

PART 6B  
CEYLON

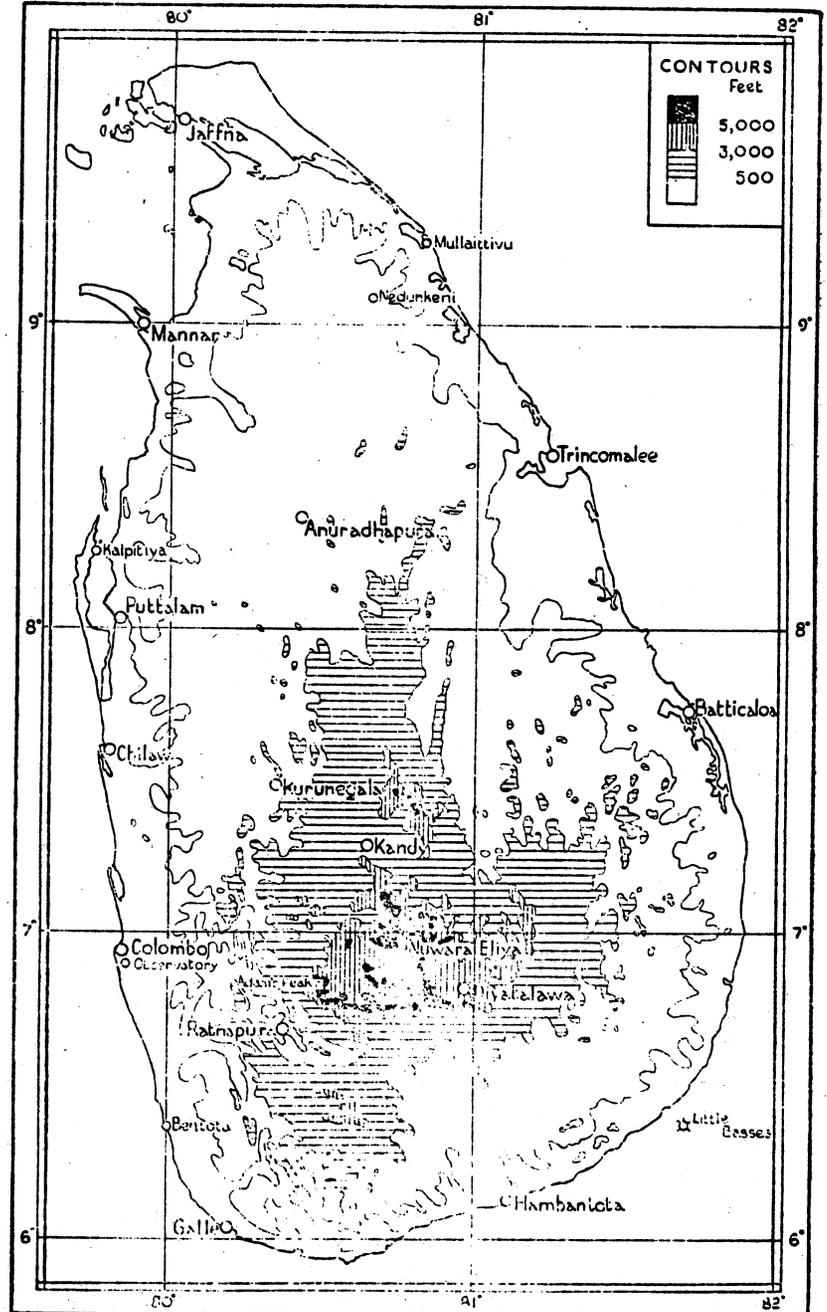


FIG. 31—THE ISLAND OF CEYLON

## CEYLON

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### I—GENERAL

The island of Ceylon is about 270 miles in length and 140 miles in width, it is situated off the south-eastern end of the Indian peninsula between the latitudes of 5° N. and 10° N.

The central part of the southern half of the island is mountainous rising to over 8,000 feet in one part where there is a remarkable cone known as Adam's peak which shows up prominently from the westward and southward. The remainder of the island is practically flat except for several isolated hills which rise abruptly from the eastern plain. Low-lying country occupies the entire northern half of the island and also the wide plain between the mountain district and the coast.

The climate of Ceylon varies considerably in different parts of the island both as regards temperature and rainfall. In the lowlands the climate is tropical, but at altitudes of 4,000 feet or more, the climate in many respects resembles that of a European summer.

The rainfall of the SW. monsoon is confined to the south-western part of the island while the eastern side receives most of its rain in November, December and January. The rain in those months is not entirely restricted to the eastern side of the island as a good deal of rain falls also in the hills and in the south-west. The average rainfall at Galle and Colombo in October and November is nearly as much as in May and considerably heavier than in the other months of the SW. monsoon.

The island is seldom visited by tropical cyclones with winds of hurricane force, and the temperature shows no violent changes. The coolest months are December and January with mean temperatures in the low country between 76° and 80° F., and the warmest months are April and May with mean temperatures between 81° and 85° F., the annual range varying between 3° and 8° F. Except at the hill stations the temperature in January is comparable with that of southern Italy in July. At Colombo, on the west coast, the annual mean temperature is 80° F. The climate on the east coast of the island is very similar to that experienced on the Coromandel coast of India; the mean temperature at Trincomalee is very nearly the same as at Madras, but the annual range is less. The mean temperatures at the hill stations are lower throughout the year than those on the coast. Although the temperatures are

fairly high all the year round there is usually a refreshing sea breeze on the coast during the day which makes the high temperatures more bearable.

The year has been divided into the four seasons given on page 10 of Part 6A, but there is really no cool season in Ceylon.

From December to March north-easterly winds predominate at the surface and from late May to early October, during the SW. monsoon, the predominating winds are south-westerly. During the intermonsoon months of April, May and October, November the surface winds are variable with land and sea breezes prevailing. The sea breezes in Ceylon are of great importance.

**Summary of typical weather conditions at Colombo during the different seasons and when under the influence of a depression**

*Weather conditions between December and April in the cool season.*—The mornings are generally bright, with clear blue skies, and occasionally there is a slight mist which disappears shortly after sunrise. There is generally little wind at the surface in the early morning, but when there is any wind at that time of the day in December and January, it is usually northerly or north-easterly and light to moderate in force. A sea breeze springs up between about 1000 and 1100 and strengthens in the afternoon, giving northerly to westerly or even south-westerly winds; northerly or north-westerly winds predominate in the afternoon from December to February. In the late evening the wind dies away.

About midday convection cumulus clouds appear on the horizon to the east, frequently showing well marked anvils. These clouds gradually spread out towards the coast in sheets of high stratus with long streamers of false cirrus, and by the late afternoon, between 1600 and 1800, the sky at Colombo is often completely overcast, while distant flashes of lightning may be seen towards the hills. Sometimes low sheets of nimbostratus form, spreading rapidly towards the coast, and heavy rain may follow, usually accompanied by heavy squalls of wind, thunder and lightning. The rain does not usually persist for more than two or three hours, at most, and in the late evening the sky clears again. These evening rains have a tendency to persist for several days in succession but it is unlikely that they extend far out to sea.

The visibility is usually good except for occasional morning mists and temporary bad visibility during heavy rain.

Although there is little change in the mean temperature throughout the year at Colombo, conditions are much pleasanter between December and February than in March, April and the beginning of May, the so-called "hot season." In the former months the nights are frequently relatively cool, while in the latter the lack of wind and the increase in humidity make the days, and more particularly the nights, unpleasant. This is the season when Europeans usually take their leave in the hills.

*Weather conditions in May and early June during the onset of the SW. monsoon.*—The weather at the beginning of May is frequently of the kind described above for December to April, but a tendency for rain squalls at or before dawn has begun to manifest itself before the beginning of May. Barometric gradients for south-westerly winds begin to appear, with moderate and sometimes strong, south-westerly or west-south-westerly winds. There are dull gloomy skies, with more or less heavy continuous rain often accompanied by thunder. These conditions may last for several days at a time, and usually become more frequent towards the end of the month, until, with the setting in of the monsoon, they merge into the weather conditions of the steady SW. monsoon.

*Weather conditions from June to September during the SW. monsoon.*—The weather on the whole is fine, with the sky partly covered with low patches of fractocumulus, moving rapidly from the west, while blue sky or thin upper cloud is seen between them.

Visibility is generally good, except during heavy rain. When there is rain, as a rule it comes in short, sharp local squalls and there is no marked tendency for it to favour any particular time of the day or night. The intensity of the rainfall may be very heavy for a few minutes but prolonged heavy rain is quite unusual.

The wind at the surface is almost always from a south-westerly or west-south-westerly direction and light to moderate; it is generally less at night and it increases during the day.

*Weather conditions in October and November in the post SW. monsoon period.*—Weather conditions tend to deteriorate; rain squalls from westerly or south-westerly directions become more frequent and are often accompanied by thunder. In November cloud and rain again begin to show a diurnal variation and evening thunderstorms are comparatively frequent. With the dying away of the wind, except for the sea breeze which blows from the late morning until the evening, conditions again become somewhat oppressive, although not so markedly so as in the "hot season".

*Weather conditions at Colombo while Ceylon is under the influence of a depression from the Bay of Bengal.*—The sky is covered with a pall of high stratus cloud; nimbostratus sometimes forms and there may be continuous and often heavy rain for several hours. Apart from local gusts during rain, the wind is not usually very strong at Colombo. Owing to the overcast skies and frequent rain, conditions during the day, and sometimes during the night, appear cool.

## II—TROPICAL CYCLONES AND DEPRESSIONS

A more detailed description of tropical cyclones of the Indian ocean, their origin and formation is given in Volume I. Those tropical cyclones and depressions which affect the east coast of India and the western portion of the Bay of Bengal are dealt with briefly on pages 18-23 of Part 6A and those that affect the west coast of India and the Arabian sea in Part 5.

Tropical cyclones of great severity are not often experienced in Ceylon but depressions of a cyclonic type and of only moderate intensity often occur. Depressional activity near Ceylon is mainly concentrated between October and December with a pronounced maximum in November. Depressions are also experienced occasionally between January and March, but they are very rare between April and September. In the 18 years between 1921 and 1938, the number of depressions reported as passing either over Ceylon or fairly near to it in each month is shown in the following table:—

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
3	1	2	0	1	0	1	0	1	6	14	5

*Authority.*—Bibliography No. 117.

Depressions usually skirt the north-east coast of the island moving in a northerly or north-westerly direction; the effects are therefore felt more on the east and north coasts of the island than on the west coast as the latter is to some extent protected. The depressions affect the weather over the island much more by causing heavy widespread rain with low clouds than by strong winds, although high winds, particularly in the north-east of the island, are not unknown.

When a depression crosses the island it usually travels from east to west, or sometimes from east-south-east to west-north-west, though tracks in other directions across the island are not entirely unknown. When the centre of lowest pressure has passed to the west of the west coast it does not necessarily mean that the weather will clear and that the storm is over; in the rear of the depression there are thunderstorms. Not infrequently when the depression leaves the shelter of the land and emerges into the strong N. or NE. winds of the Gulf of Mannar the centre is displaced eastwards again towards Ceylon. The amount of the displacement depends on the relative strength of the rotating motion of the wind in the cyclone compared with that of the NE. monsoon. It is said that the closer the isobars are together and the more intense the circulation the greater is the chance of the depression moving westwards and the weather improving rapidly. If, on the other hand, the rotation is weak, then the depression may remain near the west coast and give rise to several days of continuous rain.

As an example of the irregularity that may occur in the movements of depressions in the vicinity of Ceylon, a case may be cited of a depression in March, 1925, that had its centre first identified about 100 miles west-south-west of Colombo on the 12th. This storm travelled first north, then north-east or east-north-east; after moving northwards and then north-eastwards into the Gulf of Mannar it developed into a storm with winds of gale force on the 14th. On the morning of the 15th it turned northwards and later to north-north-west, and finally filled up on the 17th off Cuddalore on the Coromandel coast.

The existence of a depression near Ceylon is shown by a decrease in the barometric pressure, due allowance having been made for the large diurnal variation which is liable to mask any other movements of the barometer. Not infrequently, however, even when there is a well marked fall of pressure, the depression may fail to develop.

The approach of a depression is also frequently indicated by a distinct rise in the minimum temperature at a high-level station in the centre of the island. This rise may be due partly to the increased cloud amount, but there is evidence to show that it is not due only to that factor.

One of the worst tropical storms ever experienced on the east coast of Ceylon occurred on the night of March 9th and 10th, 1907, when a tropical cyclone struck the coast a few miles south of Batticaloa and caused very considerable damage; this cyclone is known in Ceylon as the Batticaloa cyclone. The direction of its track was from south-south-east to north-north-west and the track itself must have passed mainly over the sea parallel to the south-eastern shore; the nearest approach to the coast was just south of Batticaloa where the greatest amount of damage occurred. The S.S. *Havelock* and two native schooners were wrecked, the latter with a loss of fourteen lives; a hospital and other buildings on shore were damaged, and a large number of trees were destroyed.

### III—WIND

#### 1—SURFACE WINDS

Wind-roses of the surface winds at 0930 (Z-5½) for each of the twelve months for Colombo on the west coast, Trincomalee on the east coast and Little Basses off the south-east coast are given in Figs. 2-13 on pages 24-35 of Part 6A. The direction of the wind only is indicated as information about the force of the wind is not available.

The corresponding data for Colombo and Trincomalee, and for Galle and the high level station of Diyatalawa in addition, are included in the general climatological tables on pages 172-5, and for Hambantota, Little Basses and Batticaloa in Table X on page 177. In these tables the frequencies are given for both the morning and afternoon hours of observation, 0930 and 1530, separately in order to show the effect of land and sea breezes on the direction of the wind. In Fig. 32 wind-roses for four representative months are drawn for Colombo, Hambantota, Batticaloa and Trincomalee for the two separate hours.

The average speed of the wind, taken as a mean over the 24 hours, is also given in the general climatological tables for Colombo, Galle and Trincomalee.

The surface winds of Ceylon like those of the Bay of Bengal and the west and east coasts of India are dominated by the NE. and

SW. monsoons; between these two monsoons the winds are generally variable with sea breezes prevailing during the day.

The north-easterly winds of the NE. monsoon do not reach Ceylon until about the end of November and usually prevail until February or March. The south-westerly winds of the SW. monsoon may occasionally begin to blow before the end of April but usually they set in about the middle of May and last until October.

#### Seasonal variation

**Cool season** (December to March).—*West coast.*—In December and January off the west coast of Ceylon the winds are mainly NE. of Beaufort force between 3 and 4. Over the land the mornings are frequently calm otherwise northerly or north-easterly winds, light to moderate in strength are experienced. In the afternoon owing to the effect of the sea breeze the wind backs and becomes a little stronger, the usual direction being northerly or north-westerly.

In February and March off the west coast the wind is still NE. but it is lighter in force than in January; over the land there is very little wind in the morning but a light to moderate sea breeze from a northerly to westerly direction in the afternoon, this sea breeze is of longer duration after February.

*East coast.*—During this season the NE. monsoon winds are steadier in force and direction than on the west coast. The surface winds blow chiefly from NE. and N. in December and January, and in the early morning are light with frequent calms. In January squalls are not infrequent off the east coast of Ceylon, but although they are generally accompanied by much thunder and lightning they are rarely severe. In February and March the winds are still mainly from NE. of Beaufort force between 2 and 4; in February squalls occasionally occur near the coast, but they are less frequent than in January and are rare in March.

**Hot season** (April and May).—*West coast.*—In April the winds off the west coast are westerly of Beaufort force between 2 and 3 and thunderstorms and rain squalls sometimes occur near the coast. Over the land there is usually little wind in the morning but a light to moderate south-westerly or westerly sea breeze springs up in the afternoon. During April the wind at night is light and variable, with possibly squalls and showers, but in May the winds begin to blow continuously from SW.

The SW. wind of the SW. monsoon usually sets in about the middle of May although occasionally it has been known to commence before the end of April. The SW. monsoon arrives near the island in fairly gradual stages so that it is difficult to fix the exact date, especially as depressions often form in the Bay of Bengal ahead of the monsoon air current, and tend to bring south-westerly winds to the island.

*East coast.*—Off the north-east coast the winds are south-easterly in April, of Beaufort force between 2 and 3, and sometimes squalls may occur near the coast. In May the SW. monsoon sets in and the

direction of the wind becomes mainly SW. of Beaufort force between 3 and 4. The coast immediately to the east of the hills is to a great extent shielded from the SW. monsoon, it is therefore only at some distance from the coast that the full force of the SW. monsoon wind is felt.

**SW. monsoon (June to September).—West coast.**—The SW. monsoon winds gain in strength in June and fishermen seldom put to sea in this month. The wind speed at times during the early months of the SW. monsoon averages 25–35 knots for several hours, whilst short gusts between 50 and 60 knots have been known, otherwise the south-westerly winds are usually light to moderate. Off the north-west coast of Ceylon in June the winds are more westerly, of Beaufort force 4. As the season progresses the winds on the west coast tend to veer and in July, August and September the winds are westerly off the west coast and west-north-westerly off the north-west coast, the force of the wind being between 3 and 4 of the Beaufort scale. In July, whilst there is generally a fresh breeze blowing off the north-west coast, the wind moderates near the head of the Gulf of Mannar in the mornings and blows strongly again in the afternoon. In August and September the afternoon breezes are stronger and are accompanied by occasional squalls.

**East coast.**—Off the east coast of Ceylon the SW. monsoon wind blows steadily from the SW. from June to September with Beaufort force about 4 but it begins to weaken a little in September. During the SW. monsoon a föhn wind, known as the Batticaloa "Kachchan," sometimes blows from the hills to the east coast, giving high temperatures and low humidity.

**Post SW. monsoon period (October and November).—West coast.**—In October light to moderate south-westerly winds prevail with frequent calms in the morning. Owing to depressions from the Bay of Bengal which sometimes affect the island during this month, there may occasionally be high winds particularly in the north of the island affecting the north-west coast. In November the mornings are generally calm while there are light or moderate westerly sea breezes in the afternoon. Off the north-west coast the winds are between NE. and WNW. with frequent heavy squalls. About the end of this month the NE. monsoon winds arrive and they are usually ushered in by thunderstorms and heavy rain.

**East coast.**—The SW. monsoon weakens and begins to disappear in October. The strength of the SW. winds consequently becomes very changeable, if the weather is fine the winds are light but they strengthen again when squally or stormy weather prevails in the Bay of Bengal. In November, when the NE. monsoon sets in, the winds become northerly or north-easterly, of Beaufort force between 3 and 4; but before these winds arrive there is a period of light, variable and unsteady winds.

