0	69.2	71.9	75.0	73.3	75.4	75.5	74.8	75.6	74.4	73.2	68.7
Mean for } 10 years. }	66.75	70.29	73.36	76.48	76.17	76.02	75.73	75.54	75.39	74.83	71.34	66.82

APPENDIX
Dates and Amounts of

Year	January	February	March	April	May	June
1902	93 on 17, 18, 19, 31	94 on 1, 2, 17	102 on 23	98 on 28	102 on 31	100 on 1, 2
1903	97 on 26	97 on 25, 27, 28	103 on 31	103-5 on 21	104 on 18	100 on 20
1904	93 on 29, 30	97 on 25	96 on 29	101 on 15, 17	98 on 24, 26	93 on 17
1905	97 on 23	98 on 3, 26	100 on 31	104 on 30	99 on 3	94 on 2, 10
1906	100 on 15, 16, 23, 24, 31	106 on 26	100 on 3, 12, 29	106 on 8, 19	106 on 7	99 on 9, 30
1907	100 on 16	100 on 11	102 on 9, 10	103 on 30	100 on 2	98 on 13
1908	98 on 22, 31	102 on 2, 3, 4	101 on 5	101 on 15, 17	99 on 5	98 on 3, 4, 5
1909	97 on 27	98 on 20, 24, 28	99 on 27	101 on 25	102 on 3	98 on 12, 13
1910	96 on 5, 8, 11, 2	100 on 27, 28	99 on 2	100 on 21, 22	101 on 5, 8, 10, 11	97 on 3
1911	96 on 10	97 on 8, 16	99 on 17	101 on 25	100 on 2	97 on 26

VII.

Highest Maxima.

July	August	September	October	November	December
98 on 21, 22	98 on 9, 10	97 on 18	94 on 12	93 on 21	95 on 7, 9, 10
99 on 4, 6, 7	96 on 12	92 on 23	93 on 9	91 on 8, 9	91 on 14
94 on 23, 24	96 on 28	96 on 1	95 on 20, 21, 22	93 on 13	96 on 12
95 on 13, 21	96 on 13	97 on 16	95 on 19	96 on 1, 3	98 on 26
100 on 2	99 on 10	98 on 7	100 on 30	98 on 1, 2	100 on 20
97 on 10	94 on 2, 17, 27, 28, 29	96 on 13, 21, 26, 27	96 on 8, 14, 27	99 on 21	96 on 30, 31
101 on 7, 8	97 on 24	96 on 8, 14	96 on 13	95 on 4	93 on 17, 18, 31
97 on 3	96 on 14, 15	97 on 14	98 on 2	92 on 8, 9	96 on 31
98 on 13, 14, 30	98 on 20	95 on 15	96 on 9	95 on 28, 29	95 on 11
96 on 27	97 on 29	95 on 1, 3	97 on 31	98 on 2	97 on 2

APPENDIX
Dates and Amounts of

Year.	January	February	March	April	May	June
1902	59 on 3	56 on 13, 14	70 on 5	73 on 6, 30	73 on 17	74 on 20
1903	58 on 7	66 on 9	71 on 4	72 on 1	72 on 8	75 on 1, 2, 17, 28
1904	58 on 22	59 on 12	68 on 16	68 on 6	72 on 4, 14, 26	74 on 1
1905	60 on 1	66 on 1	68 on 19	74 on 1, 7, 9, 19	74 on 0, 14, 25	74 on 3, 4, 6
1906	65 on 2, 31	65 on 1, 2	64 on 8	72 on 7, 18	74 on 30, 31	74 on 9, 12, 17, 24, 28
1907	54 on 3, 4, 6, 7	69 on 6, 10	66 on 6	70 on 1, 6	74 on 3, 5, 7, 8, 10, 11, 17	74 on 19
1908	60 on 10	61 on 3	62 on 22	72 on 10	74 on 2, 4, 16 21, 22	72 on 21
1909	61 on 23	66 on 13	68 on 13, 26	73 on 11	74 on 5	70 on 10
1910	58 on 26	59 on 2	68 on 23	73 on 12	71 on 6	73 on 20
1911	58 on 2, 23	58 on 2	66 on 17	70 on 29	73 on 9, 10	71 on 24

VIII.

