

# THE COLOMBO OBSERVATORY.

1936



## REPORT OF THE SUPERINTENDENT OF THE OBSERVATORY.

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### ADMINISTRATION.

*Staff.*—Mr. D. T. E. Dassanayake, Assistant Superintendent, was in England on study leave throughout the year, at the Imperial College of Science, London. Mr. A. P. Kandasamy continued to act as Assistant Superintendent. The cadre of the scientific staff was increased by one Junior Technical Assistant, and Mr. M. Kidnapillai, B.A., B.Sc., was appointed to this post.

I left Ceylon on December 27, to attend the Meteorological Conference of the Far East Meteorological Services at Hong Kong. Mr. Kandasamy acted as Superintendent till my return, on February 3, 1937.

### TIME WORK.

The astronomical activities of the Observatory were mainly limited to time work.

*Observatory Clocks.*—The clocks were rated by regular observations of the Bordeaux and Rugby vernier time signals, and the Cooke micrometer transit was not used during the year.

The performance of sidereal 72 was very satisfactory during the year. The other clocks, whose rate is affected by the electric contacts, were occasionally erratic, but on the whole, their behaviour was satisfactory.

The Synchronome master clocks continued to be in use for dials, and for calibrating the seismograph.

*Time Ball and Synchronization.*—The time ball at the Flagstaff station was dropped at 0900, Ceylon Standard Time (0330 G.M.T.) on all days, inclusive of Sundays and public holidays.

There were two failures during the year, both in January, the first, on the 30th, owing to a mechanical defect in the winding apparatus at Flagstaff, and the second, on the 31st, due to a break in the line.

The working of the time ball involves co-operation between four departments—Survey (Observatory), Telegraph, Harbour Engineer's, and Master-Attendant's—and my thanks are due to those officers of the other departments concerned who have co-operated in this work.

Synchronizing signals were sent daily to the Central Telegraph Office, whence a further distribution of time signals was made throughout the Island. These were sent from the Observatory at 07.55 and 15.55 on ordinary week days, at 07.55 only on Saturdays and public holidays that are not post office holidays, and at 08.54 on Sundays and post office holidays. A test measurement is made immediately after the setting signal, which enables the officer on duty at the Observatory to verify that the setting signal has done its work satisfactorily, and if necessary to report any defect by telephone.

The clock in the lighthouse at the corner of Chatham street and Queen street was synchronized daily at 09.00, its relay being in series with the time ball circuit. At noon, the chimes and strike of this clock are included in the broadcasting programme as a time signal.

The error of the clock is noted every day at noon. On one occasion it was 44 seconds fast at noon, on another, 20 seconds fast, and on two occasions, 11 seconds fast. Otherwise the noon errors were comprised within the range ; 5 seconds fast to 2 seconds slow. On the night of June 16–17 the clock stopped, having been inadvertently allowed to run down. It was restarted on the morning of the 17th.

*Issue of Wireless Time Signals.*—These were sent out twice daily, in the old International or “Onogo” code, from the Welikada Wireless Station. The morning signal is from 11.27–11.30, Ceylon Standard Time, (0557–0600, G.M.T.), on 130 kc/s (2300 metres), C.W., while the evening one is now from 18.57 to 19.00 (1327–1330, G.M.T.) on 500 kc/s (600 metres), C.W. (see the 1935 report). There is no curtailment on Sundays or public holidays.

In the case of a failure or erroneous signal, the words “time signal failed” or “cancel time signal” are sent out in Morse immediately afterwards.

Further details of the apparatus and procedure are given in the 1930 and previous reports.

In 1936 there were 731 successful signals, out of a possible 732. The one failure, on January 3, was due to a defect in the apparatus at the Wireless Station. This number of failures is the smallest recorded in any year since these signals were started.

As in the case of the time ball work, the wireless signals involve close co-operation with the Telegraph Department, and I am glad to take the opportunity of expressing my thanks to all concerned for the way in which they have been maintained.

*Naval Chronometers and Watches.*—Colombo Observatory continued to function as the chronometer depot for the East Indies Squadron.

### METEOROLOGICAL EQUIPMENT AND WORK.

The 16 main climatological stations and the 3 stations established for aeronautical meteorology continued to function during the year.



At the 16 main climatological stations, observations were taken daily at 9½ hours and 15½ hours. In addition, observations were taken at 8 hours at Colombo and Nuwara Eliya, and at 8 hours and 17 hours at Trincomalee, Batticaloa, and Hambantota, for transmission to India. The observations at 17 hours are used, in conjunction with values derived from the Colombo autograms, in preparing the evening wireless weather report for issue from Colombo.

Mention must also be made of the climatological stations maintained by the Rubber Research Institute at Dartonfield, Agalawatta (in place of the discontinued station at Culloden, Neboda); by the Tea Research Institute at St. Coomb's, Talawakele, and at Passara; and by the Coconut Research Institute at Bandirippu. The records from these stations are sent regularly to the Observatory.