**Diurnal variation of wind speed at Colombo.**—During the inter-monsoon periods of April to May and October to November, and

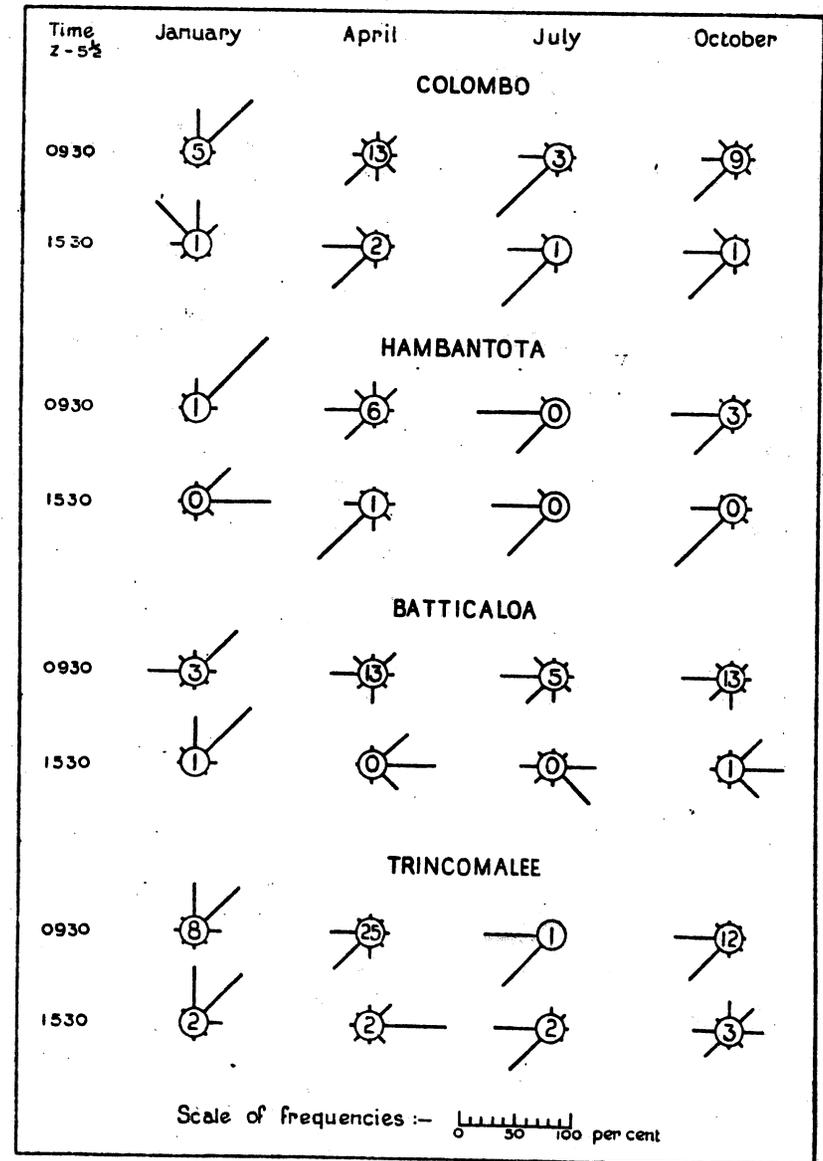


FIG. 32—SURFACE WINDS—MORNING AND AFTERNOON  
 Figures inside the circles indicate the percentage frequency of calms.

during the NE. monsoon, November to March, there is a well marked diurnal variation of wind at Colombo. The wind begins to increase at about 0600 from a light wind or calm, and attains its maximum force between 1400 and 1500, after which it decreases steadily until about midnight, dropping to a light wind or calm which persists throughout the night. The speed of the wind at night during the NE. monsoon is somewhat higher than during the inter-monsoon months, but in other respects the diurnal variation is similar.

Whilst the SW. monsoon winds are blowing the diurnal variation is less conspicuous owing to the general persistence of a steady monsoon drift throughout the night. The diurnal increase begins between 0600 and 0800 and the maximum speed is reached at about 1200 or 1300, slightly earlier than in the other seasons, but the amount of the increase is only slight. The decrease in wind speed during the afternoon ceases at about 2000, after which a fairly steady wind blows during the night.

**Land and sea breezes.**—The diurnal variation of wind direction is shown in Fig. 32. Wind-roses are drawn for 0930 and 1530 (Z-5½) in four representative months, January, April, July and October, for four stations on the coast; Colombo on the west, Hambantota on the south, Batticaloa and Trincomalee on the east.

The sea breezes of Ceylon are of great importance particularly during the periods between the monsoons, or in sheltered places during the monsoons. These breezes give rise to shifts in the wind direction that might be thought to be due to the movement of a depression whereas they are actually diurnal effects that will be reversed in a few hours.

On the west coast, at Colombo, which is to some extent shielded from the winds of the NE. monsoon by the mountains of the interior, the sea breeze is strongest during the months from December to April. The effect of the sea breeze is shown by the backing of the wind in the afternoon from a north-easterly or northerly direction to N. or NW. with a distinct increase in its force. In February as the NE. monsoon winds are lighter the effect of the sea breeze is more noticeable and in March it is shown in the afternoon by the prevalence of a light westerly wind which may, however, sometimes blow from a south-westerly or north-westerly direction. In April there is usually a light to moderate south-westerly or westerly sea breeze in the afternoon whilst in May the arrival of the SW. monsoon completely obliterates the effect of the land and sea breezes. These conditions continue until towards the end of October when the SW. monsoon starts to withdraw; the sea breeze then becomes noticeable again in the afternoon. In November light westerly sea breezes blow in the afternoon, and towards the end of the month the north-easterly winds of the NE. monsoon set in and these back to N. or NW. in the afternoon. The height to which the diurnal variation in the

direction of the wind at Colombo extends may be seen by a comparison of the upper wind diagrams of Figs. 33 to 40 on pages 144-51.

On the east coast, at Batticaloa, which is sheltered from the south-westerly winds of the SW. monsoon by a range of hills, the sea breeze is conspicuous even during the months of that monsoon, and is shown by a change in direction from W. or SW. winds in the morning to E. or SE. in the afternoon. At Trincomalee, situated further north on the east coast, in a low-lying level part of the island, exposed to both monsoons, the effect of the sea breeze during the NE. monsoon is shown by a strengthening of the monsoon in the afternoon, with little change in direction. In March, towards the end of the NE. monsoon, the average wind speed is about 3 or 4 knots at 0930 rising to about 7 or 8 knots at 1530, at which hour the wind is almost due east. During the SW. monsoon, the direction of which is opposed to the sea breeze, the heating of the land in the afternoon results in a lessening of the average speed at that time.

In order to show how far the sea breeze may extend out to sea the following account is given:—

“In November 1919 the S.S. *Trewidden* was passing to the southward of Ceylon. At noon she experienced variable light breezes but at 1600 when she was 50 miles from land she was under the influence of the sea breeze. At midnight the land breeze had arisen which persisted in the usual way until between 0800 and noon by which hour the sea breeze had set in once more.”

**Gales and squalls.**—The average number of days per month when gusts of gale force, *i.e.* a wind speed of 33 knots or more, were recorded by the anemometer at Colombo is given in the general climatological table on page 172. The anemometer is in an exceptionally well exposed position in Colombo harbour. The figures show that gusts of gale force occur most frequently in May and June when they are recorded on 7 or 8 days per month, and are least frequent from December to April when the average is only 1 or 2.

No information of the frequency of gales at other coastal places is available.

The occurrence of squalls in the different months of the year has already been described in the paragraphs on the surface winds in the different seasons. Squalls are sometimes of the “line squall” type and in some years are fairly common at Colombo during the inter-monsoon periods, when they are liable to be severe. The wind speed may be very high during the gusts in these squalls. At Colombo during a violent line squall on September 2nd, 1903, the wind reached a speed of 43 knots; on July 12th, 1907, a speed of 54 knots was reached and on April 9th, 1907, a speed of 59 knots

was recorded. There are usually sudden changes in the wind direction during these squalls. During the period 1930-8 gusts of 50 knots or more were experienced in all months except December and January, the highest speed of 60 knots being recorded on April 27th, 1931.

## 2—UPPER WINDS

Observations of upper winds over Ceylon are available only for Colombo, on the west coast, and the following discussion is based on those data. It is considered that the winds at 10,000 feet and above may be regarded as representative of the upper winds over the island as a whole, whilst below that height the winds are probably affected by the local topography of the land.

Two sets of wind-roses for Colombo are reproduced in Figs. 33 to 40 and the corresponding data are given in Tables XI and XII on pages 179-83. One set of observations gives the wind in the morning up to 16,500 feet whilst the other gives the wind in the afternoon up to 6,500 feet, *i.e.* for the levels within which diurnal variation may be appreciable. Seasonal averages for 20,000 feet and 30,000 feet, where they are available, have been added to the table of morning observations but are not shown on the diagrams. The observations extend over a period of 13 years from 1922-34. The average wind speeds at different heights are given in the column on the right hand side of the tables. The speed is the average for all winds irrespective of direction.

It should be remembered that from about May to October, when Ceylon is under the influence of the SW. monsoon, low clouds are prevalent; in those months no less than half the balloons sent up for observation purposes are lost in cloud at a height of little more than 3,000 feet, consequently during this period, even when sufficient observations are available above 3,000 feet to enable a wind-rose to be drawn, the conditions it represents are not typical of the SW. monsoon. During the months of the NE. monsoon the sky is clearer and the wind-roses for the upper levels are then more representative of normal conditions. From December to April, which are the months when conditions are most favourable, more than half the pilot balloons are still visible at a height of 10,000 feet.

**General.**—From December to February the winds in the lower layers are predominantly north-easterly in the morning backing to NW. near the surface in the afternoon. In the upper levels the wind veers to E. and these easterly winds extend up to at least 20,000 feet. In March and April sea breezes predominate at the surface and winds are light but mainly from SW.; above 3,000 feet the wind is from NE. or E. From May to September SW. winds predominate veering to W. at comparatively low levels, and when the SW. monsoon is fully developed these westerly winds probably extend up to heights of at least 20,000 feet. In the post SW. monsoon period of October and November light SW. or W. winds predominate at the surface

with frequent calms; these SW. winds are comparatively shallow with a layer of variable winds above them and E. winds at high levels.

In general the average speed of the wind increases from the surface up to 1,500 feet in all months of the year, the increase being greatest in the SW. monsoon months from June to September. In those months the speed continues to increase up to at least 3,000 feet and probably also to higher levels.

In both May and October the speed of the wind reaches a maximum between 1,500 and 3,000 feet and then steadily decreases, this has been regarded as indicating that the SW. monsoon winds arrive and depart as a comparatively shallow layer.

During the remainder of the year, except in January, there is generally a slight increase in speed from 1,500 to 3,000 feet in the early morning and a slight decrease in the afternoon. In January there is a decrease above 1,500 feet both in the morning and afternoon.

Except during the months of the SW. monsoon the speed of the wind is greater in the afternoon than in the morning both at the surface and at 1,500 feet. The difference is greatest in the interim periods of October and November and February to April, and in both these periods it is sometimes perceptible even at 3,000 feet. This diurnal variation is largely due to the development of the sea breeze.

During the SW. monsoon there is a slight increase in the speed of the wind at the surface in the afternoon, but little or no increase in the speed above the surface.

## Seasonal variation

**Cool season (December to March).**—In December and January in the early morning the winds at the surface are calm or light and blow chiefly from NE. or N.; at 1,500 feet calms are less frequent and NE. winds definitely prevail with fairly frequent winds also from N. The average speed of the wind increases from about 5 knots at the surface to 10 knots at 1,500 feet. In the afternoon the effect of the sea breeze is shown by a decrease in the frequency of calms and a backing of the wind to N. or NW. at the surface and to between NW. and NE. at 1,500 feet; the increase of speed with height is less rapid in the afternoon than in the early morning. At 3,300 feet the effect of the sea breeze is no longer evident and the winds are the undisturbed winds of the general monsoon air current blowing chiefly from NE. or N. and veering gradually at greater heights until at 10,000 feet and above winds between E. and NE. prevail. These upper easterlies are encountered at a slightly lower level in January than in December, they extend upward probably to at least 20,000 feet. The average speed of the wind varies little with height from 3,300 to 10,000 feet and is about 10 knots; speeds

of over 27 knots are rare at all levels, although NE. and E. winds may occasionally exceed that limit, and a speed of over 40 knots has been recorded at high levels.

In February conditions are not very different from those in December and January, but the NE. monsoon is lighter and in consequence the effect of the sea breeze is more noticeable. In the early morning there are usually calms at the surface and light variable winds at 1,500 feet with NE. winds predominating. In the afternoon calms are infrequent and the sea breeze from W. or NW. prevails at the surface veering to between W. and N. at 1,500 feet. Above 3,300 feet the NE. winds of the monsoon prevail, veering gradually with increasing height from between N. and NE. at 3,300 feet to E. or NE. at 10,000 feet. Above 10,000 feet easterly winds still prevail but they are not so persistent as in December and January. In the early morning the speed of the wind increases gradually from about 3 knots at the surface to about 10 knots at 10,000 feet; in the afternoon the surface wind is stronger and the increase with height is in consequence less rapid; there is in fact a slight tendency in the afternoon for the speed to decrease between 1,500 and 3,300 feet. Speeds exceeding 13 knots are infrequent at 3,300 feet and below and even above that level the speed rarely exceeds 27 knots.

In March in the early morning there is usually a calm at the surface with light variable winds at 1,500 feet, whereas in the afternoon a light westerly sea breeze prevails at both levels, which may blow occasionally from either SW. or NW. At 3,300 feet the afternoon sea breeze has disappeared and light winds may be experienced from any direction but most frequently from NE., rarely exceeding 13 knots. Above this level up to 16,000 feet the wind is generally NE. or E. becoming definitely more easterly above 10,000 feet. In the early morning the average speed increases from about 3 knots at the surface to 6 knots at 3,300 feet and 10 knots at 10,000 feet. In the afternoon the average speed at the surface is about 8 knots, there is a slight increase at 1,500 feet followed by a decrease to below the surface value at 3,300 feet and then a gradual increase to 10 or 11 knots at 10,000 feet. At 3,300 feet and below the speed rarely exceeds 13 knots and above that level it rarely exceeds 27 knots.

*Hot season (April and May).*—In April in the early morning there is usually little wind at the surface, with light winds from between S. and W. at 1,500 feet. In the afternoon there is a light SW. or W. sea breeze at the surface which strengthens and veers slightly at 1,500 feet. At 3,300 feet and at 6,500 feet winds become more variable, W. and SW. winds decreasing in frequency and E. and NE. increasing. Above these heights the wind blows chiefly from between E. and NE. up to at least 16,000 feet. The average speed of the wind from 3,300 to 6,500 feet is about 7 knots and it

## COLOMBO

(morning observations)

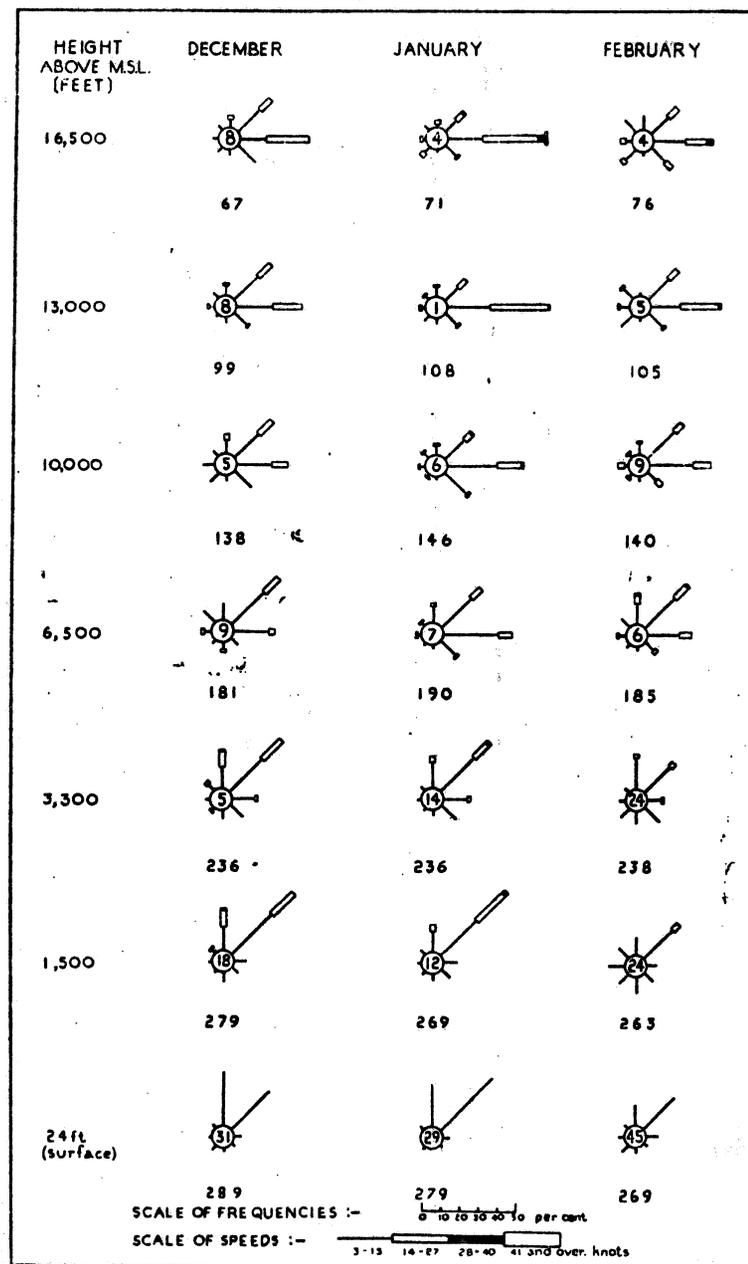


FIG. 33—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
Figures below the roses indicate the number of observations.

increases to about 11 knots at 10,000 feet. The sea breeze sometimes exceeds 13 knots in the afternoon and there are also occasional westerly winds of over 27 knots at 3,300 and 6,500 feet, but with these exceptions the speed does not often exceed 13 knots below 10,000 feet; above that level the wind rarely exceeds 27 knots.

In May the SW. monsoon winds have set in. At the surface calms or light SW. winds prevail in the early morning and light SW. winds in the afternoon. At 1,500 feet the direction shows little change but the speed of the wind has increased from 6 or 7 knots at the surface to 14 knots at 1,500 feet. At 3,300 feet the winds veer somewhat to W. with an average speed of about 16 knots, the speed exceeds 27 knots occasionally and a speed of over 40 knots although rare is not unknown. Above 3,300 feet the number of observations falls off rapidly owing to the prevalence of low cloud but W. or SW. winds seem to persist up to at least 6,500 feet. The wind-roses at 10,000 feet suggest that the SW. monsoon air current

COLOMBO  
(afternoon observations)

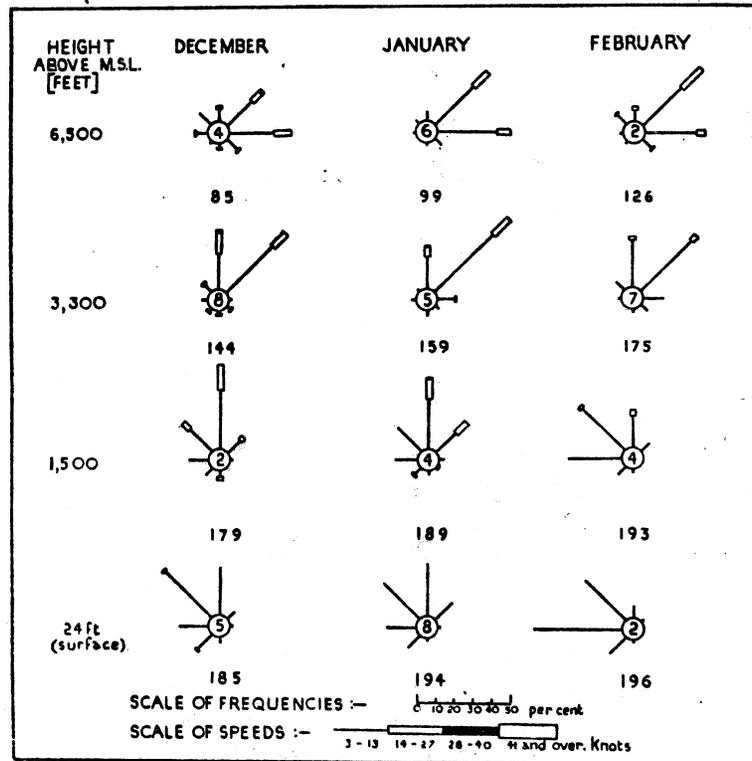


FIG. 34—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
Figures below the roses indicate the number of observations.