Lowest Minima.

July	August	September	October	November	December
73 on 20	74 on 4	70 on 26	73 on 20	68 on 10	69 on 20, 21, 26, 27, 28
72 on 21	74 on 9, 10	71 on 16	71 on 30	64 on 28	58 on 24, 25, 26
74 on 5, 11, 12, 15, 25, 27 30, 31	74 on 16, 19, 22, 25, 27, 28,	72 on 13	74 on 8th to 31st 24 days	62 on 19	56 on 3, 4
74 on 9, 15, 19, 30, 31	74 on 1, 2, 4	74 on 8, 9, 10, 13, 15, 17, 20, 22, 23, 24, 25, 26, 29	72 on 21, 22	64 on 20, 21	66 on 20, 21
72 on 10	74 on 2, 3, 9, 14, 15, 16, 21, 23, 25, 26, 29	73 on 29	64 on 23	56 on 15	57 on 13
72 on 6	74 on 10, 11, 14, 15, 26, 29	72 on 19	73 on 4, 22, 24	66 on 30	52 on 21
71 on 12	74 on 1, 2, 8, 10, 12, 18, 23, 27, 30	71 on 17	74 on 16, 20, 24, 26, 29, 31	64 on 25, 29, 30	61 on 9, 10
72 on 20	74 on 2, 8, 10, 12, 13, 16	72 on 15, 22	73 on 12, 13, 15	62 on 19	60 on 22, 26
73 on 30	73 on 30	73 on 20, 26, 27	70 on 14	67 on 19	53 on 26
71 on 8	72 on 9	73 on 10	71 on 17	70 on 14	63 on 11, 12

APPENDIX IX.

Greatest Daily Range per mensem.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902	28	31	24	23	24	24	22	21	22	18	20	24
1903	28	27	31	30	30	25	23	19	17	16	19	23
1904	27	33	26	26	26	17	18	22	22	21	24	29
1905	34	28	29	26	24	18	19	20	21	20	26	30
1906	29	36	30	32	28	25	22	24	23	27	31	33
1907	40	30	30	25	24	22	23	20	23	22	25	30
1908	35	41	37	26	23	22	25	22	24	21	22	25
1909	31	26	31	25	26	24	22	21	22	23	23	26
1910	30	30	28	25	27	23	25	23	21	24	22	30
1911	33	33	33	27	25	22	20	22	20	23	24	27

Date and amount of Highest Daily Range = 41 in February 1908.

APPENDIX X.

Least Daily Range per mensem.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902	20	3	13	15	12	12	9	10	7	10	14	12
1903	17	13	14	16	11	8	9	9	8	5	10	11
1904	17	14	12	8	11	10	10	10	9	9	12	6
1905	18	18	10	13	5	6	12	12	11	8	12	16
1906	19	16	14	16	12	14	12	12	7	10	16	18
1907	14	16	8	14	6	10	12	7	12	7	16	9
1908	17	11	14	10	6	14	12	6	6	10	8	11
1909	15	9	15	17	11	12	12	14	9	10	6	11
1910	15	13	7	17	8	8	8	16	9	11	13	12
1911	25	14	14	15	12	6	10	11	10	11	18	19

Date and amount of least daily range = 3 in February 1902.

APPENDIX XI.

Mean Daily Range per mensem.