An auxiliary meteorological station is maintained in the Fort area, Colombo, and a Dines pressure anemometer at the Pilot Station in Colombo Harbour. A pluviograph is maintained at Labugama by the Colombo Municipality, while the Observatory maintains another at Watawala, and a recording anemometer at Haputale, in addition to some pluviographs and recording anemometers at the main stations. There is a Robinson anemometer at the Little Basses Lighthouse, which is maintained and read twice daily by the Lighthouse Service. There is a Dines pressure anemometer on Sober Island, in Trincomalee Harbour, in addition to the climatological station at Fort Frederick, Trincomalee.

The pin diagrams and other systems of checking at Colombo were continued without any change.

Two clerks of the Survey Department were given a course of training in meteorological work at the Observatory.

*Rain-gauges and Volunteer Observers.*—Rainfall figures appear in this report from over 400 stations. These include the stations that report daily, at which the observers receive an allowance, but the great majority of them are maintained voluntarily, and I am glad to take this opportunity of thanking all who have co-operated in this work.

Thirteen new stations were started during the year, while 4 were discontinued. Of these latter, 3 had records of at least 10 years, Horton Plains 27, Culloden 12, and Gendagala 10.

While it is not possible to mention all the voluntary rainfall observers individually, I wish to put in a special word of thanks to some, who have supplied other useful meteorological data. Among these may be mentioned—Mr. R. G. Coombe (Poonagalla) for his weekly barograms; Mr. E. E. Megget (Detenagalla) for sunshine charts and graphs, wind observations and anemograms, humidity and temperature graphs; Messrs. Ross Wyllie (Oakwell) and A. Pearson (Horakele) for sunshine charts; Messrs. H. Andrews and G. R. B. Williams (Hope) and R. Mallaby (Horton Plains) for wind observations; Messrs. E. H. Mellore (Norton and Donnybrooke), D. A. Wright (South Wanarajah), and C. Erskine (Ben Hope) for telegrams and post cards concerning heavy rain; Messrs. G. Huntley and O. L. Jessop (Vincit), C. W. Boyd-Moss and J. M. Hodgson (Theydon Bois), V. C. Baker and C. E. Meares (Keenagahaella), G. P. Kelly (Nilloomally), F. A. Bourke (Campion), and H. A. Clark (Kirklees) for interesting notes.

The number of stations which report rainfall daily remained at 39 during the year, this number including 15 of the 16 principal climatological stations. Of these stations 9 are estate rain-gauges. I must express my great indebtedness to the Superintendents concerned, Messrs. W. S. Veitch (Eheliyagoda), H. A. McLaren and H. A. F. McLaren (Geekiyanakanda), A. B. Gault and V. C. Jagers (St. Martin's), W. S. Roper and M. H. Villiers (Panilkanda), F. A. Bourke (Campion), Guy M. Neave and B. G. Graham (Dunedin), R. Neville Rolfe and D. L. Nicol (Maliboda), H. C. Rodale (Yataderiya), and A. J. McKee (Maha Uva), for their ready co-operation.

*Wireless Weather Reports.*—The chief daily weather report and forecast were prepared each morning in time to be broadcast *en clair* at noon. They subsequently appeared in the *Post Office Daily List* and in the local newspapers.

The material for the report was mainly provided by the morning telegrams from 14 climatological outstations, the observations at Colombo, including the morning pilot balloon flight, and such ship's messages as were available. Other sources of information were the telegram from Pamban, and the figures from stations in Ceylon that are not fully equipped climatological stations, but from which the morning measurement of rainfall is wired.

Weather reports for ships were sent out in Morse immediately after the time signals at 11½ hours and 19 hours, while extra weather reports were sent out in Morse at 22½ hours, whenever the state of the weather made such extra reports desirable. These messages deal with the immediate neighbourhood of Ceylon in more detail than can be expected in the Indian messages, which have to summarize the outstanding features over large areas. By kind permission of the Director-General of Observatories, copies of the Indian messages are received at Colombo, and use is made of any relevant parts.

An Indian Fleet Synoptic Message has been sent out from Matara at noon since the beginning of 1936, and copies of these messages are received at Colombo. These include the 8 hours observations from a number of Indian coastal stations. Although this information is not received here in time for the morning weather report, it is available for the evening report, and permits the drawing of fairly recent synoptic charts over a considerably greater area than has hitherto been the case here. By the courtesy of the Naval Wireless Station at Matara, broadcasts of meteorological observations from stations in Malaya and Italian Somaliland were also frequently received, and plotted on the same charts.

The time of the Ceylon Fleet Synoptic Message was altered to noon, so that it could be broadcast with the Indian Message. Any information received too late for that broadcast is sent out at 3.18 P.M.