COLOMBO  
(morning observations)

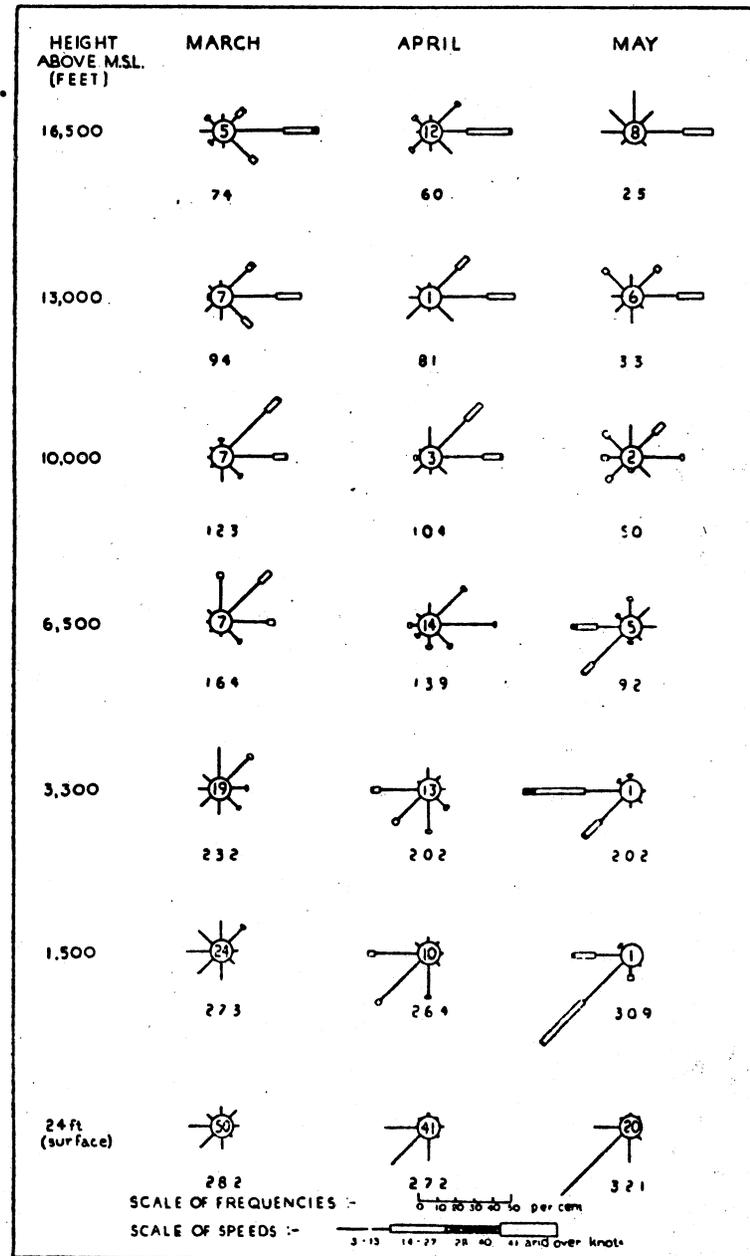


FIG. 35—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
Figures below the roses indicate the number of observations.  
The decrease in the number of observations above 3,300 ft. in May

does not extend above that level, but the winds cannot be regarded as typical of conditions in May. There are indications that easterly winds prevail at 16,500 feet.

*SW. monsoon (June to September).*—The wind-roses for these months are limited to the lower levels; nearly 50 per cent. of the pilot balloons are lost in cloud below 3,300 feet and over 80 per cent. are lost below 6,500 feet.

At the surface the winds throughout the season blow almost entirely from SW. or W. with occasional winds from S. The wind increases rapidly in strength with increasing height and veers gradually to W.; at 1,500 feet in June SW. and W. winds are about equally frequent but at 3,300 feet the wind blows almost entirely from W. and continues in that direction up to the greatest height reached by the observations. The direction of the wind shows little change throughout the months of the SW. monsoon

COLOMBO

(afternoon observations)

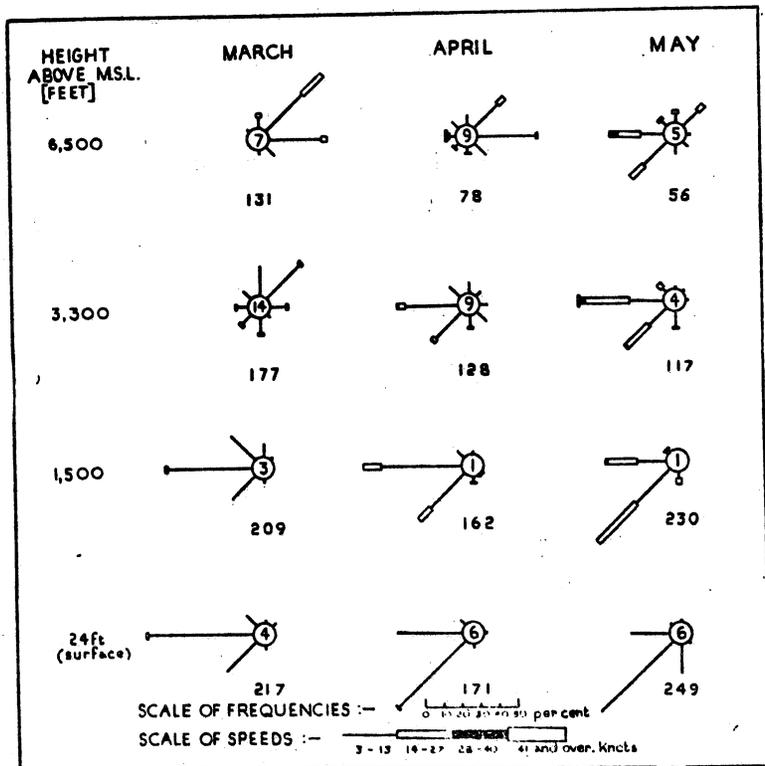


FIG. 36—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
 Figures below the roses indicate the number of observations.

COLOMBO

(morning observations)

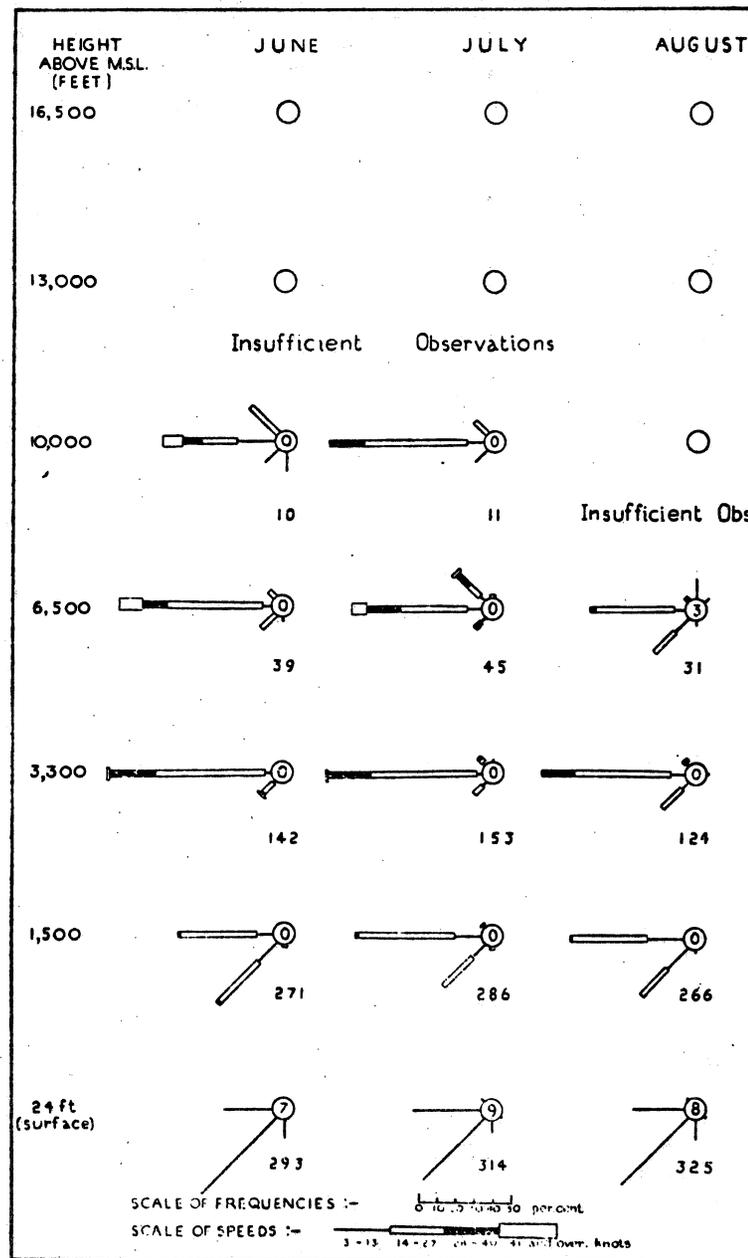


FIG. 37—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
 Figures below the roses indicate the number of observations.  
 The decrease in the number of observations above 3,300 ft. should be noted.

except that the veer of the wind to W. occurs at a slightly lower level in July than in June; in July and August the frequency of W. winds is greater than of SW. winds even at 1,500 feet and this is also true in September although to a less extent. The average speed of the wind at the surface from June to August is about 7 knots increasing to about 18 knots at 1,500 feet and to 24 knots at 3,300 feet. The speed shows signs of a very slight decrease in August which becomes more pronounced in September when the averages at 1,500 and 3,300 feet are 15 and 18 knots respectively.

At the surface the speed rarely exceeds 13 knots; at 1,500 feet speeds exceeding 27 knots occur occasionally and such speeds are frequent at 3,300 and 6,500 feet especially in June, July and August. At these higher levels speeds exceeding 40 knots are also not infrequently recorded.

COLOMBO

(afternoon observations)

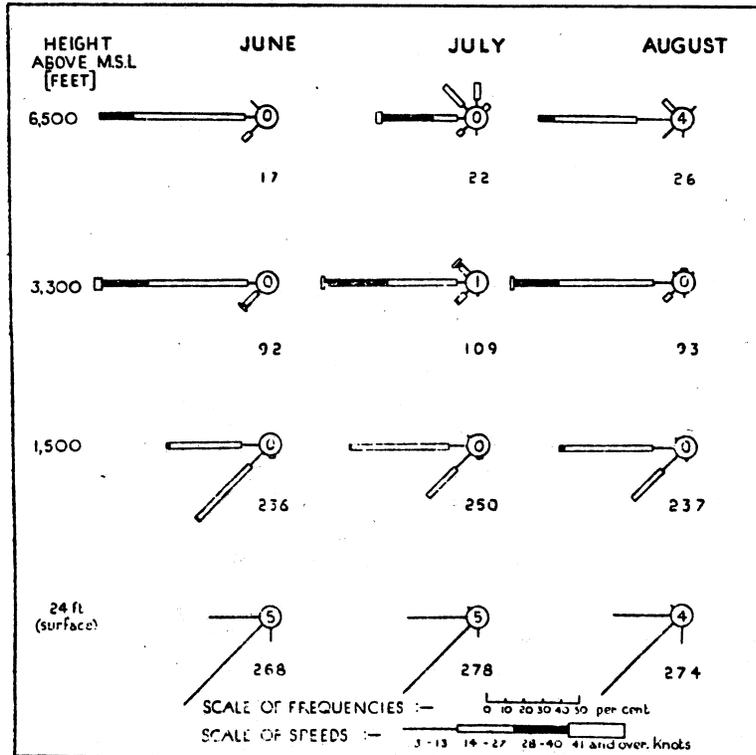


FIG. 38—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
 Figures below the roses indicate the number of observations.

COLOMBO  
(morning observations)

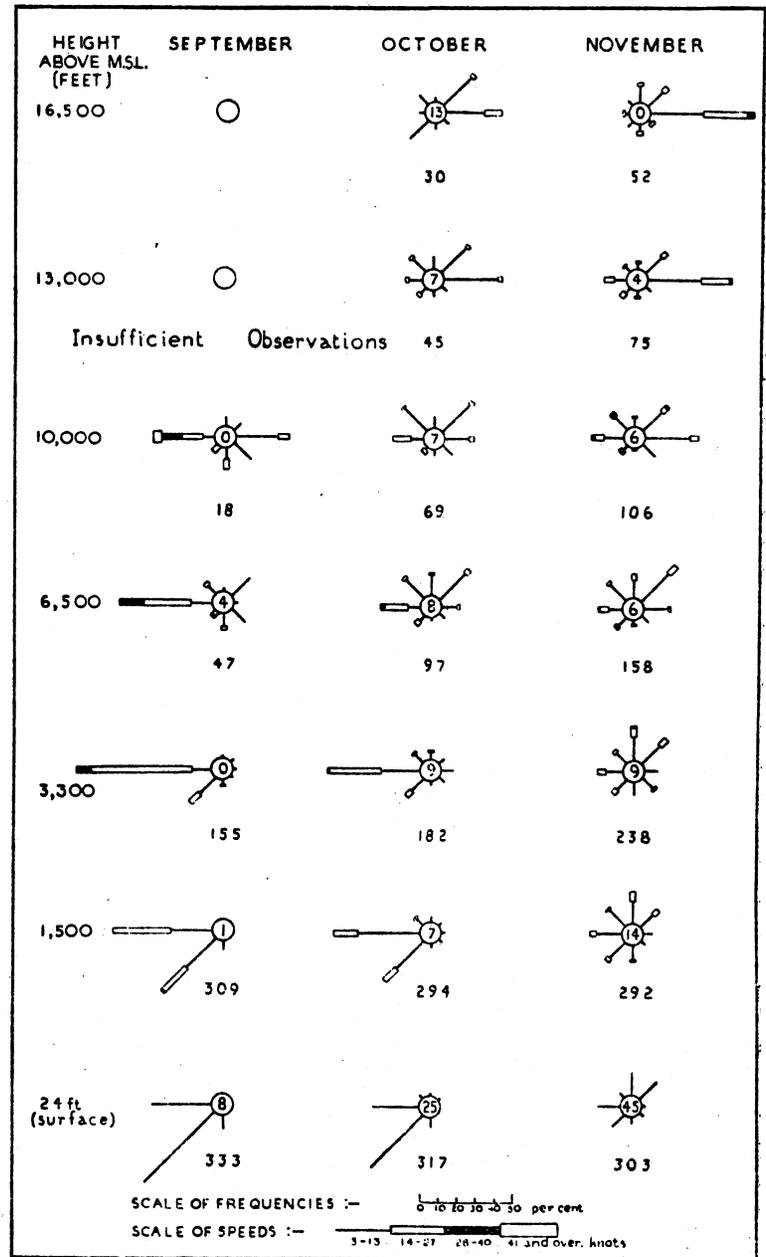


FIG. 39—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.  
 Figures below the roses indicate the number of observations.  
 The decrease in the number of observations above 3,300 ft. in September

Post SW. monsoon period (October and November).—In October SW. or W. winds of the SW. monsoon still persist in the lower layers and show a similar veer to W. with increasing height.

The average speed of the wind for the month as a whole is much less than in the mid-monsoon months, varying from 5 knots at the surface to 11 knots at 1,500 feet and showing very little increase above that level. The decrease in speed is particularly noticeable in the latter part of the month. Speeds between 14 and 27 knots are fairly common, but speeds above 27 knots are infrequent. The SW. monsoon winds are limited to the lower levels and at 6,500 feet and above the winds become increasingly variable and are much lighter than during the mid-monsoon months; winds with an easterly component show a definite increase above 10,000 feet.

## COLOMBO

(afternoon observations)

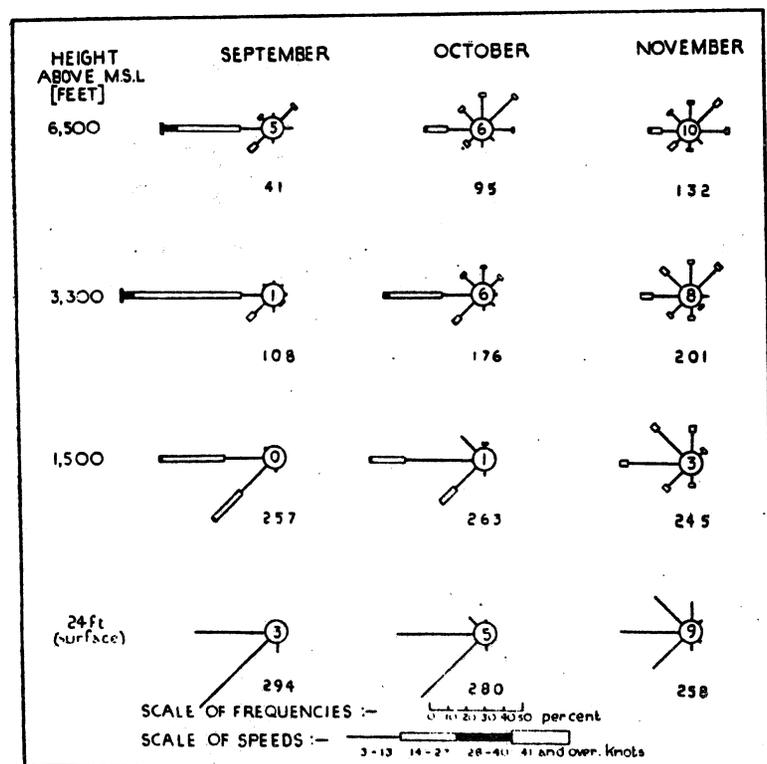


FIG. 40—UPPER WINDS—MONTHLY

Figures inside the circles indicate the percentage frequency of calms.

Figures below the roses indicate the number of observations.

The decrease in the number of observations above 3,300 ft. in September should be noted.

The wind-roses above 10,000 feet cannot, however, be regarded as typical because over 70 per cent. of the pilot balloons are lost before reaching that height.

In November the winds at the surface and at 1,500 feet are light and there is no prevailing direction. Calms or light variable winds in the early morning usually give way to light westerly sea breezes in the afternoon, except when depressional activity checks the formation of the sea breeze. In some years the NE. monsoon makes its appearance towards the end of this month and this is shown by the NE. winds which appear on the surface wind-roses in the morning, backing to N. or NW. in the afternoon as a result of the sea breeze. From 3,300 to 6,500 feet the winds are very variable with an average speed of about 10 knots; speeds exceeding 13 knots are experienced occasionally but speeds exceeding 27 knots are rare. At 10,000 feet easterly winds begin to show a predominance and they increase in strength and frequency in the higher levels.

## IV—VISIBILITY

The number of days per month on which mist occurred at Colombo, Galle, Trincomalee, Nuwara Eliya and Diyatalawa is given in the general climatological tables on pages 172-6. The observations extend over a period of 10 years. Except at Colombo it is probable that the figures give an underestimate of the number of occasions of mist because the earliest observations are taken at 0800 by which time any early morning mist will probably have dispersed.

The following table, giving the percentage frequency of different degrees of visibility in the mornings at Colombo, is based on one year's observations only.

## Colombo.—PERCENTAGE FREQUENCY OF DIFFERENT DEGREES OF VISIBILITY

Time of obsn. : morning. Period : One year.

Visibility nautical miles	0- $\frac{1}{2}$	$\frac{1}{2}$ -2	2-5	5-10	Over 10
January-February ..	0	0	6	10	84
April-May ..	1	2	13	9	75
July-August ..	0	1	20	13	66
October-November ..	0	0	7	19	74

Authority.—Bibliography No. 8.

The visibility on the west coast of Ceylon, which is the only coast for which information is obtainable, is almost always good or fair except in so far as it may be reduced by rain. The visibility is at its best during the NE. monsoon though early morning mist is comparatively frequent in that season. Fog is practically unknown.