	Jan.	Feb.	March.	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1902	25.2	21.2	17.5	17.8	17.3	18.2	16.6	15.9	15.2	15.0	17.1	18.6
1903	21.6	20.1	20.9	19.7	20.1	14.1	15.4	14.2	12.1	12.4	14.6	17.3
1904	23.2	25.4	19.2	19.8	18.5	14.0	14.8	15.2	15.2	16.5	17.7	23.5
1905	26.1	22.8	20.4	19.7	16.5	13.7	15.0	16.2	14.6	14.6	20.7	23.5
1906	24.6	25.4	21.4	23.0	19.3	18.7	17.5	17.8	17.3	19.3	24.1	28.7
1907	28.3	21.3	20.7	19.2	17.5	16.6	17.6	15.4	16.6	17.0	19.3	22.1
1908	27.9	24.0	22.9	18.9	18.5	18.3	18.3	16.1	15.0	15.1	16.2	19.0
1909	25.0	21.5	21.5	21.6	18.0	18.3	16.2	18.0	16.7	17.6	16.7	21.6
1910	23.0	22.3	19.4	20.4	19.6	17.0	18.6	18.0	15.5	16.7	17.8	22.5
1911	29.4	23.0	22.4	21.4	19.1	16.8	16.0	18.5	16.1	16.8	20.8	24.3
Mean for 10 Years.	25.43	22.70	20.63	20.17	18.54	16.57	16.60	16.53	15.43	16.10	18.50	22.11

APPENDIX XII.

Means and Extremes of Maximum Solar Radiation Temperatures

Year	January			February			March			April			May			June		
	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest
1902	137	142	132	137	141	117	142	162	133	140	149	129	144	154	131	143	155	117
1903	140	148	131	136	149	109	140	150	131	141	148	134	145	157	117	132	146	108
1904	129	135	125	133	146	129	144	149	141	145	152	105	149	159	123	146	154	115
1905	144	150	133	143	148	135	144	151	110	147	153	145	144	156	102	145	154	118
1906	140	149	120	143	149	130	143	149	115	147	154	135	140	150	115	142	155	120
1907	137	145	129	134	147	120	137	146	87	143	153	97	140	155	86	137	150	110
1908	133	148	114	137	146	110	141	148	130	139	151	95	141	154	82	144	152	120
1909	137	145	110	135	152	111	141	152	95	145	153	135	147	160	117	152	160	126
1910	144	154	127	145	155	111	148	160	109	152	159	140	152	161	118	149	159	116
1911	144	150	136	143	154	131	150	158	144	153	158	142	153	159	136	148	161	106
Mean Solar Temperature for 10 years.	139			138			143			145			145			143		

in Bangkok during 10 years, 1902-1911.

July			August			September			October			November			December		
Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest
143	151	104	139	149	112	148	149	109	140	146	125	139	144	127	138	150	113
136	145	115	133	143	113	131	143	117	130	142	86	127	135	100	125	132	107
140	156	122	145	158	120	146	155	121	146	159	129	141	155	107	137	147	100
145	154	127	147	156	132	140	155	110	133	150	115	136	145	110	143	150	131
137	151	110	140	153	100	137	150	95	136	150	100	133	145	125	135	140	120
132	146	95	133	157	110	134	151	100	133	149	110	138	150	120	129	147	90
142	158	99	138	152	97	135	150	90	132	148	105	131	147	102	136	140	130
148	160	118	151	158	145	149	160	104	152	162	133	145	160	121	141	149	129
149	161	121	153	162	138	145	160	115	147	163	122	146	155	131	143	155	130
148	161	105	153	169	128	151	161	138	150	160	134	151	158	146	147	157	132
142			143			141			139			138			137		

APPENDIX XIII.

Rainfall for the Month.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total for Year
1902	0.000	0.400	1.000	2.970	3.150	2.995	2.400	6.865	16.640	7.800	1.490	0.800	46.510
1903	0.050	0.300	0.000	0.000	9.888	9.160	4.165	7.505	11.978	7.585	0.425	1.425	52.481
1904	0.000	0.000	0.873	5.715	12.545	4.020	2.980	2.805	15.260	10.383	5.500	0.100	60.131
1905	0.150	0.000	3.050	2.000	11.675	6.350	7.775	6.600	11.755	6.960	2.800	0.000	59.115
1906	0.025	0.000	0.000	0.075	5.100	5.380	7.930	6.910	14.720	4.580	1.230	0.000	45.950
1907	0.560	0.060	6.180	0.350	10.950	5.150	3.090	2.900	6.300	11.160	2.650	0.020	49.370
1908	0.250	0.900	0.060	2.090	9.570	7.320	8.660	10.340	16.600	11.650	4.360	0.330	72.130
1909	0.160	0.250	0.210	1.470	5.350	3.720	7.560	11.160	13.990	7.290	8.140	0.000	59.300
1910	1.350	2.740	2.030	2,660	5.990	10.130	4.620	12.650	14.640	9.630	1.360	1.020	68.820
1911	0.000	2.045	0.100	2.960	7.140	4.770	5.260	6.760	14.630	13.410	0.500	0.010	57.585
Mean of 10 Years	0.254	0.670	1.350	2.029	8.135	5.899	5.439	7.449	13.651	9.044	2.845	0.370	57.139