When there is exceptionally heavy rain the visibility may occasionally be reduced to as low as 3 of the international code

(objects not visible at 1,100 yards) but such extremely low visibilities do not usually last for more than a few minutes; in the periods between the monsoons, in April and to a less extent in October, the coast-line is sometimes obscured by local showers. Probably the only other exception to the rule of good visibility on the west coast is the occasional occurrence of light mists in the night or early morning. These mists probably do not extend more than a few hundred feet above the surface of the ground, and they are practically confined to the period from October to April. With these mists the visibility may fall as low as 2 (objects not visible at 550 yards) but such very low visibilities are rare; they do not persist long after sunrise and by 0700 or at the latest 0800 have entirely disappeared.

Very little information is available with regard to visibility on the east coast but observations at Trincomalee indicate that mist is rare except possibly in the early morning.

#### V—CLOUD

Step diagrams showing the monthly variation of mean cloud amount at 0930 (Z-5½) at Colombo and Trincomalee are reproduced in Fig. 28 on page 70 of Part 6A. The corresponding data, together with similar information for Galle, Nuwara Eliya and Diyatalawa, are included in the general climatological tables on pages 172-6. In these tables data are given also for 1530.

The mean annual cloud amount over the island of Ceylon is between 4 and 6-tenths. In the cloudiest months the average amount is about 3-tenths greater than in the months with least cloud.

The annual variation differs in different parts of the island. On the south and south-west coasts which are exposed to the SW. monsoon the cloudiest month is June, whereas on the east coast and on the northern part of the west coast it is one of the months from October to December, though on these coasts there is also a secondary maximum of cloudiness during the SW. monsoon. The months with the clearest skies in all parts of the island are February, March and April.

#### Seasonal variation

*Cool season (December to March).*—The cloudiest region is over the high land of the interior where the average amount exceeds 7-tenths in December falling to about 5-tenths in March. On the coasts the average amount differs very little from place to place; it lies between 5 and 6-tenths in December falling to between 3 and 5-tenths in March. The cloudiness during the NE. monsoon is controlled by the activity of that monsoon, during periods when the monsoon is strong the skies are generally overcast and they are clear or partially clouded only when this monsoon weakens. During this season on the west coast the mornings are generally fairly free

of clouds, but the clouds start spreading over from the hills about the middle of the day and reach the coast as a sheet of high stratus cloud during the afternoon. Low clouds are not usually experienced but they may form under the higher clouds in rainy or thundery weather. February and March are very similar to December and January except that the amount of cloud is less.

*Hot season (April and May).*—The amount of cloud on the west coast increases fairly rapidly in this season while that on the east coast shows little change. In May there is a definite decrease in cloudiness from west to east, the average at Colombo in the west being nearly 7-tenths and that at Batticaloa in the east being less than 5-tenths. Any low cloud that forms in fine weather is usually in broken patches and not in sheets. In the Gulf of Mannar in May the sky becomes overcast and banks of clouds can be seen rising over the ocean to the south-west, cloudy skies are also experienced in May on the east coast of Ceylon. Sometimes the cloudiness in May may be due to thunderstorms associated with the advancing SW. monsoon air current.

*SW. monsoon (June to September).*—During this season the amount of cloud is least in the north-east where the average is less than 5-tenths and is greatest in the west. On the coast the cloudiest region is in the neighbourhood of Colombo where the amount is about 7-tenths; over the high land of the interior it exceeds that amount. In June, July, August and September there is a considerable amount of cloud which is usually in the form of rapidly moving broken patches. The low cloud at Colombo during this season is mainly fast moving fractocumulus which is a familiar feature of the sky during the SW. monsoon. In September continuous sheets of low cloud are infrequent.

*Post SW. monsoon period (October and November).*—During the early part of the season the distribution of average cloudiness is similar to that during the SW. monsoon, with greater cloudiness on the west coast than on the east (6 to 7-tenths in the west and 5 to 6-tenths in the east). The difference between the two coasts diminishes slightly as the season advances. Over the high land of the interior the cloud exceeds 7-tenths. There is a considerable amount of cloud in October and November but in October, as soon as the SW. monsoon begins to withdraw, there is a tendency towards clear skies in the morning and cloudy skies in the afternoon. There may sometimes be sheets of low cloud lasting for several days during wet or threatening weather associated with depressions, but with this exception the clouds are not usually low. On the south and south-west coasts the amount of cloud decreases towards the end of November. A certain amount of the cloudiness in October may be due to thunderstorms associated with the retreat of the SW. monsoon.

*Diurnal variation.*—In the general climatological tables averages are given of the cloud amount at both 0930 and 1530, but as over

a great part of the year there is a considerable increase in cloudiness after 1530, these data give an inadequate idea of the diurnal variation and cannot be regarded as giving information about the amount of cloud in the evening.

On the west coast of Ceylon there is in general a noticeable diurnal variation of cloudiness between November and April, the afternoons during this period being distinctly more cloudy than the mornings. On the east coast a similar increase in cloudiness in the late afternoon occurs between the months of May and October. During the remainder of the year there is on the average little difference in the amount of cloud throughout the day at coastal stations. At inland and high level stations the diurnal variation, except during the SW. monsoon, is large, and owing to the formation of cloud early in the afternoon it is apparent even in the data for 0930 and 1530. At Nuwara Eliya for example from February to May the cloudiness increases by 3 or 4-tenths between 0930 and 1530.

**Height.**—There is very little information available about the height of clouds.

The following table gives for each month the number of balloons which were lost behind cloud below the levels of 3,000 feet and 10,000 feet during pilot balloon ascents at Colombo. The figures are expressed as a percentage of the total number of balloons sent up in each month.

**Colombo.**—PERCENTAGE NUMBER OF BALLOONS LOST IN CLOUD BELOW 3,000 AND 10,000 FEET

Period: 1922-34

Height feet	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
10,000	42	34	41	56	82	97	95	96	94	74	55	46
3,000	8	6	10	15	30	42	40	49	42	26	14	11

Authority.—Bibliography No. 77.

The clouds of the SW. monsoon may at times be as low as 1,000 to 1,500 feet, and the table shows that during that season over 40 per cent. of the pilot balloons sent up at Colombo are lost below 3,000 feet, compared with less than 10 per cent. during the NE. monsoon. The low cloud during the SW. monsoon is for the most part rapidly moving fractocumulus.

Between December and April on the west coast of Ceylon the clouds that usually spread from the hills towards the coast are sheets of high stratus under which low rain clouds may form.

VI—RAIN AND HAIL

1—RAIN

Step diagrams showing the monthly averages of rainfall and rain-days at 12 stations in Ceylon are reproduced in Figs. 41 and 42; the corresponding data for 5 stations are given in the general

climatological tables on pages 172-6, and for the other 7 stations in the table below.

**Ceylon.**—AVERAGE MONTHLY RAINFALL AND NUMBER OF RAIN-DAYS

Period: 1911-30

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
<i>millimetres</i>													
WEST COAST													
Jaffna ..	109	30	46	38	41	10	15	25	79	244	414	239	1,290
Mannar ..	102	43	43	79	48	13	13	13	33	178	249	198	1,012
Puttalam ..	91	28	84	124	94	43	36	5	46	206	254	157	1,168
SOUTH COAST													
Hambantota	94	25	97	84	86	56	61	25	79	122	198	142	1,069
EAST COAST													
Batticaloa ..	351	69	86	46	48	25	30	46	66	180	404	437	1,788
INLAND													
Anuradhapura	145	38	91	150	79	23	36	30	99	249	292	193	1,425
Kandy (1,611 ft.)	170	46	147	157	152	244	193	140	168	277	284	231	2,209
<i>days</i>													
WEST COAST													
Jaffna ..	6	2	2	3	2	1	1	2	4	11	16	12	62
Mannar ..	7	2	4	5	3	1	1	1	3	10	15	12	64
Puttalam ..	8	2	6	8	7	5	2	1	5	13	16	10	83
SOUTH COAST													
Hambantota	8	4	8	8	9	10	8	5	8	11	14	11	104
EAST COAST													
Batticaloa ..	14	5	6	5	4	3	3	4	5	12	16	17	94
INLAND													
Anuradhapura	10	3	7	10	5	3	3	2	6	15	18	13	95
Kandy (1,611 ft.)	10	4	9	10	11	20	18	15	14	19	18	13	161

Authority.—Bibliography No. 117 (1936 and 1937).

Note.—The average monthly rainfall and number of rain-days at Colombo, Galle, Trincomalee, Diyatalawa and Nuwara Eliya are included in the general climatological tables.

In these data a rain-day is defined as a day on which 1 mm. (0.04 in.) or more of rain falls, whereas the limit used by the India Meteorological Department is 2½ times greater, namely 2.54 mm. (0.1 in.). The number of rain-days given in the tables and diagrams for Ceylon is in consequence greater than it would be if the definition used by the India Meteorological Department were adopted. For Trincomalee and Colombo data for both definitions are included in the general climatological tables, the step diagrams for the Indian definition being given in Fig. 30 on page 77 of Part 6A and those for the definition used in Ceylon in Fig. 42.

**General.**—On the south-west and south coasts of Ceylon there are two rainy seasons, one starts before the beginning of the SW. monsoon, reaching its greatest intensity in May, and the other is in October and November, the interim period between the SW. and NE. monsoons. On the northern and eastern coasts of the island there is only one rainy season namely from November to January during the NE. monsoon. The regions with the least rainfall are on the north-west coast opposite the Indian peninsula and on the south-east coast; in the driest parts the amount is about 1,000 mm. (40 in.). On the coast the highest annual fall is in the south-west

between Colombo and Galle where the amount exceeds 2,500 mm. (100 in.) in places. At some places at high level inland the average fall is more than 5,000 mm. (200 in.).

On the south-west coast, the wet region, the driest month of the year is February, but in the comparatively dry zones in the north and east the dry season extends from February to September; the driest months being June, July and August.

On the east coast the rain during the NE. monsoon is mainly orographic and is heaviest on the north-eastern slopes of the hills and in the low-lying country between these slopes and the coast. The weather in Ceylon from October to December and also occasionally between January and May is liable to be affected sometimes by depressions from the Bay of Bengal. The west coast is to some extent sheltered from the effects of these depressions but they may give several days of heavy rain there.

The annual variation in the average number of rain-days corresponds very closely with the variation in the average monthly rainfall. Colombo and Galle, on the west coast, where the highest annual rainfall on the coast is experienced, have also the greatest number of rain-days. At Colombo the average is 148 and at Galle it is 165, on the north-west coast the number is considerably smaller, both Mannar and Jaffna having about 63 in the year. On the east coast the average annual number of rain-days at Trincomalee and Batticaloa respectively is 89 and 94.

The place which records the greatest number of rain-days in a year in Ceylon is Ratnapura with an average of 218 days, this is an inland station about 30 miles from the west coast. At Nuwara Eliya a hill station about 6,000 feet above sea level the average is 186.

#### Seasonal variation

**Cool season (December to March).—West coast.**—In December the rainfall along the west coast averages between 125 and 250 mm. (5 and 10 in.) but in January it decreases to about 50 to 125 mm. (2 to 5 in.) The rain in January is usually due to local thunderstorms which do not as a rule extend far out to sea. In February there is a marked decrease in the amount of rain this being the driest month of the year on the southern part of the coast with an average monthly rainfall of less than 50 mm. (2 in.). Along the whole coast from Jaffna to Colombo in March there is a slight increase in the rainfall the monthly totals averaging from 40 to 125 mm. (1.6 to 5 in.). The rain in this month is often accompanied by thunder. February has the fewest rain-days of any of the four months; the average is 5 or less on all parts of the coast and is only 2 in the north.

**East coast.**—December and January on this coast are rainy months and Batticaloa has the heaviest rainfall of the year in December with an average of 437 mm. (17.2 in.) which decreases

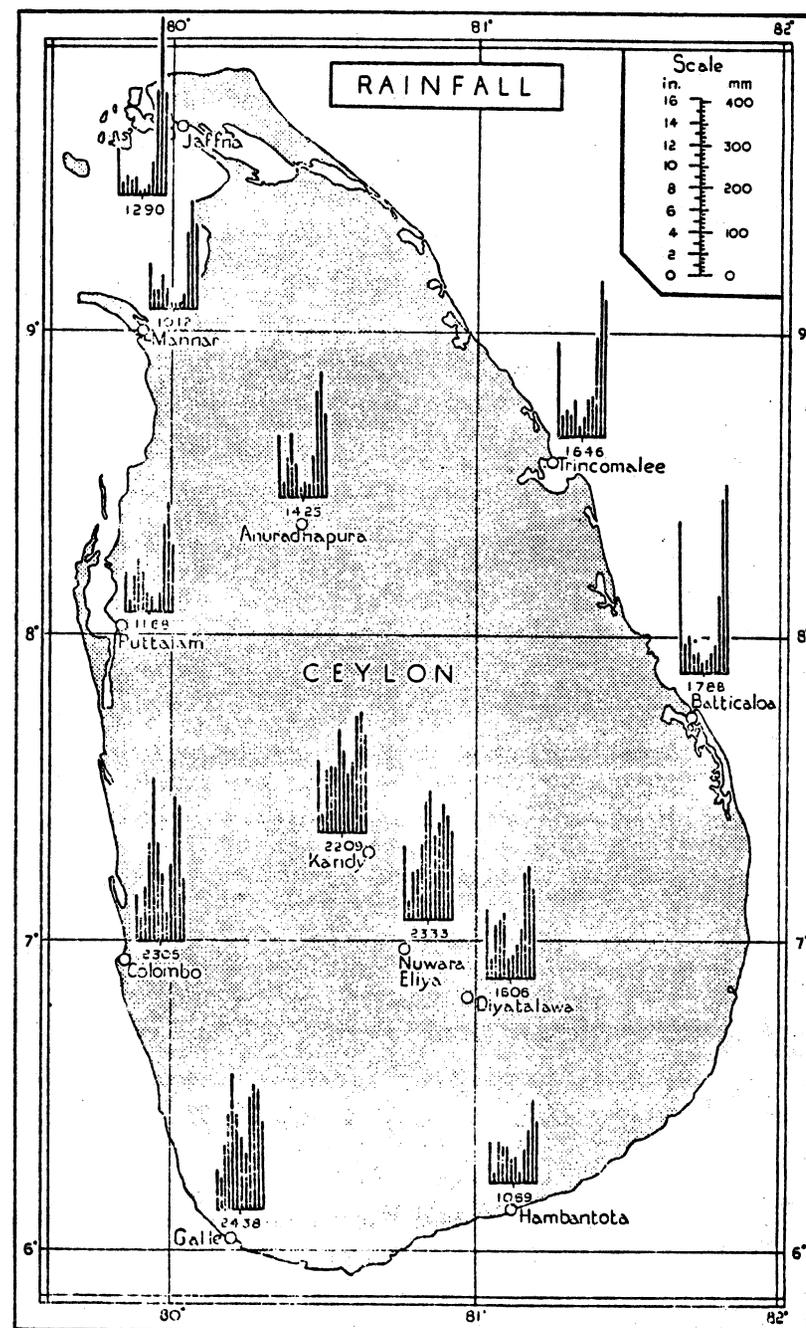


FIG. 41—MONTHLY VARIATION OF RAINFALL

The figures below the step diagrams indicate the total annual amount of rain

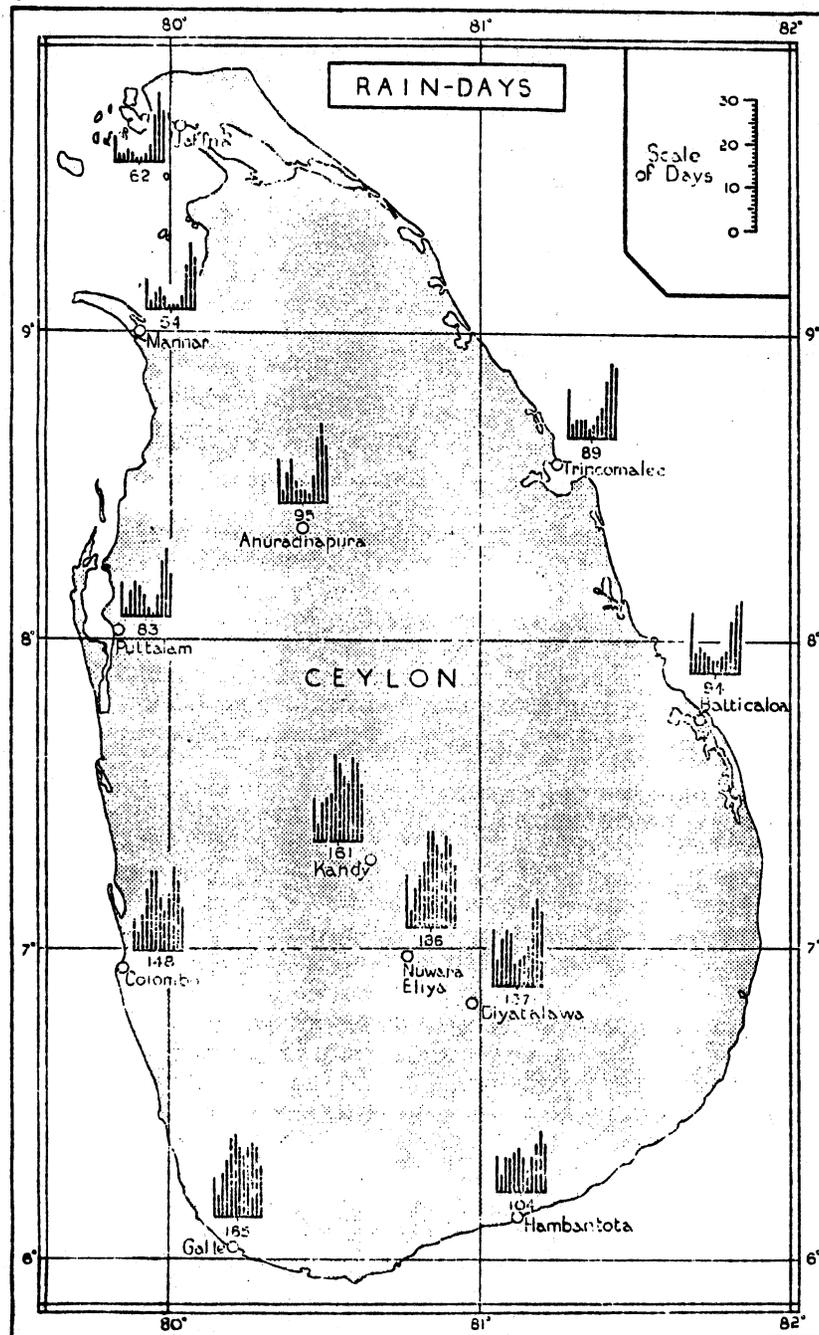


FIG. 42—MONTHLY VARIATION IN THE FREQUENCY OF RAIN-DAYS

The figures below the step diagrams indicate the total number of rain-days in the year.

A rain-day is taken as one on which 1 mm. (0.04 in.) or more of rain falls.

to 351 mm. (13.8 in.) in January. At Trincomalee the rainfall is also high with 320 mm. (12.6 in.) in December and 221 mm. (8.7 in.) in January. There is a marked decrease in the amount of rain in February and March, when the average is only about 50 to 90 mm. (2 to 3.5 in.). There are on the average on this coast about 16 days with rain in December whilst in March there are 7 or less.

**Hot season (April and May).—West coast.**—In April the rainfall along the west coast is distinctly heavier than in March. North of Puttalam the average monthly falls are about 40 to 125 mm. (1.6 to 5 in.) whilst between Puttalam and Colombo they are as much as 125 to 250 mm. (5 to 10 in.). Rain associated with thunderstorms is frequent and towards the end of the month squalls with showers of rain occur at night. The average number of rain-days at Colombo and Galle is 13 or 14 but the number decreases northwards until at Jaffna it is only 3.

In May on the south-west coast the liability for prolonged intense and extensive rain is much greater than in any other month between January and September. When the SW. monsoon first sets in there is a considerable amount of rain associated with thunderstorms. The rainfall on the north-west coast from Puttalam northwards is not heavy being on the average less than 100 mm. (4 in.) but south of Puttalam there is a big increase due to the arrival of the SW. monsoon. Puttalam in May receives on the average 94 mm. (3.7 in.) which is less than the average there for April; further south at Colombo the average rainfall in May is 381 mm. (15 in.) which is more than in any other month and the same applies to Galle where the average is 317 mm. (12.5 in.). Carney estate, an inland station near Ratnapura about 30 miles from the coast at a height of 1,000 feet and situated between Colombo and Galle, records the heaviest rainfall for any place in Ceylon in May with an average fall of 790 mm. (31.1 in.). Colombo and Galle have about the highest average monthly number of rain-days of the year in May with 18 but the decrease northwards is well marked, there are only 3 at Mannar and only 2 at Jaffna.

**East coast.**—The rainfall on the east coast in April and May is not heavy being on the average between 50 and 80 mm. (2 to 3 in.). The rainfall in May if anything is slightly more than in April. The SW. monsoon sets in towards the end of May but this coast is protected from this monsoon so that its effects are not felt until some distance off the coast where, as also off the south coast, isolated rain squalls are of frequent occurrence. The average number of rain-days on this coast is between 3 and 5 in both months.

**SW. monsoon (June to September).—West coast.**—During June, July and August there is a gradual decrease in the rainfall on the whole of the west coast. On the coast north of Puttalam the lowest rainfalls of the year are recorded in these months. At Jaffna in June the average is only 10 mm. (0.4 in.), whilst at Mannar the average for each of the three months is 13 mm. (0.5 in.) and at

Kalpitiya, north of Puttalam, the lowest average amount for any place in Ceylon is recorded in August with only 3 mm. (0·1 in.). In June, July and August at Mannar there is only one day with rain in each month. South of Puttalam the average rainfall in June is still fairly high, Colombo having 228 mm. (9 in.) and Galle 221 mm. (8·7 in.), the amounts, however, decrease in the following months until in August they are 67 mm. (2·6 in.) and 131 mm. (5·2 in.) respectively. Along the south-west coast the rain in these months usually comes in short, sharp squalls, prolonged rain being comparatively infrequent except perhaps in the beginning of June. The average number of rain-days at Colombo and Galle in June is as high as in May when it is 18, it falls to 9 in August at Colombo and to 14 at Galle.

In September there is a slight increase in the rainfall on the whole of the west coast. From Puttalam northwards the rainfall is still small, being on the average not more than 50 to 80 mm. (2 to 3 in.), but on the south-west coast the rainfall has increased to 178 mm. (7 in.) at Colombo and 264 mm. (10·4 in.) at Galle. The average number of rain-days at Colombo in September increases to 13 whilst on the north-west coast at Jaffna and Mannar it is only between 3 and 4.

*East coast.*—The rainfall on the east coast from June to September is comparatively small. In June and July the average rainfall at Trincomalee and Batticaloa in each month is not more than 25 to 50 mm. (1 to 2 in.). In August and September at Trincomalee the average rainfall has increased to 80 to 100 mm. (3 to 4 in.) but at Batticaloa it has increased to not more than 50 to 80 mm. (2 to 3 in.). On this coast in June and July there are on the average only 2 or 3 days with rain a month with an increase to between 4 and 7 in September.

*Post SW. monsoon period (October and November).*—*West coast.*—This is the second wettest period on the south-west coast. Heavy rain lasting for several days associated with depressions may sometimes be experienced; these depressions may affect the whole or a large part of the island. On the north-west coast from Puttalam to Jaffna the heaviest rainfall of the year occurs in these months. In October along this coast the average rainfall is about 175 to 250 mm. (7 to 10 in.), and in November, which is the month with the highest rainfall on this part of the coast, the average is about 250 mm. (10 in.) at Puttalam and Mannar whilst at Jaffna it is as much as 414 mm. (16·3 in.). On the south-west coast Colombo and Galle both have an increase in the rainfall in these months; it is most noticeable at Colombo where the average fall is between about 315 and 340 mm. (12·4 to 13·4 in.), the smaller amount falling in November. At Galle the rainfall is between about 280 and 295 mm. (11 to 11·6 in.), being slightly less in November than in October.

The average number of rain-days in October at Colombo and Galle is as many as in May and June, namely about 18, whilst on the north-west coast from Puttalam northwards the highest average number of rain-days of the year occurs in November when there are between 15 and 16.

*East coast.*—There is an increase in the rainfall on this coast in these months. About the middle of November the NE. monsoon is ushered in by thunderstorms and heavy rain. In October at Trincomalee the average rainfall is 231 mm. (9·1 in.) which increases to 363 mm. (14·3 in.) in November the rainiest month of the year; and at Batticaloa the amounts are 180 mm. (7·1 in.) in October and 404 mm. (15·9 in.) in November, Batticaloa has its highest monthly rainfall in December. The average number of rain-days on this coast in October is between 9 and 13 and in November it is between 14 and 17 which is about the same as for December. Trincomalee has the highest monthly average for the year in November with 17.

*Diurnal variation.*—The hour of occurrence of rainfall varies considerably with the season. This is illustrated in Fig. 43 on page 163 which shows, for Colombo on the west coast and Trincomalee on the east, the average number of days per month on which rain falls in each of six periods of 4 hours throughout the day.

It can be seen from the diagram that when either monsoon is fully established the windward coasts have rain at all hours with a slight maximum at dawn and that such rain as occurs on the leeward coasts in these months falls almost entirely between noon and midnight. During the inter-monsoon periods at both places rain is most frequent after 1600.

At Colombo on the west coast between November and April there is a marked diurnal variation of rainfall, rain occurring most often between 1600 and midnight and least often between 0400 and 1600. During the other months of the year, which include the wettest period, rain may occur at all hours of the day but the time of greatest frequency is at about dawn and that of least frequency between 0800 and 1600.

On the east coast from October to February rain may fall at any hour of the day. In October and November it falls most often between 1600 and midnight whilst in December, January and February the time of greatest frequency is between 0400 and 0800. In March there is very little rain and such as there is falls most often between about midnight and 0400. From April to September rain on the east coast occurs chiefly in the afternoons, there being usually very little rain between midnight and noon.

*Extremes of annual and monthly rainfall.*—The following table gives the greatest and least amounts of rainfall that have occurred in each month of the year at three stations in Ceylon. Colombo has been chosen for the west coast and Trincomalee for the east

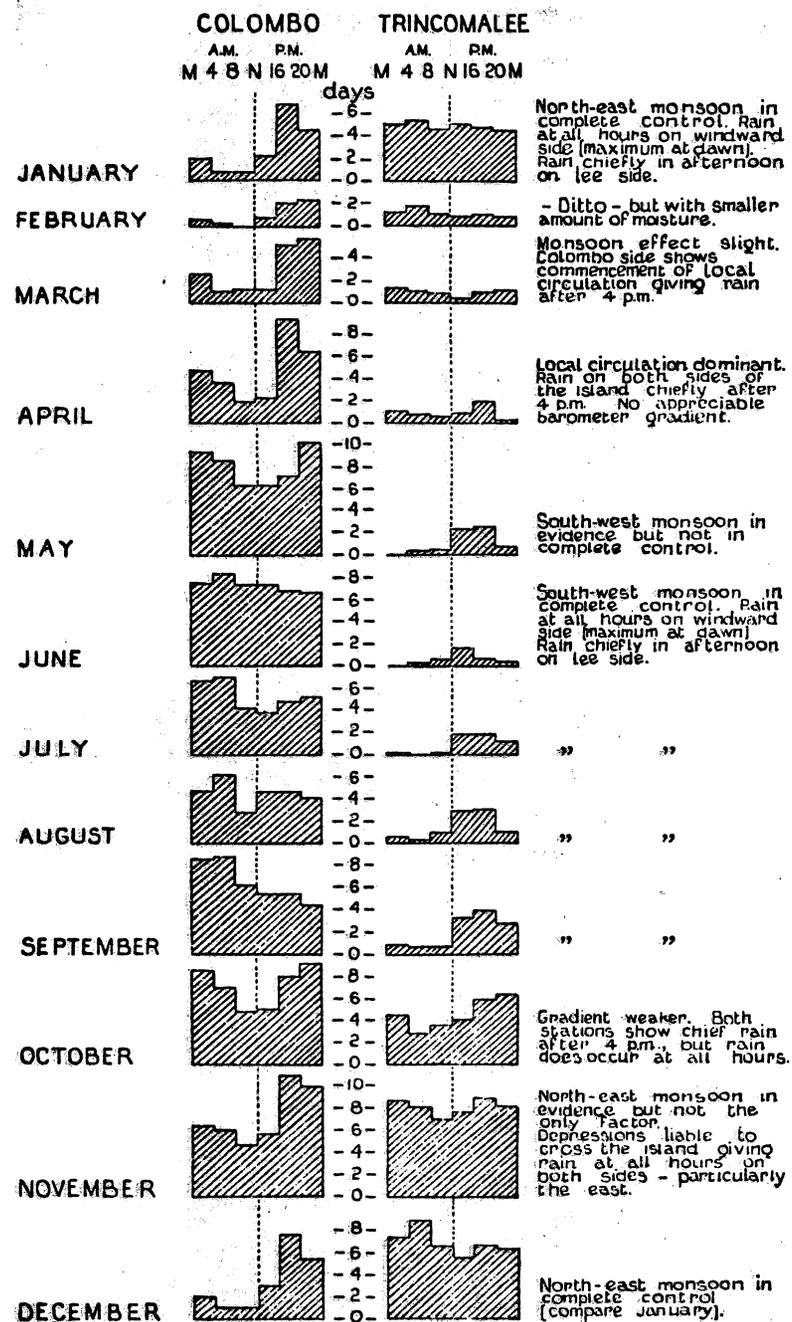


FIG. 43.—DISTRIBUTION OF RAINFALL IN 4-HOUR INTERVALS AT COLOMBO AND TRINCOMALEE

The diagrams show for each month the average number of days on which rain falls in each of six periods of 4 hours throughout the day.

coast; data for Nuwara Eliya, a hill station in the centre of the southern part of Ceylon about 6,000 feet above sea level, have also been included.

#### MAXIMUM AND MINIMUM MONTHLY AND ANNUAL RAINFALL

The period over which the observations extend is given in brackets under each place.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Colombo (61 years)	319 1 0(2)	178 21	287 21	731 46	809 59	507 16	712 13	406 8	637 1	896 45	731 24	393 7	3,548 1,161
Trincomalee (62 years)	740 2 0(5)	207 0(7)	209 0(7)	238 0(3)	434 0(1)	164 0(6)	199 0(7)	298 5	289 10	540 43	894 110	801 56	2,416 886
Nuwara Eliya (62 years)	628 2	274 1	245 0(1)	343 15	561 19	707 79	889 69	528 44	876 34	724 52	426 57	587 46	3,341 1,739

Authority.—Bibliography No. 12.

Note.—The figures in brackets indicate the number of times during the period that the particular month was rainless. The normal rainfall during the month is given in the general climatological tables.

From this table it can be seen that the amount of rain that falls in a month may vary considerably from one year to another. At Colombo in May and October, the two wettest months, in some years between 800 and 900 mm. (31 and 35 in.) of rain have fallen whilst in others between 45 and 60 mm. (1.7 and 2.4 in.) only have been recorded. In February which is the driest month of the year as much as 178 mm. (7 in.) of rain fell in 1925 whilst in other years there was none at all.

At Trincomalee the wettest months are November and December and in some years between 800 and 900 mm. (31 and 35 in.) of rain have been recorded in these months, whilst in other years only 55 to 110 mm. (2 to 4 in.) have fallen. In all months from February to September, which on the average are the driest months of the year, as much as 200 mm. (7.8 in.) has fallen in some years except in June when the greatest amount is 164 mm. (6.5 in.). In May which is a rather wetter month than the others as much as 434 mm. (17 in.) fell in 1930. On the other hand in most of these months no rain at all has been recorded on several occasions.

In the interior of the island, at Nuwara Eliya, July is normally the wettest month in the year with an average rainfall of 300 mm. (11.8 in.); the highest rainfall that has ever been recorded in that month is 889 mm. (35 in.) in 1882, whilst the lowest is 69 mm. (2.7 in.) in 1877. September with an average of only 226 mm. (8.9 in.) has also had a record rainfall of 876 mm. (34.5 in.) whilst the least amount recorded in this month is 34 mm. (1.3 in.). In February which is the driest month of the year with an average of 43 mm. (1.7 in.) as much as 274 mm. (10.8 in.) has been recorded, whereas on two occasions only 1 mm. (0.02 in.) fell.

**Maximum rainfall in 24 hours.**—The details of the maximum rainfall in 24 hours are given in the general climatological tables\* on pages 172-6. The maximum rainfall in 24 hours that has been recorded at Colombo is 290 mm. (11.4 in.). The corresponding amounts for Galle and Trincomalee are 320 mm. (12.6 in.) and 272 mm. (10.7 in.), and for the hill stations Nuwara Eliya and Diyatalawa 231 mm. (9.1 in.) and 198 mm. (7.8 in.) respectively. Except in the south-east and in certain hill districts, practically no rainfall station in Ceylon with a long record has failed to record at least 254 mm. (10 in.) in a day, while even in those areas, all such stations have recorded daily falls of at least 150 mm. (6 in.). Two stations in the north-east have recorded daily falls of over 762 mm. (30 in.), Nedunkeni, 806 mm. (31.7 in.) in 1897 and Mullaattivu, 792 mm. (31.2 in.) in 1911. The annual averages for these places, which are in the "dry zone," are only 1,753 mm. (69 in.) and 1,524 mm. (60 in.) respectively, but these districts are liable occasionally to very heavy depressional rain.

**Intensity of rainfall.**—At Colombo the rainfall over short periods may be very intense. A rate of approximately 8 in. (200 mm.) per hour is frequently experienced for 3 or 4 minutes. The shortest times in which falls of 1, 2, 3 and 4 inches (25 to 102 mm.) have been recorded at the Observatory are 7, 17, 29 and 43 minutes respectively, while falls of an inch (25 mm.) in 11 minutes or less, and of 2 inches (51 mm.) in half an hour or less are recorded on an average about once in 2 years. A fall of 5.6 in. (142 mm.) in an hour was recorded on the roof of a building in the Fort in 1907, while falls of 4.9 and 4.7 in. (125 and 119 mm.) in an hour have been recorded at the Observatory, in 1932 and 1915 respectively, and falls of 3 in. (76 mm.) or more in an hour are recorded on an average once every 2 or 3 years. During the intense fall in May, 1932, mentioned above, 6 in. (152 mm.) fell in 93 minutes, 7 in. (178 mm.) in 107 minutes, 8 in. (203 mm.) in 122 minutes, 9 in. (229 mm.) in 180 minutes and 9.6 in. (244 mm.) in 212 minutes, the total fall in 4 hours being 9.8 in. (249 mm.).

## 2—HAIL

The occurrence of hail is very rare on the coast and it is also uncommon at places in the hills. It has only occasionally been reported in the low country in the northern part of the island and there is no record of its ever having fallen at Trincomalee or Galle, and only one doubtful case of its having fallen at Colombo. If it does occur it is generally in association with the thunderstorms of the inter-monsoon periods or in the lee of the hills in the SW. monsoon. It may sometimes be of destructive violence.

\* The figures in those tables differ in some cases from those quoted in the text as, except at Colombo and Trincomalee, the figures in the tables refer to the period 1911-30 only.

## VII—AIR TEMPERATURE

The data of the mean and extremes of temperature are given in the general climatological tables on pages 172-6.

**Seasonal variation.**—The climate of Ceylon is tropical, and on the coasts and plains the variation in mean temperature from month to month is very small. The coolest months are December and January with mean temperatures on the coasts between 76° and 80° F. and the warmest months are April and May with mean temperatures between 81° and 85° F., giving an annual range of between 3° and 8° F. Although the temperature is high throughout the year there is usually a refreshing sea breeze on the coast during the day, which prevents the temperature becoming insupportably high. The temperature of Ceylon in January is comparable with that of the south of Italy in July.

The mean monthly temperatures at inland places situated on the plains are very much the same as those on the coast, but at high level stations the temperatures are lower throughout the year. At Kandy, about 1,600 feet above sea level, the mean temperature in December and January, the coolest months, is 75° F. and in April and May, the warmest months, it is 79° F.; at Diyatalawa, about 4,000 feet above sea level, the temperature is 65° F. in December and January, the coolest months, and 70° F. from May to August the warmest months; at Nuwara Eliya, about 6,000 feet above sea level, the coldest months are January and February with a mean temperature of 57° F., and during those months and also in December the thermometer may fall to freezing point at night; the warmest month is May with a mean temperature of 62° F.

At Colombo, on the west coast, the mean monthly temperature in any year is not likely to differ from the average by more than 2° or 3° F., the greatest difference between the highest and lowest mean monthly temperatures ever recorded is 6° F. in February.

At Trincomalee, on the east coast, the annual mean temperature of 82° F. is very much the same as that on the Coromandel coast of the Indian peninsula but the annual range is less. The temperature in December and January is only 4° F. below the annual mean and in the three months May, June and July, it is only 3° F. above it. The minimum temperatures at night are also very uniform as they average between 75° and 79° F. throughout the year and rarely if ever fall below 65° F.

On the arrival of the SW. monsoon there is no drop in temperature on the east coast as there is very little rain there at that time, but on the south and west coasts of the island there is a slight fall in temperature owing to the heavy cloud and rain associated with the monsoon. Those places on the coasts which are exposed to the SW. monsoon have temperatures 3° to 5° F. lower than those which are sheltered from it. During the NE. monsoon, on the other hand, the differences of temperature are very small.

**Diurnal variation.**—On the west coast the diurnal variation of temperature is most marked in February and March. At Colombo in February the mean daily maximum temperature is 87° F. and the mean daily minimum 72° F., an average daily range of 15° F.; during the SW. monsoon the range of temperature is reduced to 8° F. At Galle in February and March the average daily range is 12° F., whereas in July, August and September it is only 6° F. On the east coast at Trincomalee and Batticaloa the greatest diurnal ranges of temperature occur in July, August and September when they are about 14° or 15° F., whilst the smallest ranges are in December and January, when the average range at Trincomalee is only 6° F.

At inland and high level stations the diurnal range of temperature is about 5° to 7° F. greater than on the coast. At Nuwara Eliya it is as much as 26° F. in February.

**Extremes of temperature.**—On the west coast the highest and lowest temperatures of the year are most likely to occur during the months of the NE. monsoon, and on the east coast during May. At Colombo the difference between the highest and lowest temperature recorded in each month is largest in February when it amounts to 35° F. and it is smallest in July when it is 19° F. The highest temperature recorded at Colombo in a period of 21 years is 97° F. in February and the lowest is 62° F. in January. At Galle the greatest difference between the highest and lowest temperatures recorded in any month during the period 1929–37 is 22° F. in December and the smallest difference is 13° F. in September. The highest temperature recorded at Galle in the same period is 92° F. in March and the lowest is 66° F. in December. On the east coast, at Trincomalee, the highest temperature ever recorded is 104° F. in May, which is the month when the largest range of temperature, of 37° F., occurs, the lowest temperature ever recorded is 65° F. in January.