Mean Number of days on which Rain fell.

Year.	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1902	0	1	1	6	14	12	11	20	20	19	4	1
1903	1	4	0	0	11	17	16	16	25	22	1	4
1904	0	0	2	11 Hail on 7th	18	18	11	13	21	15	9	1
1905	2	0	2	2	13	16	17	16	20	15	2	0
1906	2	0	0	1	15	15	22	16	23	9	6	0
1907	3	1	6	4	16	18	19	16	21	20	6	1
1908	1	3	1	9	22	20	18	22	22	28	10	4
1909	2	2	3	6	23	20	22	26	17	19	11	0
1910	4	5	10	5	19	21	15	22	24	22	5	5
1911	0	4	1	7	18	17	21	19	23	18	4	1
Mean for 10 Years	1.5	2.0	2.6	5.1	16.9	17.4	17.2	18.6	21.6	18.7	5.8	1.7

Date and Amount of Greatest

Year	January	February	March	April	May	June
1902	0	0.4	1.0	1.2	0.85	0.95
		on	on	on	on	on
		4	12	6, 18	21	4
1903	0.05	0.17	0	0	4.5	1:7
	on	on			on	on
	16	1	0	0	8	2
1904	0	0	0.65	2.130	2.7	0.875
			on	on	on	on
	0	0	31	18	7	20
1905	0.125	0	2.2	1.95	2.925	1.1
	on		on	on	on	on
	13	0	6	7	19	9
1906	0.025	0	0	0.075	1.8	1.34
	on			on	on	on
	27	0	0	23	10	4
1907	0.43	0.06	2.62	0.30	2.78	1.07
	on	on	on	on	on	on
	31	21	1	5	3	4
1908	0.25	0.62	0.06	0.98	3.82	1.55
	on	on	on	on	on	on
	29	16	20	21	28	7
1909	0.14	0.24	0.17	0.73	1.25	0.9
	on	on	on	on	on	on
	10	12	10	2	13	24
1910	0.98	2.47	0.77	0.73	1.83	1.68
	on	on	on	on	on	on
	24	25	15	9	11	21
1911	0	1.65	0.10	1.65	1.36	1.18
		on	on	on	on	on
	0	21	31	6	17	3

XIV.

Rainfall in 24 hours,

July	August	September	October	November	December
0.6 on 31	1.8 on 17	2.68 on 30	1.46 on 17	1.15 on 16	0.8 on 7
0.925 on 16	1.475 on 10	1.7 on 29	0.8 on 11, 29	0.425 on 10	0.92 on 15
1.225 on 11	1.125 on 14	2.750 on 9	1.925 on 17	2.625 on 3	0.1 on 26
1.725 on 18	1.6 on 5	1.55 on 8	1.48 on 20	2.75 on 4	0 0
1.97 on 25	1.13 on 23	3.61 on 29	1.45 on 5	0.76 on 3	0 0
0.68 on 10	0.79 on 3	0.84 on 11	1.78 on 18	1.15 on 1	0.02 on 27
1.83 on 30	1.71 on 27	2.40 on 9	1.7 on 1	1.3 on 8	0.31 on 19
1.8 on 4	1.57 on 16	3.7 on 15	0.87 on 28	3.7 on 6	0 0
1.26 on 5	2.24 on 28	2.27 on 8	2.07 on 5	1.06 on 8	0.58 on 1
1.19 on 3	1.65 on 30	3.03 on 23	2.75 on 7	0.23 on 3	0.01 on 20

APPENDIX XV.