**Variation of temperature with height.**—At Colombo during the period from mid-March to mid-April it has been found that there is usually an increase of temperature with height near the surface at night from about 2300 to 0800, the temperature at the surface being about 1½° F. lower than that at 260 feet. This increase with height is not observed during the SW. monsoon.

#### VIII—HUMIDITY

In the general climatological tables monthly data are given of the mean relative humidity at night and in the day. The night values are obtained from the minimum readings of the dry and wet bulb temperatures and represent approximately the maximum relative humidity in the 24 hours. The day readings are the mean of observations at 0930 and 1530. The mean of the night and day readings may be taken as the average humidity over the 24 hours.

The general climatological tables include also values of the mean daily maximum and mean daily minimum wet bulb temperatures.

In Ceylon the mean relative humidity of the 24 hours taken over the year as a whole is about 80 per cent., the mean values at different places varying between 75 and 85 per cent. On the west and south coasts the annual variation in the monthly means is very small being less than 5 per cent., except in the north-west where it rises to 8 per cent. On the east coast the annual variation is greater, the difference between the highest and lowest monthly means being 15 per cent. In all parts of the island, except at very high levels, the highest average humidity is in November; the lowest humidity is in February or March except on the east coast where it is in July.

During the SW. monsoon the relative humidity is between 10 and 15 per cent. higher on the south-west and south coasts than on the east coast, whereas during the NE. monsoon it is if anything slightly lower than on the east coast.

The diurnal variation of humidity is fairly large and in the west and south is appreciably greater than the annual variation. On the west and south coasts it is largest during the dry season, in February and March, and smallest during the SW. monsoon; on the east coast on the other hand the highest values are during the SW. monsoon, which is a dry season on that coast, and lowest in December and January, which are wet months.

Taking the mean of the observations at 0930 and 1530 as representative of conditions during the day, the mean annual relative humidity on the coasts is between 68 and 80 per cent. whereas at night it is between 85 and 90 per cent. Inland and at high levels it is between 65 and 75 per cent. during the day and between 85 and 95 per cent. at night.

During the NE. monsoon the average humidity during the day on the west coast is about 75 per cent., decreasing to just under 70 per cent. in March; on the south and east coasts the values are about 5 per cent. higher varying from just under 80 per cent. in December to between 70 and 75 per cent. in March. At night the average humidity on all coasts is about 90 per cent. throughout the season. Inland and at high levels the humidity during the day is between 75 and 80 per cent. in December and between 60 and 70 per cent. in March, whereas at night it rises to between 85 and 95 per cent.

During the SW. monsoon the average humidity during the day on the west coast is between 70 and 80 per cent., rising to nearly 85 per cent. at Galle in the south-west; the east coast is much drier with an average of only 60 per cent. At night the average is about 85 per cent. in the west, slightly exceeding that value in the south, and about 80 per cent. in the east. Inland and at high levels the humidity shows large differences from place to place depending on the degree of exposure to the moist winds of the SW. monsoon. In the drier parts the humidity during the day is about 60 per cent.

rising to 80 or even 90 per cent. at night ; in the damper parts it is over 75 per cent. by day and over 90 per cent. at night.

**Wet-bulb temperature.**—The wet-bulb temperature is regarded as giving a better idea of the effect of atmospheric conditions on human activity and comfort than either the dry-bulb temperature or the relative humidity alone, and it has been estimated that when the reading of the wet-bulb thermometer is about 78° F. continuous hard labour is impracticable. The averages given in the general climatological tables show that at the time of minimum this figure is not exceeded in any month of the year, but at the time of maximum the average wet-bulb temperature reaches or exceeds 78° F. on all coasts except in December, January and February and even in those months it does so on some occasion in nearly every year. The highest value of the wet-bulb recorded on the coasts during the years 1928–37 are between 84 and 85° F.

## IX—MISCELLANEOUS

### 1—THUNDERSTORMS

Thunderstorms are very frequent in Ceylon and may occur in any month, they are most frequent, however, during the inter-monsoon periods, in March, April and May and also in October and November, being particularly numerous in all parts of the island in April.

The average number of days on which thunder was heard is included in the general climatological tables on pages 172–6. If the days with lightning alone were included the figures would be very much higher. At Colombo, for example, the average number of days with either thunder or lightning is 200 and at Trincomalee 87.

Thunderstorms in Ceylon are sometimes very violent and may very occasionally be accompanied by hail. At Colombo thunder is most frequent during the late afternoon or early evening ; during the inter-monsoon periods and also under the lee of the island during the monsoons, the liability to evening thunderstorms near the coast of Ceylon, especially at Colombo, can probably be gauged to some extent by the formation in the early afternoon of an anvil-shaped cumulus cloud in the direction of the hills and by its extension into layers of stratus cloud towards the coast. During the months of December to February thunderstorms start a little earlier in the day inland than on the coast and as a rule they do not extend far out to sea. About mid-November the NE. monsoon may be ushered in by lightning, thunder and heavy rain.

The following is an account of a thunderstorm that was experienced at sea by the S.S. *Ranchi* when about 150 miles west of Colombo :—“ On April 18th, 1934 at 0210 (ship's time), the ship encountered a thunderstorm of extreme violence. The sky had been overcast with altocumulus and cumulus 4-tenths and

cumulonimbus 6-tenths, and the weather squally: wind, WSW., force 6; barometer, 1014.9 mb; temperature, 80° F. There was vivid lightning in the western sky. Before the commencement of the storm the temperature fell 5° F. and the wind decreased to force 2 and became variable and then suddenly freshened and again blew from WSW., force 6, accompanied by torrential rain and vivid lightning and thunder. Between 0235 and 0310 the wind veered to NW. and at 0325 the rain ceased, but at 0345 the rain again commenced with extreme severity, the wind backing to WSW., force 5 to 6, and vivid lightning was observed all round the horizon. At 0405 during a particularly vivid flash of lightning a ball of fire exploded with a loud report between the bridge and the foremast, and travelling in a downward direction struck the sea with a hissing sound about 30 yards from the ship to starboard. The track of the fireball from the time it exploded until it struck the water resembled that of a distress rocket. At 0507 the storm passed away to the eastward, but until the ship's arrival at Colombo, at noon the same day, heavy thunder squalls of wind and rain were experienced. After the worst of the storm was over the wind blew steadily from WSW., force 6 to 7, until the ship's arrival at Colombo.” (*Marine Observer* vol. 12, 1935)

### 2—SEA AND SWELL

At Colombo towards the end of April a ground swell is experienced from the westward and this indicates that the SW. monsoon is not far distant.

Off the SW. coast between Bentota and Galle heavy rollers occur which extend from 2 to 5 cables from it, so that it is impossible for boats, except native canoes, to land at any time ; a swell sets in on the south coast in the vicinity of Hambantota when the wind is from the north-westward.

At Trincomalee the heavy swell experienced on the outer beaches during the NE. monsoon does not become general until the end of November.

### 3—WATERSPOTS, WHIRLWINDS AND SAND-DEVILS

Waterspouts sometimes occur in the vicinity of the coasts of Ceylon. Between the years 1920 and 1931 ships have reported as many as 45 waterspouts off the west coast of Ceylon in the area 0°–10° N., 70°–80° E., and 16 off the east coast in the area 0°–10° N., 80°–90° E. This number does not of course account for all the waterspouts that have occurred but it gives an indication that they are by no means uncommon.

H.M.S. *Hawkins* when at Colombo on April 26, 1933, reported seeing a waterspout at 0900 and another one at 1730. The same

ship on May 1, 1933, again reported seeing three waterspouts forming between 1520 and 1530 in the vicinity of Colombo.

Local whirlwinds or tornadoes which are very similar phenomena on land to waterspouts at sea have been known to occur in Ceylon but they are very rarely reported. Not very much is known about these whirlwinds which are of limited area and path but of considerable wind strength. One of these whirlwinds occurred at Veyangoda, a town about 20 miles to the north-east of Colombo, on the morning of July 20, 1921. This particular whirlwind took the roof off a schoolhouse near the town; its track was less than a quarter of a mile in diameter and it had a total path of about three miles before it died away.

There is also a record of a small whirlwind or tornado occurring at Colombo between 2030 and 2100 on February 20, 1907 which caused some damage; the area affected was about half a mile in breadth.

It is possible that occasional whirlwinds may give rise to sand or dust-devils in the dry districts in the north-west of the island and occasionally at Colombo. These sand or dust-devils are even more localised than tornadoes.

A dust-devil occurred at Colombo about 1230 on February 12, 1905. It was about 30 to 40 feet high with a diameter of about three or four feet at the top and where it touched the ground, but it had a bulge a few feet above the ground. It was revolving in a counter clockwise direction when viewed from above and lasted about three minutes. These phenomena are of such rare occurrence that the chance of aircraft being seriously damaged by them is very slight and they can probably be seen and avoided by any aircraft in the air.

TABLE IX—GENERAL CLIMATOLOGICAL TABLES

Colombo. 6° 54' N., 79° 52' E. 24 ft.

Times of obs.: 0930, 1530 (Z-5½)

Month	Pressure at M.S.L.		Air Temperature						Rain				Thunder heard		Wind											Fog or mist †	Relative humidity %	Cloud amount	Wet bulb temperature ††		
	Average ††	Daily range ††	Average*	Mean of		Mean of		Extreme	Average fall	No. of days	Max. fall in 24 hours	Thunder heard	Gusts of gale force ϕ	Speed in knots	Percentage of observations from																
				Daily max.	Daily min.	Highest	Lowest								Highest	Lowest	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm						
	inb.	mb.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.	†	†	mm.	in.	days	**	Observations at 0930											§	0930	min.	
January ..	1011	4.2	79	86	72	90	68	94	62	102	4.0	7	5	79	3.1	7	2	5	27	56	2	3	1	1	1	4	5	8	91	4.3	70
February ..	1011	4.3	79	87	72	91	67	97	62	55	2.2	4	4	132	5.2	7	1	4	18	48	5	5	2	4	1	7	10	7	92	4.0	70
March ..	1010	4.3	81	88	74	91	69	97	65	124	4.9	8	6	89	3.5	13	1	3	10	31	5	8	5	12	7	9	13	4	93	4.3	72
April ..	1009	3.9	82	88	76	90	72	95	69	225	8.9	14	11	183	7.2	16	1	3	7	11	5	10	11	26	9	8	13	1	92	5.0	74
May ..	1009	3.3	82	87	77	89	72	93	69	381	15.0	18	13	290	11.4	12	7	5	1	4	2	7	8	55	16	3	4	0	89	6.7	74
June ..	1009	2.9	81	85	77	87	73	91	71	228	9.0	18	13	94	3.7	4	8	6	0	1	0	2	5	64	22	4	2	0	87	7.4	74
July ..	1009	2.8	81	85	77	86	72	89	70	152	6.0	12	8	183	7.2	1	4	5	0	1	1	2	4	62	22	5	3	0	87	7.3	74
August ..	1010	3.1	80	85	76	86	72	90	70	67	2.6	9	6	127	5.0	2	3	5	1	0	0	1	5	62	26	5	0	0	87	6.5	74
September ..	1010	3.6	81	85	77	86	73	91	71	178	7.0	13	8	152	6.0	3	3	5	0	0	1	3	6	61	22	5	2	0	89	6.5	74
October ..	1010	3.9	80	84	75	87	72	91	68	338	13.3	19	16	257	10.1	8	3	4	4	7	3	5	5	39	17	11	9	2	92	6.9	73
November ..	1010	3.9	79	85	73	88	70	92	64	312	12.3	16	13	211	8.3	12	2	3	15	25	6	6	5	10	9	12	12	4	93	5.7	72
December ..	1011	4.1	79	86	72	88	68	92	63	143	5.6	10	7	114	4.5	8	1	5	29	48	4	4	1	1	1	5	7	7	92	4.8	70
Year ..	1010	3.7	80	86	75	92	65	97	62	2305	9.8	148	110	290	11.4	93	36	4	9	19	3	5	5	33	13	6	7	33	90	5.8	73

Authorities.—Bibliography Nos. 88, 117, 118.

Periods.—Pressure, 19 years.

Temp. (average, mean daily max. and min., mean highest and lowest), 8 years; (extremes), 21 years.

Rain (average fall, no. of days with 1 mm.), 1911-30; (no. of days with 2.54 mm.), 32 years; (max. fall in 24 hours), 27 years.

No. of days with thunder, Aug. 1929-July 1938. Gales, 1930-7.

Wind (speed), relative humidity, 1911-30.

Wind (direction), 1911-26. No. of days with mist, 1928-37.

Cloud amount, 1906-15. Wet bulb temp. 1928-38.

Notes.—†† Mean of obs. at 0930 and 1530.

‡ Difference between means at 0930 and 1530. \* ‡ (max.+min.).

† Day with 1 mm. (.04 in.) or more of rain.

† Day with 2.54 mm. (0.1 in.) or more of rain. \*\* Mean of 24 hours.

ϕ Gusts of 33 knots or more. † Definition not known.

§ Expressive of humidity during the night; obtained from min. dry and wet bulb temps.

†† Mean daily min. and mean daily max.

Month	Observations at 1530											††	1530	max
	28	12	0	1	1	6	11	40	1	70	4.8			
January ..	28	12	0	1	1	6	11	40	1	70	4.8	77		
February ..	9	3	1	0	1	11	31	44	0	68	3.8	78		
March ..	2	2	0	1	1	26	42	26	0	68	4.1	79		
April ..	1	1	1	1	7	40	34	13	2	71	5.2	81		
May ..	1	1	2	2	10	58	23	2	1	76	6.5	81		
June ..	0	1	0	0	7	60	26	5	1	78	7.3	80		
July ..	0	0	0	0	7	56	30	6	1	78	7.5	79		
August ..	0	0	0	0	5	61	30	4	0	76	7.2	79		
September ..	0	0	0	1	7	62	27	3	0	75	7.0	79		
October ..	2	1	0	1	5	43	31	16	1	76	7.7	79		
November ..	15	3	0	1	3	18	29	29	2	76	7.0	78		
December ..	29	14	0	1	3	7	11	34	1	72	5.9	77		
Year ..	7	3	<1	<1	5	37	27	19	<1	74	6.2	79		

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Ceylon

TABLE IX—continued

Galle. 6° 02' N., 80° 13' E. 14 ft.

Times of obs. : 0930, 1530 (Z-5½).

Month	Pressure at M.S.L.		Air Temperature								Rain			Thunder heard	Wind										Fog or mist †	Relative humidity %	Cloud amount	Wet bulb temperature °F. ††
	Average ††	Daily range †	Average*	Mean of		Mean of		Extreme		Average fall	No. of days †	Max. fall in 24 hours	Percentage of observations from															
				Daily max.	Daily min.	Highest	Lowest	Highest	Lowest				Speed in knots		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm					
				°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.	days	**	Observations at 0930										‡	0930	min.		
January ..	1011	3-6	78	84	73	88	69	89	67	93	3-6	9	5	4	16	23	23	7	3	3	4	9	12	6	92	4-8	71	
February ..	1011	3-8	79	85	73	89	71	91	69	76	3-0	5	7	4	15	19	32	8	5	2	4	7	8	5	90	4-1	73	
March ..	1010	3-7	81	87	75	90	72	92	71	158	6-2	10	12	4	11	20	24	8	6	2	8	12	9	2	90	4-1	73	
April ..	1009	3-6	81	86	77	88	73	90	71	223	8-8	13	11	5	9	8	10	5	5	9	28	20	6	0	89	5-4	74	
May ..	1009	3-0	81	85	77	87	73	88	71	317	12-5	18	7	8	5	2	2	1	2	18	46	22	2	0	87	6-4	75	
June ..	1009	2-6	80	84	77	85	73	86	71	221	8-7	19	1	10	2	<1	<1	<1	<1	9	55	28	4	0	87	7-1	74	
July ..	1009	2-5	80	83	77	84	73	85	71	170	6-7	16	0	10	<1	<1	0	<1	<1	2	55	41	<1	1	88	6-9	74	
August ..	1010	2-8	79	83	76	84	73	85	70	131	5-2	14	0	10	3	0	0	0	<1	7	52	37	<1	0	88	6-7	74	
September ..	1010	3-3	80	83	77	84	73	85	72	264	10-4	16	1	10	1	<1	<1	<1	2	11	51	32	<1	0	87	6-4	74	
October ..	1010	3-5	79	83	75	85	72	87	70	295	11-6	17	2	8	5	3	2	2	2	9	43	29	5	0	90	6-2	73	
November ..	1010	3-5	79	83	74	86	72	87	71	283	11-1	16	6	6	14	10	12	5	2	4	15	27	11	3	91	6-3	73	
December ..	1010	3-5	78	84	73	87	70	89	66	207	8-2	12	7	4	18	20	17	6	4	3	3	14	15	6	92	5-4	72	
Year ..	1010	3-3	80	84	75	90	69	92	66	2438	96-0	165	59	7	8	9	10	4	3	7	30	23	6	23	89	5-8	73	

Authorities.—Bibliography Nos. 117, 118.

Periods.—Pressure, 1912-30. Temp., 1929-37.

Rain, wind (speed), relative humidity, cloud amount, 1911-30.

No. of days with thunder, Aug. 1929-July 1938.

Wind (direction), 1927-38.

No. of days with mist, 1928-37.

Wet bulb temp., 1929-38.

Notes.—†† Mean of obs. at 0930 and 1530.

‡ Difference between means at 0930 and 1530.

\* (max. + min.).

† Day with 1 mm. (.04 in.) or more of rain.

\*\* Mean of 24 hours.

‡ Definition not known.

§ Expressive of humidity during the night; obtained from min. dry and wet bulb temps.

†† Mean daily min. and mean daily max.

Month	Observations at 1530										††	1530	max
	4	3	5	9	10	17	33	17	2	78			
January ..	4	3	5	9	10	17	33	17	2	78	6-4	77	
February ..	2	2	3	11	20	21	27	12	2	75	5-5	78	
March ..	3	2	4	11	16	22	28	13	<1	74	6-0	79	
April ..	2	2	3	6	7	18	42	18	2	77	6-2	80	
May ..	2	<1	<1	0	2	16	57	21	<1	81	6-6	80	
June ..	1	0	0	<1	<1	7	60	31	<1	84	7-2	79	
July ..	<1	0	0	<1	<1	1	53	45	0	84	7-0	78	
August ..	<1	<1	0	<1	<1	5	53	41	0	84	6-7	78	
September ..	1	0	0	<1	2	14	52	31	0	82	6-4	78	
October ..	2	1	1	1	4	10	50	31	<1	82	7-1	78	
November ..	3	3	3	6	7	14	35	27	2	80	7-1	78	
December ..	3	3	7	9	12	16	28	18	4	80	6-9	77	
Year ..	2	1	2	4	7	14	43	25	2	80	6-6	78	

Table IX—General climatological tables

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TABLE IX—continued

Trincomalee. 8° 35' N., 81° 15' E., 99 ft.

Times of obs. : 0930, 1530 (Z-5½).

Month	Pressure at M.S.L.		Air Temperature						Rain			Thunder heard	Wind										Fog or mist †	Relative humidity %	Cloud amount	Wet bulb temperature †† F.				
	Average ††	Daily range ††	Average*	Mean of		Mean of		Extreme	Average fall	No. of days	Max. fall in 24 hours		Percentage of observations from																	
				Daily max.	Daily min.	Highest	Lowest						Highest	Lowest	N.	NE.	E.	SE.	S.	SW.	W.	NW.					Calm			
January ..	mb. 1012	mb. 3.4	°F. 78	°F. 81	°F. 75	°F. 83	°F. 71	°F. 92	°F. 65	mm. 221	in. 8.7	† 11	‡ 7	§ 208	in. 8.2	days 1	** 7	29	41	11	2	2	2	3	2	8	1	86	5.2	72
February ..	1012	3.7	79	83	76	85	71	96	66	51	2.0	3	3	121	4.8	1	6	14	27	24	3	7	5	3	2	15	0	82	3.9	72
March ..	1011	3.9	81	83	77	88	72	101	67	61	2.4	4	2	107	4.2	3	5	6	15	16	10	11	11	5	1	25	0	87	3.5	73
April ..	1009	3.8	83	89	78	95	74	102	67	51	2.0	4	3	74	2.9	8	5	2	2	3	4	10	31	21	2	25	0	88	3.3	75
May ..	1006	3.4	85	91	79	95	73	104	67	86	3.4	4	3	104	4.1	6	8	1	1	1	1	4	48	40	1	5	0	83	3.8	75
June ..	1005	3.0	85	92	79	95	75	103	71	28	1.1	2	2	112	4.4	3	10	0	0	0	0	1	50	50	0	0	0	80	4.8	74
July ..	1006	3.1	85	92	78	96	74	101	70	48	1.9	3	2	100	3.9	4	10	0	0	0	0	0	50	49	1	1	0	79	5.0	73
August ..	1007	3.4	84	92	77	95	73	102	69	89	3.5	5	5	106	4.2	9	9	0	0	0	1	2	50	47	1	1	0	80	4.5	73
September	1007	3.8	84	91	77	95	73	102	70	97	3.8	7	6	129	5.1	6	8	0	0	1	1	2	49	46	1	2	0	82	4.1	73
October ..	1009	3.8	82	88	76	94	72	102	69	231	9.1	13	11	127	5.0	10	6	3	1	2	2	3	39	36	2	12	0	88	5.0	73
November	1010	3.6	79	83	75	88	71	97	67	363	14.3	17	13	265	10.4	6	5	16	13	5	3	3	15	20	4	21	0	90	5.7	73
December	1011	3.5	78	81	75	84	71	91	66	320	12.6	16	14	257	10.1	1	7	30	31	10	4	2	2	5	3	13	1	88	5.8	72
Year ..	1009	3.5	82	87	77	97	69	104	65	1646	64.8	89	71	265	10.4	58	7	8	11	6	3	4	29	27	2	10	2	84	4.5	73

Authorities.—Bibliography Nos. 88, 117, 118.

Periods.—Pressure, 16 years.

Temp. (average, mean daily max. and min., mean highest and lowest), 1928-38; (extremes), 55-60 years.

Rain (average fall, no. of days with 1 mm.), wind (speed), relative humidity, 1911-30.

Rain (no. of days with 2.54 mm.), 22 years.; (max. fall in 24 hours), 59 years.

No. of days with thunder, Aug. 1929-July 1938.

Wind (direction), 1927-38.

No. of days with mist, 1928-37.

Cloud amount, 1906-15. Wet bulb temp. 1928-38.

Notes.—†† Mean of obs. at 0930 and 1530.

‡ Difference between means at 0930 and 1530. \* ½ (max. + min.).

† Day with 1 mm. (.04 in.) or more of rain.

‡‡ Day with 2.54 mm. (0.1 in.) or more of rain. \*\* Mean of 24 hours.

§ Definition not known. †† Mean daily min. and mean daily max.

§ Expressive of humidity during the night; obtained from min. dry and wet bulb temps.

† A fall of 272 mm. (10.7 in.) was recorded on May 5, 1930.

Month	Observations at 1530										††	1530	max
January ..	36	46	13	2	1	0	0	1	2	78	5.5	76	
February ..	19	43	32	5	1	0	0	0	1	70	3.9	76	
March ..	14	33	43	6	1	1	1	1	2	70	3.3	78	
April ..	6	15	55	9	1	6	5	1	2	68	3.9	80	
May ..	2	4	26	6	1	30	29	1	2	64	4.9	80	
June ..	1	1	5	2	1	45	45	1	1	60	5.7	78	
July ..	8	6	4	1	1	39	39	1	2	59	6.0	77	
August ..	6	6	18	2	1	32	31	1	4	60	6.2	78	
September	5	6	24	7	1	25	28	1	4	62	6.3	78	
October ..	15	17	19	5	1	18	20	2	3	70	6.2	78	
November	32	30	14	3	1	3	7	3	7	79	6.2	78	
December	41	41	10	3	1	1	1	1	2	79	6.3	76	
Year ..	15	21	22	4	1	17	17	1	3	68	5.4	78	

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Ceylon

TABLE IX—continued

Diyatalawa. 6° 49' N., 80° 58' E., 4,101 ft.

Times of obs. : 0930, 1530 (Z-5½).

Month	Pressure at station level		Air Temperature								Rain			Thunder heard	Wind													
	Average††	Daily range‡	Average*	Mean of		Mean of		Extreme		Average fall	No. of days†	Max. fall in 24 hours	Percentage of observations from															
				Daily max.	Daily min.	Highest	Lowest	Highest	Lowest				N.		NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Fog or mist‡‡	Relative humidity %	Cloud amount	Wet bulb temperature °F.††		
January ..	876	3-2	65	72	58	77	50	83	45	161	6.3	13	103	4.1	1	Observations at 0930												
February ..	876	3-2	66	75	56	79	48	82	46	46	1.8	6	55	2.2	4	31	18	8	3	1	1	2	13	23	2	91	5.9	57
March ..	876	3-2	67	77	58	80	52	82	49	126	5.0	11	114	4.5	11	19	17	13	7	7	1	3	7	26	1	85	4.3	55
April ..	875	3-1	69	78	60	82	56	84	54	133	5.2	13	55	2.2	17	11	18	23	7	9	4	2	3	23	1	86	4.0	56
May ..	874	2-8	70	78	62	83	57	85	53	149	5.9	12	119	4.7	11	7	11	19	8	12	4	3	5	31	0	88	4.5	59
June ..	873	2-3	70	78	63	82	58	84	56	45	1.8	5	55	2.2	4	5	4	10	10	17	10	7	11	26	0	84	4.6	59
July ..	873	2-1	70	78	63	83	58	85	54	50	2.0	6	42	1.7	4	8	1	3	7	15	7	16	35	8	0	78	5.6	59
August ..	874	2-5	70	78	62	83	57	84	53	77	3.0	7	64	2.5	9	7	2	5	4	4	2	17	53	6	0	77	5.7	58
September ..	874	3-0	69	78	61	83	56	84	54	112	4.4	9	82	3.2	8	9	4	6	9	11	6	12	34	9	0	79	5.0	58
October ..	875	3-2	68	76	61	80	56	83	52	242	9.5	18	108	4.2	12	6	3	8	9	15	8	10	28	13	0	82	5.0	57
November ..	876	3-1	67	74	60	79	55	83	51	259	10.2	20	89	3.5	10	7	10	18	9	14	7	8	10	17	0	88	5.1	58
December ..	876	3-2	65	72	58	77	50	79	44	206	8.1	17	117	4.6	4	12	12	21	8	9	4	3	5	26	1	90	6.0	59
Year ..	875	2-9	68	76	60	84	47	85	44	1606	63.2	137	119†	4.7	95	12	10	12	7	10	5	7	18	19	7	85	5.2	58

**Authorities.**—Bibliography Nos. 117, 118.  
**Periods.**—Pressure, Sept. 1925–Dec. 1937.  
 Temp., Nov. 1927–Dec. 1937.  
 Rain, relative humidity and cloud amount, 1911–30.  
 No. of days with thunder, Aug. 1929–July, 1938.  
 Wind (direction), 1927–38.  
 No. of days with mist, 1928–37.  
 Wet bulb temp., Nov. 1927–Dec. 1938.

**Notes.**—†† Mean of obs. at 0930 and 1530.  
 ‡ Difference between the means at 0930 and 1530.  
 \* (max. + min.).  
 † Day with 1 mm. (.04 in.) or more of rain.  
 ‡ Definition not known.  
 § Expressive of humidity during the night; obtained from min. dry and wet bulb temps.  
 †† Mean daily min. and mean daily max.  
 † A fall of 198 mm. (7.8 in.) was recorded on April 14, 1931.

Month	Observations at 1530											††	1530	max
January ..	45	28	11	1	2	1	1	7	4	77	6.9	66		
February ..	30	20	18	3	7	4	2	7	9	63	6.0	67		
March ..	23	19	25	4	10	3	2	4	10	62	7.0	68		
April ..	6	14	29	5	12	4	4	3	23	67	7.4	69		
May ..	8	8	10	2	13	10	10	14	20	66	7.4	70		
June ..	4	3	3	1	10	9	23	42	5	60	7.2	68		
July ..	4	3	5	2	5	3	18	56	4	60	7.1	66		
August ..	5	4	9	3	9	6	18	37	9	58	7.1	67		
September ..	5	2	7	6	16	9	14	32	9	62	7.5	67		
October ..	9	9	19	4	14	9	7	12	17	70	8.1	68		
November ..	14	16	21	4	12	6	3	5	19	76	8.5	68		
December ..	40	21	14	2	6	2	1	8	6	80	8.1	66		
Year ..	16	12	14	3	10	6	9	19	11	67	7.4	67		

Table IX—General climatological tables



TABLE X—MONTHLY FREQUENCY OF WIND DIRECTION AT COASTAL STATIONS

Number of occasions per 100 on which particular winds may be expected

0930 (z-5½).

	N.	NE.	E.	SE.	S.	SW.	W.	NW.	C.	N.	NE.	E.	SE.	S.	SW.	W.	NW.	C.	N.	NE.	E.	SE.	S.	SW.	W.	NW.	C.
	HAMBANTOTA									LITTLE BASSES									BATTICALOA								
January .. ..	14	78	3	.3	.3	.7	.5	2	1	75	13	2	1	.4	.7	1	7	.3	7	39	6	2	1	5	29	8	3
February .. ..	13	75	5	.3	0	.6	2	1	3	71	14	2	.2	.2	2	3	6	2	4	23	6	2	5	6	35	11	8
March .. ..	14	52	5	0	0	.6	9	5	9	48	14	.6	.7	1	.5	8	11	12	4	14	5	3	9	6	35	14	10
April .. ..	11	13	4	2	1	21	31	11	6	9	4	1	.5	4	31	32	9	10	4	15	7	6	14	7	24	10	13
May .. ..	2	2	0	0	0	41	51	4	.5	2	.3	.3	.3	.2	74	18	3	2	3	7	6	10	23	17	16	8	10
June .. ..	0	0	0	0	0	40	56	4	.3	0	0	0	0	.4	85	14	.2	0	1	5	4	10	19	20	28	7	6
July .. ..	.3	0	0	0	.2	36	58	5	.3	.3	0	0	0	0	79	20	.3	0	2	4	5	7	10	21	35	11	5
August .. ..	0	0	0	0	0	44	51	4	.5	0	0	0	0	0	86	13	.6	0	2	7	5	8	16	16	30	10	6
September .. ..	.4	.2	0	.5	1	41	51	6	.4	0	0	0	0	2	85	10	.4	3	4	7	5	11	16	15	27	7	8
October .. ..	3	7	3	.3	2	36	41	5	3	8	3	.6	.2	1	53	26	5	3	3	8	5	6	14	13	30	8	13
November .. ..	10	31	4	.7	.4	10	24	11	9	31	8	.2	.6	1	12	20	16	9	4	7	4	2	6	8	50	10	9
December .. ..	19	64	3	.3	.2	2	3	4	5	67	10	1	1	.2	2	3	14	2	7	18	4	1	2	6	45	10	7
Year .. ..	7	27	2	.4	.4	23	32	5	3	26	5	.8	.4	.9	43	14	6	4	4	13	5	6	11	12	32	9	8

1530 (z-5½).

January .. ..	2	27	54	9	5	2	.7	0	.3	35	54	4	3	2	.6	.3	1	0	26	59	8	2	.3	0	1	3	.6
February .. ..	.3	8	63	18	5	5	.3	0	.3	18	67	9	3	3	.2	0	.2	0	13	65	14	5	.7	.3	.3	.8	1
March .. ..	.4	6	33	21	18	20	1	.3	.3	6	52	15	7	12	6	1	.3	1	6	53	26	9	1	.8	1	2	.8
April .. ..	1	2	7	8	11	57	12	.7	.8	2	12	7	7	25	38	6	.9	2	3	29	44	19	3	.3	1	.3	.3
May .. ..	.4	.3	0	.3	2	63	32	2	.3	.8	.6	.2	2	6	81	6	2	0	1	16	41	27	4	4	6	1	0
June .. ..	0	0	0	0	0	55	40	5	0	.2	0	0	0	.3	89	10	.4	0	.7	9	29	30	3	7	19	2	0
July .. ..	.3	0	0	0	.3	48	42	9	0	.6	.3	.8	1	3	78	14	.8	1	1	5	27	33	5	9	17	3	0
August .. ..	.2	.2	0	0	0	67	29	4	0	0	.3	0	0	3	88	8	1	0	1	9	37	35	5	4	7	2	.3
September .. ..	0	0	0	0	1	63	31	5	0	.8	0	.2	.3	5	88	5	.4	0	1	5	35	39	5	6	8	1	.4
October .. ..	.4	.7	3	5	5	60	25	1	.3	2	5	4	3	10	61	9	3	3	4	25	35	22	4	1	6	2	.5
November .. ..	1	6	15	13	12	38	13	1	.8	12	26	7	4	11	24	7	5	4	18	36	16	9	3	2	6	8	2
December .. ..	2	15	42	15	10	13	1	.5	1	24	57	5	3	4	4	1	2	.3	28	48	8	3	1	.7	4	5	2
Year .. ..	.7	5	18	8	6	41	19	2	.3	8	23	4	3	7	47	6	1	.9	8	30	27	19	3	3	6	3	.7

Authority.—Bibliography No. 117. Periods: Hambantota and Batticaloa, 1927-38; Little Basses, 1928-36.

Note.—The times of observation at Little Basses were 0900 and 1700 in 6 of the 9 years.

Table X—Wind direction at coastal stations

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TABLE XI—MONTHLY FREQUENCY OF WIND DIRECTION AND SPEED IN THE UPPER AIR UP TO 10,000 FEET AND SEASONAL FREQUENCY AT 20,000 AND 30,000 FEET IN THE MORNING

Number of occasions per 100 on which particular winds may be expected  
 I = 3-13 knots (4-15 m.p.h.)    II = 14-27 knots (16-31 m.p.h.)    III = 28-40 knots (32-47 m.p.h.)    IV = over 40 knots (over 47 m.p.h.)    C = less than 3 knots (less than 4 m.p.h.)

Colombo. 6° 54' N., 79° 52' E., 24 ft.    Time of obs. : morning    Period : 1922-34

Height above M.S.L. (feet)	N.				NE.				E.				SE.				S.				SW.				W.				NW.				C.	No. of obs.	Average speed†
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
<b>JANUARY</b>																																			
Surface ..	22	0	0	0	39	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	29	279	knots
1,500 ..	10	4	0	0	26	21	2	0	7	0	0	0	6	0	0	0	4	0	0	0	2	0	0	0	2	0	0	0	3	0	0	0	12	269	5
3,300 ..	13	3	0	0	25	10	1	0	12	2	0	0	10	0	0	0	3	0	0	0	2	0	0	0	2	0	0	0	3	0	0	0	14	236	9
6,500 ..	8	2	0	0	22	7	0	0	28	8	0	0	10	1	0	0	2	0	0	0	1	0	0	0	1	1	0	0	2	1	0	0	7	190	10
10,000 ..	5	1	0	0	14	5	1	0	26	14	1	0	15	2	0	0	1	0	0	0	1	1	0	0	3	1	0	0	4	1	0	0	6	146	12
13,000 ..	5	1	0	0	9	6	0	0	22	31	1	0	8	1	0	0	3	0	0	0	4	0	0	0	2	2	0	0	3	1	0	0	1	108	12
16,500 ..	1	3	0	0	7	6	1	0	18	30	4	1	7	1	0	0	1	0	0	0	4	3	0	0	1	1	0	0	4	0	0	0	4	71	15
<b>FEBRUARY</b>																																			
Surface ..	10	0	0	0	23	0	0	0	6	0	0	0	2	0	0	0	3	0	0	0	5	0	0	0	4	0	0	0	2	0	0	0	45	269	3
1,500 ..	9	0	0	0	21	5	0	0	5	0	0	0	6	0	0	0	8	0	0	0	7	0	0	0	8	0	0	0	7	0	0	0	24	263	6
3,300 ..	16	2	0	0	19	3	0	0	7	1	0	0	10	0	0	0	6	0	0	0	6	0	0	0	3	0	0	0	3	0	0	0	24	238	6
6,500 ..	10	5	1	0	22	9	1	0	16	7	0	0	6	2	0	0	2	0	0	0	2	0	0	0	4	1	0	0	6	0	0	0	6	185	11
10,000 ..	6	1	0	0	20	6	0	0	23	10	0	0	6	4	0	0	2	0	0	0	3	1	0	0	2	4	0	0	2	1	0	0	9	140	10
13,000 ..	2	0	0	0	15	6	0	0	15	21	2	0	10	1	0	0	2	0	0	0	8	0	0	0	5	1	0	0	7	1	0	0	5	105	11
16,500 ..	7	0	0	0	12	7	0	0	16	12	4	0	10	5	0	0	1	0	0	0	7	3	0	0	3	3	0	0	8	0	0	0	4	76	12
<b>MARCH</b>																																			
Surface ..	5	0	0	0	6	0	0	0	4	0	0	0	2	0	0	0	6	0	0	0	10	0	0	0	12	0	0	0	5	0	0	0	50	282	3
1,500 ..	10	0	0	0	10	1	0	0	4	0	0	0	5	0	0	0	10	0	0	0	12	0	0	0	13	0	0	0	10	0	0	0	24	273	5
3,300 ..	16	0	0	0	16	3	0	0	8	1	0	0	8	1	0	0	8	0	0	0	8	0	0	0	7	0	0	0	6	0	0	0	19	232	6
6,500 ..	17	3	0	0	24	7	0	0	19	4	0	0	8	1	0	0	2	0	0	0	2	0	0	0	2	0	0	0	4	0	0	0	7	164	9
10,000 ..	3	1	0	0	28	9	1	0	21	7	1	0	7	1	0	0	7	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	7	123	10
13,000 ..	3	0	0	0	14	3	1	0	23	14	0	0	10	6	0	0	7	0	0	0	6	0	0	0	0	1	0	0	3	0	0	0	7	94	10
16,500 ..	3	0	0	0	5	4	1	0	26	16	3	0	14	3	0	0	3	0	0	0	3	1	0	0	7	0	0	0	5	1	0	0	5	74	12
<b>Dec.-Mar.</b>																																			
20,000 ..	5	5	0	0	13	7	1	0	16	16	3	0	12	3	0	0	5	5	0	0	3	2	0	0	3	1	0	0	3	5	0	0	6	202	—
30,000 ..	7	3	0	0	13	2	2	0	5	13	2	0	10	2	0	0	8	2	0	0	7	0	0	0	8	3	2	0	3	3	0	0	5	60	—

† From 6,500 feet upwards the speeds are the average of the morning and afternoon observations; below that height they refer to the morning observations only.

6 178

Ceylon

TABLE XI—continued

Number of occasions per 100 on which particular winds may be expected

I = 3-13 knots  
(4-15 m.p.h.)

II = 14-27 knots  
(16-31 m.p.h.)

III = 28-40 knots  
(32-47 m.p.h.)

IV = over 40 knots  
(over 47 m.p.h.)

C = less than 3 knots  
(less than 4 m.p.h.)

Colombo—cont.