Relative Humidity of the Atmosphere.

Month	Percentage amount.
January	68.
February	60.4
March	62.8
April	62.2
May	65.5
June	69.4
July	67.6
August	65.9
September	73.1
October	74.1
November	68.2
December	66.7

APPENDIX XVI.

Bangkok Rainfall for 10 Years 1882-1891. Registered at B. C. L., Koh Kwai.

Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.		Average.
1882	.5021	4.52	5.92	3.78	8.43	3.07	14.15	11.56	1.50	...	53.64	1882	47.92 for 2 years. 43.20 „ 3 „ 47.37 „ 4 „ 51.05 „ 5 „ 51.73 „ 6 „ 50.91 „ 7 „ 53.30 „ 8 „ 52.83 „ 9 „ 51.27 „ 10 „
1883	...	.63	...	3.16	7.44	9.69	2.10	5.76	8.57	3.44	1.52	...	42.21	1883
1884	1st Jan to 30th June. Total					7.-	5.29	3.57	6.18	8.49	3.23	...	33.76	1884	
1885	.10	3.62	.12	1.35	1.52	8.88	6.78	10.96	14.12	9.06	3.35	...	59.86	1885	
1886	...	.52	.95	.72	7.72	8.49	10.97	4.02	16.41	12.85	3.12	...	65.77	1886
1887	1.79	2.25	.87	2.39	8.76	4.19	7.97	8.75	9.61	6.98	1.56	...	55.12	1887	
1888	...	...	...	1.50	13.25	1.40	4.05	6.39	11.34	6.58	1.50	...	46.01	1888
1889	5.10	...	1.15	1.04	6.97	5.81	3.88	10.64	16.07	11.14	6.76	1.51	70.07	1889	
1890	.50	.50	...	1.40	8.52	5.68	4.01	12.14	10.26	5.-	.89	...	48.90	1890	
1891	...	5.80	1.62	.46	1.33	1.77	4.54	5.29	7.10	6.93	2.53	...	37.37	1891	
Monthly Averages	88	1.48	.55	1.83	6.83	5.52	5.80	7.06	11.38	8.20	2.59	.15			

for 9 years.

for 10 years

Note:—The above data, as well as the figures on the following page, have been kindly supplied by the Borneo Co., Ltd., from readings taken in the Company's compound in Bangkok.

APPENDIX XVII.

SUMMARY.—Rainfall Registered at B. C. L., Koh Kwai.

	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
January ... ..	...	...	...	...	.32	.24	...	.08	1.46	...
February ... ..	.60	.35	...	...	.27	.48	.30	1.19	3.26	1.42
March	2.88	...	1.37	1.92	...	5.06	.02	.67	.49	...
April	2.94	...	7.69	1.48	.94	1.75	3.18	1.59	.99	3.71
May	2.10	10.13	10.41	16.50	6.53	12.42	10.29	5.87	7.68	7.21
June	2.96	9.59	3.76	4.95	4.61	4.81	9.61	3.49	11.39	4.94
July	3.17	4.01	3.77	6.68	7.46	3.85	9.07	8.07	5.50	2.13
August	5.79	8.09	2.93	7.30	7.01	4.12	10.23	10.42	11.49	6.26
September	18.68	12.48	10.07	13.98	10.70	7.05	16.43	11.86	13.60	13.02
October	10.18	8.66	9.84	7.70	4.84	9.44	13.21	8.62	10.45	9.64
November	1.08	1.38	6.44	3.07	1.27	2.39	4.48	7.93	.74	.45
December ... ..	.85	1.42	...	.25	...	.18	.60	...	.85	...
Total	51.23	56.11	56.29	63.83	43.95	51.79	77.42	59.79	67.90	48.78
Average	...	53.67	54.54	56.87	54.28	53.87	57.23	57.55	58.70	57.71