Time of obs. : morning

Height above M.S.L. (feet)	N.				NE.				E.				SE.				S.				SW.				W.				NW.				C.	No. of obs.	Average speed†
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
<b>APRIL</b>																																			
Surface ..	2	0	0	0	1	0	0	0	2	0	0	0	1	0	0	0	12	0	0	0	22	0	0	0	18	0	0	0	1	0	0	0	41	272	knts
1,500 ..	3	0	0	0	2	0	0	0	2	0	0	0	4	0	0	0	16	1	0	0	30	3	0	0	23	3	0	0	3	0	0	0	10	264	8
3,300 ..	6	0	0	0	4	0	0	0	4	0	0	0	7	1	0	0	15	2	0	0	17	3	0	0	20	4	1	0	2	0	0	0	13	202	7
6,500 ..	6	0	0	0	19	2	0	0	29	1	0	0	9	1	0	0	5	1	0	0	3	1	0	0	4	2	0	0	4	0	0	0	14	139	7
10,000 ..	11	0	0	0	22	12	0	0	22	10	1	0	7	0	0	0	3	0	0	0	7	0	0	0	1	2	0	0	1	0	0	0	3	104	11
13,000 ..	2	0	0	0	15	9	0	0	25	15	0	0	11	0	0	0	2	0	0	0	10	0	0	0	6	0	0	0	4	0	0	0	1	81	11
16,500 ..	3	0	0	0	13	2	0	0	13	23	2	0	10	0	0	0	5	0	0	0	7	2	0	0	2	0	0	0	5	60	11				
<b>MAY</b>																																			
Surface ..	1	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	13	0	0	0	46	0	0	0	14	0	0	0	1	0	0	0	20	321	6
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	3	0	0	30	30	1	0	13	12	1	0	1	1	0	0	1	309	14
3,300 ..	2	1	0	0	0	0	0	0	2	0	0	0	4	0	0	0	4	0	0	0	16	12	2	0	19	27	6	0	2	1	0	0	1	202	16
6,500 ..	8	2	0	0	9	0	0	0	9	0	0	0	4	0	0	0	1	2	0	0	21	8	1	0	11	12	3	0	3	1	0	0	5	92	12
10,000 ..	12	0	0	0	12	6	0	0	20	2	0	0	8	0	0	0	0	2	0	0	8	4	0	0	6	4	0	0	10	4	0	0	2	50	11
13,000 ..	6	0	0	0	12	3	0	0	18	15	0	0	3	0	0	0	9	0	0	0	6	0	0	0	6	0	0	0	12	3	0	0	6	33	11
16,500 ..	16	0	0	0	8	0	0	0	20	16	0	0	4	0	0	0	0	0	0	0	4	0	0	0	12	0	0	0	12	0	0	0	8	25	10
<b>JUNE</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	57	0	0	0	27	0	0	0	0	0	0	0	7	293	7
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	14	30	2	0	8	42	2	0	0	0	0	0	0	271	19
3,300 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	1	1	4	59	25	1	0	0	0	0	0	142	24
6,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	10	0	0	5	51	13	13	0	5	0	0	0	39	25
10,000 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	20	20	10	10	0	20	0	0	0	10	—
13,000 ..																																			
16,500 ..																																			
<b>APRIL-MAY</b>																																			
20,000 ..	4	0	0	0	9	7	0	0	24	13	0	0	2	0	0	0	7	2	0	0	6	0	0	0	6	0	0	0	15	0	0	0	6	54	—
30,000 ..	9	0	0	0	0	0	0	0	27	9	0	0	18	0	0	0	9	9	0	0	9	0	0	0	9	0	0	0	0	0	0	0	0	11	—

† From 6,500 feet upwards the speeds are the average of the morning and afternoon observations; below that height they refer to the morning observations only.

Table XI—Wind direction and speed in the upper air—Morning 6 179

TABLE XI—continued

Number of occasions per 100 on which particular winds may be expected  
 I = 3-13 knots (4-15 m.p.h.)    II = 14-27 knots (16-31 m.p.h.)    III = 28-40 knots (32-47 m.p.h.)    IV = over 40 knots (over 47 m.p.h.)    C = less than 3 knots (less than 4 m.p.h.)  
 Colombo—cont.    Time of obs. : morning

Height above M.S.L. (feet)	N.				NE.				E.				SE.				S.				SW.				W.				NW.				C.	No. of obs.	Average speed†
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV							
<b>JULY</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	0	47	0	0	0	36	0	0	0	2	0	0	0	9	314	knots
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	9	22	0	0	14	51	2	0	1	0	1	0	0	286	7
3,300 ..	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	0	0	3	56	24	1	1	3	2	0	0	153	18
6,500 ..	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	7	36	18	7	4	7	9	2	0	45	24
10,000 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	54	18	0	0	9	0	0	0	11	25
13,000 ..																																			—
16,500 ..																																			
<b>AUGUST</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	0	0	0	51	0	0	0	28	0	0	0	1	0	0	0	8	325	6
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	15	20	0	0	20	41	1	0	0	0	0	0	0	266	17
3,300 ..	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	14	0	0	7	52	18	0	2	1	1	0	0	124	23
6,500 ..	10	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	10	16	0	0	6	42	3	0	0	0	3	0	3	31	19
10,000 ..																																			
13,000 ..																																			
16,500 ..																																			
<b>SEPTEMBER</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	53	0	0	0	31	0	0	0	0	0	0	0	8	333	7
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	22	18	1	0	22	31	0	0	0	0	0	0	1	309	15
3,300 ..	1	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	3	1	0	0	11	8	0	0	10	54	7	0	0	0	0	0	0	155	18
6,500 ..	2	0	0	0	13	0	0	0	2	0	0	0	9	0	0	0	6	2	0	0	0	2	2	0	11	26	13	0	6	2	0	0	4	47	16
10,000 ..	6	0	0	0	6	0	0	0	22	6	0	0	11	0	0	0	6	5	0	0	0	5	0	0	6	11	11	5	0	0	0	0	0	18	15
13,000 ..																																			
16,500 ..																																			
<b>JUNE-SEPT.</b>																																			
20,000 ..																																			
30,000 ..																																			

† From 6,500 feet upwards the speeds are the average of the morning and afternoon observations; below that height they refer to the morning observations only.

6 180

Ceylon

TABLE XI—continued

I = 3-13 knots (4-15 m.p.h.)    II = 14-27 knots (16-31 m.p.h.)    III = 28-40 knots (32-47 m.p.h.)    IV = over 40 knots (over 47 m.p.h.)    C = less than 3 knots (less than 4 m.p.h.)

Time of obs. : morning

Colombo—cont.

Height above M.S.L. (feet)	N.				NE.				E.				SE.				S.				SW.				W.				NW.				C.	No. of obs.	Average speed†
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
<b>OCTOBER</b>																																			
Surface ..	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	40	0	0	0	25	0	0	0	2	0	0	0	25	317	knots 5
1,500 ..	3	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	20	10	0	0	33	13	0	0	5	1	0	0	7	294	11				
3,300 ..	4	1	0	0	4	0	0	0	6	0	0	0	4	0	0	0	2	0	0	0	8	5	0	0	6	1	0	0	9	182	12				
6,500 ..	10	1	0	0	19	3	0	0	8	1	0	0	4	0	0	0	1	0	0	0	4	3	0	0	7	12	2	0	13	2	0	0	8	97	11
10,000 ..	6	0	0	0	20	3	0	0	12	3	0	0	7	0	0	0	3	0	0	0	1	3	0	0	7	9	0	0	17	1	0	0	7	69	10
13,000 ..	7	0	0	0	18	2	0	0	29	2	0	0	4	0	0	0	4	0	0	0	4	2	0	0	7	2	0	0	9	2	0	0	7	45	9
16,500 ..	3	0	0	0	20	3	0	0	20	10	0	0	3	0	0	0	3	0	0	0	13	0	0	0	3	0	0	0	7	0	0	0	13	30	9
<b>NOVEMBER</b>																																			
Surface ..	12	0	0	0	12	0	0	0	1	0	0	0	2	0	0	0	4	0	0	0	9	0	0	0	12	0	0	0	3	0	0	0	45	303	4
1,500 ..	11	5	0	0	9	4	0	0	5	0	0	0	3	0	0	0	8	1	0	0	11	2	0	0	13	3	0	0	11	1	0	0	14	292	9
3,300 ..	12	5	1	0	13	5	0	0	7	0	0	0	8	1	0	0	7	0	0	0	7	3	0	0	9	5	0	0	7	2	0	0	9	238	10
6,500 ..	9	4	0	0	20	6	0	0	13	1	0	0	5	0	0	0	2	1	0	0	6	2	0	0	7	5	1	0	11	2	0	0	6	158	10
10,000 ..	5	1	0	0	14	3	1	0	24	5	0	0	8	0	0	0	0	1	0	0	3	1	1	0	10	5	2	0	9	1	1	0	6	106	11
13,000 ..	4	1	0	0	11	4	0	0	28	16	1	0	4	0	0	0	3	1	0	0	3	3	0	0	7	5	0	0	4	1	0	0	4	75	12
16,500 ..	8	2	0	0	10	4	0	0	29	23	4	0	2	2	0	0	4	2	0	0	4	0	0	0	2	2	0	0	4	0	0	0	0	52	13
<b>DECEMBER</b>																																			
Surface ..	28	0	0	0	28	0	0	0	4	0	0	0	2	0	0	0	1	0	0	0	3	0	0	0	1	0	0	0	2	0	0	0	31	289	5
1,500 ..	12	9	1	0	30	17	0	0	6	0	0	0	4	0	0	0	5	0	0	0	1	0	0	0	1	0	0	0	3	1	0	0	18	279	11
3,300 ..	10	9	1	0	24	15	0	0	11	1	0	0	8	0	0	0	5	0	0	0	1	1	0	0	2	0	0	0	4	2	0	0	5	236	11
6,500 ..	9	0	0	0	24	11	0	0	18	3	0	0	5	0	0	0	4	1	0	0	2	0	0	0	4	2	0	0	8	0	0	0	9	181	9
10,000 ..	7	3	0	0	17	11	0	0	18	9	0	0	11	0	0	0	3	0	0	0	6	0	0	0	6	0	0	0	4	0	0	0	5	138	10
13,000 ..	5	2	0	0	17	10	0	0	19	16	0	0	9	1	0	0	3	0	0	0	1	0	0	0	3	1	0	0	4	0	0	0	8	99	11
16,500 ..	4	2	0	0	15	9	0	0	13	24	0	0	12	0	0	0	3	0	0	0	4	0	0	0	3	0	0	0	3	0	0	0	8	67	12
<b>Oct.-Nov.</b>																																			
20,000 ..	0	2	0	0	9	6	0	0	34	17	2	0	6	2	0	0	4	2	0	0	6	0	0	0	4	0	0	0	0	0	0	0	4	47	—
30,000 ..	Insufficient observations																																		

Authority.—Bibliography No. 77.

† From 6,500 feet upwards the speeds are the average of the morning and afternoon observations; below that height they refer to the morning observations only.

Table XI—Wind direction and speed in the upper air—Morning 6 181

TABLE XII—MONTHLY FREQUENCY OF WIND DIRECTION AND SPEED IN THE UPPER AIR IN THE AFTERNOON

Number of occasions per 100 on which particular winds may be expected

I = 3-13 knots  
(4-15 m.p.h.)

II = 14-27 knots  
(16-31 m.p.h.)

III = 28-40 knots  
(32-47 m.p.h.)

IV = over 40 knots  
(over 47 m.p.h.)

C = less than 3 knots  
(less than 4 m.p.h.)

Colombo 6° 54' N., 79° 52' E. 24 ft.

Time of obs.: afternoon

Period: 1922-34

Height above M.S.L. (feet)	N.				NE.				E.				SE.				S.				SW.				W.				NW.				C.	No. of obs.	Average speed
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
<b>JANUARY</b>																																			
Surface ..	27	0	0	0	12	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	9	0	0	0	15	0	0	0	27	0	0	0	8	194	7
1,500 ..	26	11	1	0	13	9	0	0	2	0	0	0	0	1	0	0	2	0	0	0	5	1	0	0	11	0	0	0	17	0	0	0	4	189	11
3,300 ..	16	6	1	0	43	13	0	0	8	1	0	0	2	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	5	159	10
6,500 ..	5	0	0	0	29	11	0	0	31	8	0	0	5	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	6	99	10
<b>FEBRUARY</b>																																			
Surface ..	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	12	0	0	0	47	0	0	0	30	0	0	0	2	196	7
1,500 ..	16	4	0	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	6	0	0	0	28	0	0	0	31	2	0	0	4	193	9
3,300 ..	25	2	0	0	38	4	0	0	10	0	0	0	5	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	6	0	0	0	7	175	8
6,500 ..	6	2	0	0	29	14	0	0	26	5	0	0	6	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	7	1	0	0	2	126	11
<b>MARCH</b>																																			
Surface ..	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	24	0	0	0	58	1	0	0	8	0	0	0	4	217	8
1,500 ..	7	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	18	0	0	0	46	2	0	0	19	0	0	0	3	209	9
3,300 ..	16	0	0	0	26	1	0	0	9	1	0	0	2	0	0	0	9	1	0	0	8	1	0	0	6	1	0	0	6	0	0	0	14	177	7
6,500 ..	6	2	0	0	28	15	0	0	28	4	0	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	7	131	10
<b>APRIL</b>																																			
Surface ..	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	51	1	0	0	35	0	0	0	4	0	0	0	6	171	7
1,500 ..	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1	0	0	26	9	0	0	43	10	0	0	5	0	0	0	1	162	11
3,300 ..	6	0	0	0	4	0	0	0	4	0	0	0	7	0	0	0	6	1	0	0	20	2	1	0	28	4	1	0	8	0	0	0	9	128	8
6,500 ..	5	0	0	0	19	5	0	0	32	1	0	0	9	0	0	0	3	0	1	0	3	1	0	0	4	1	0	1	5	0	0	0	9	78	9
<b>MAY</b>																																			
Surface ..	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	15	0	0	0	54	0	0	0	21	0	0	0	1	0	0	0	6	249	8
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	26	30	0	0	16	15	2	0	1	1	0	0	1	230	15
3,300 ..	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	9	1	0	0	14	16	1	0	19	23	3	1	3	3	0	0	4	117	15
6,500 ..	5	2	0	0	12	4	0	0	2	0	0	0	4	0	0	0	5	0	0	0	18	9	0	0	12	11	5	0	4	0	2	0	5	56	12
<b>JUNE</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	60	0	0	0	27	0	0	0	0	0	0	0	5	268	8
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	9	38	2	0	9	39	2	0	0	0	0	0	0	236	19
3,300 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10	1	1	5	53	24	4	0	0	0	0	0	92	25
6,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0	6	60	18	0	6	0	0	0	0	17	21

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Ceylon

TABLE XII—continued

Number of occasions per 100 on which particular winds may be expected

I = 3-13 knots  
(4-15 m.p.h.)

II = 14-27 knots  
(16-31 m.p.h.)

III = 28-40 knots  
(32-47 m.p.h.)

IV = over 40 knots  
(over 47 m.p.h.)

C = less than 3 knots  
(less than 4 m.p.h.)

Colombo—cont.

Time of obs. : afternoon

Height above M.S.L. (feet)	N.				NE.				E.				SE.				S.				SW.				W.				NW.				C.	No. of obs.	Average speed
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV							
<b>JULY</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	51	0	0	0	37	0	0	0	2	0	0	0	5	278	knots 7
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12	21	0	0	10	53	1	0	2	0	0	0	0	250	18
3,300 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	6	1	0	5	38	35	2	0	6	2	1	1	109	26
6,500 ..	4	9	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	4	0	0	4	14	27	4	4	14	0	0	0	22	22
<b>AUGUST</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	55	0	0	0	31	0	0	0	2	0	0	0	4	274	7
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	11	23	0	0	12	48	3	0	1	0	0	0	0	237	18
3,300 ..	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	5	0	0	10	51	24	2	1	0	0	0	0	93	23
6,500 ..	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	0	19	46	8	0	0	8	0	0	4	26	16
<b>SEPTEMBER</b>																																			
Surface ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	53	0	0	0	38	0	0	0	0	0	0	0	3	294	8
1,500 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	20	1	0	22	34	1	0	1	0	0	0	0	257	15
3,300 ..	2	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	4	0	0	0	8	5	0	0	11	58	6	1	1	0	0	0	1	108	19
6,500 ..	2	0	0	0	10	2	0	0	5	0	0	0	0	0	0	0	2	0	0	0	7	5	0	0	12	34	7	2	2	2	0	0	5	41	17
<b>OCTOBER</b>																																			
Surface ..	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	43	0	0	0	42	0	0	0	6	0	0	0	5	280	7
1,500 ..	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	16	11	0	0	37	18	1	0	11	0	0	0	1	263	13
3,300 ..	8	1	0	0	5	1	0	0	1	0	0	0	2	0	0	0	2	0	0	0	11	4	1	0	16	29	4	0	8	1	0	0	6	176	12
6,500 ..	12	2	0	0	18	2	0	0	10	1	0	0	3	0	0	0	4	0	0	0	4	2	0	0	13	11	2	0	8	2	0	0	6	95	10
<b>NOVEMBER</b>																																			
Surface ..	10	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	22	0	0	0	31	0	0	0	21	0	0	0	9	258	6
1,500 ..	11	4	0	0	3	2	0	0	0	0	0	0	0	0	0	0	5	2	0	0	11	3	0	0	29	4	0	0	20	4	0	0	3	245	11
3,300 ..	12	2	0	0	15	2	1	0	4	0	0	0	1	1	0	0	5	2	0	0	8	2	0	0	15	6	0	0	11	4	0	0	8	201	10
6,500 ..	8	2	0	0	14	4	0	0	14	2	0	0	4	0	0	0	4	1	0	0	4	5	0	0	9	6	2	0	8	1	0	0	10	132	10
<b>DECEMBER</b>																																			
Surface ..	25	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	10	1	0	0	15	0	0	0	35	1	0	0	5	185	7
1,500 ..	31	14	0	0	8	3	0	0	1	0	0	0	0	0	0	0	3	2	0	0	5	0	0	0	10	0	0	0	16	5	0	0	2	179	11
3,300 ..	19	11	1	0	35	10	0	0	1	0	0	0	2	1	0	0	1	1	0	0	1	1	0	0	3	0	0	0	5	1	0	0	8	144	11
6,500 ..	7	2	0	0	18	7	1	0	24	9	0	0	7	1	0	0	2	1	0	0	1	0	0	0	6	1	0	0	8	0	0	0	4	85	11

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Table XII—Wind direction and speed in the upper air—Afternoon 6 183

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103. [Faint, illegible text]

104. [Faint, illegible text]

105. [Faint, illegible text]

106. [Faint, illegible text]

107. [Faint, illegible text]

108. [Faint, illegible text]

109. [Faint, illegible text]

110. [Faint, illegible text]

111. [Faint, illegible text]

112. [Faint, illegible text]

113. [Faint, illegible text]

114. [Faint, illegible text]

115. [Faint, illegible text]

116. [Faint, illegible text]

117. [Faint, illegible text]

118. [Faint, illegible text]

119. [Faint, illegible text]

120. [Faint, illegible text]

121. [Faint, illegible text]

122. [Faint, illegible text]

123. [Faint, illegible text]

124. [Faint, illegible text]

125. [Faint, illegible text]

126. [Faint, illegible text]

127. [Faint, illegible text]

128. [Faint, illegible text]

129. [Faint, illegible text]

130. [Faint, illegible text]

131. [Faint, illegible text]

132. [Faint, illegible text]

133. [Faint, illegible text]

134. [Faint, illegible text]

135. [Faint, illegible text]

136. [Faint, illegible text]

137. [Faint, illegible text]

138. [Faint, illegible text]

139. [Faint, illegible text]

140. [Faint, illegible text]

141. [Faint, illegible text]

142. [Faint, illegible text]