The number of ships from which telegrams were received during the year was 324, which is appreciably lower than the figure for the previous year (363). The number of telegrams received, however, was substantially higher, 3,244 as against 2,886 in 1935. 104 telegrams were received from ss. Baloran, 100 from ss. Marnix van St. Aldegonde, and 98 from ss. Johan Van Oldenbarnevelt, while others from whom 40 or more were received were ss. Scharnhorst, Orford, Badarpur, H. M. S. Enterprise, ss. Chyebassa, Jalatarang, H. M. S. Berwick, and ss. Jaladuta. Acknowledgments were sent in all cases.

*Co-operation with the Indian Meteorological Department.*—Telegrams from Colombo and Nuwara Eliya are sent to India at 8 A.M., and from Trincomalee, Hambantota, and Batticaloa at 8 A.M. and 5 P.M., as a matter of daily routine, while extra storm warning telegrams are also sent from the four coast stations at various times, when asked for by the Indian Meteorological Department. The numbers of storm telegrams sent in 1936 to Poona were:—Colombo, 59; Trincomalee, 11; Batticaloa, 10; and to Calcutta:—Colombo, 29; Trincomalee, 58; Batticaloa, 31; Hambantota, 37.

The results of the morning pilot balloon flight were telegraphed to Poona throughout the year, and to Calcutta at certain seasons. In addition, afternoon flights were wired when required, and telegrams were also sent whenever the general appearance of the morning synoptic chart showed anything worthy of such treatment.



By arrangement with the Ceylon Telegraph Department, all weather telegrams received by them from ships, whether addressed to Colombo, Poona, or Calcutta, are dealt with in the same way. At certain seasons of the year, they are forwarded direct to Poona, and copies are sent to the Observatory. For the rest of the year, they are forwarded to the Observatory, and from there sent to Calcutta or Poona, by letter or wire, at the discretion of the staff.

By the courtesy of the Director-General of Observatories, India, copies of all broadcasts sent by him to the Navy Wireless Station at Matara were also delivered to the Colombo Observatory. In addition, copies of the daily morning telegram from Pamban were also sent here, and proved of considerable value, owing to the way in which, during the north-east monsoon, strong wind often blows down the Gulf of Mannar, and so produces distinctly rougher weather between Colombo and Cape Comorin than is generally indicated by Ceylon coastal observations.

*Special Warnings.*—If the weather seems unsettled or suspicious, warnings by telegraph or telephone are given to the Naval Dockyard, Trincomalee, the Naval Office, Colombo, the Master Attendant, Colombo, the Assistant Master Attendant, Galle, the Fishery Mudaliyar, Colombo, the Railway, and the Office of the Flood Scheme.

*Information to Artillery.*—Surface meteorological readings were frequently supplied to the Royal Artillery and the Ceylon Garrison Artillery, for use during artillery practice.

*Upper-Air Work.*—Rubber pilot balloons were in use throughout the year, the tail method of observation being used. The quality of the balloons received was fairly satisfactory.

The total number of flights was 617, or 55 more than last year. The number reaching 5 kilometres was 102, of which 50 reached 7 kilometres. Only 6 balloons were followed as far as 10 kilometres, the highest altitude reached being 11.0 kilometres.

*Vertical Temperature Gradient.*—The four thermographs at the Welikada Wireless Station were in continuous operation throughout the year.

#### MISCELLANEOUS.

*Kelani Flood Forecasts.*—On May 19, warning was given of the probability of a minor flood at Colombo. The river Kelani reached minor flood level (5 ft. at Nagalagam street) about midnight on May 20–21. The subsequent rise of the river to successively higher levels, as the result of the heavy rains of May 18 onwards, was predicted with fair accuracy, in sufficient time to allow of the necessary precautions to be taken in Colombo. The peak heights of the flood, 9 feet 6 inches at Nagalagam street, on the 23rd and 26th, were 3 inches below the computed maxima, 9 feet 9 inches. This flood was somewhat unusual, in that the river remained between 9 and 9½ feet for 4½ days, from the morning of the 23rd till the evening of the 27th. The flood heights during this time, and the slow subsidence afterwards, were also predicted with fair accuracy.

Heavy rain up-country on May 31 checked the subsidence, and the river rose again to just over minor flood level, on June 3 and 4. The computed maximum height was 7 inches above the new maximum height, the difference being possibly due to scour in the bed of the river after the major flood.

On September 28, warning of the possibility of a minor flood at Colombo was given. The river reached a maximum height of 4 feet 9½ inches at Nagalagam street in the early morning of the 30th, the computed maximum being 5 ft. 6 inches.

*Magnetic Observations at Ratmalana Aerodrome.*—The ground at the aerodrome was tested for variations of magnetic deviation, and a site was selected for a compass swinging base.

*Calver Equatorial Reflector.*—This instrument, of aperture 12½ inches, was dismantled for transfer to the University College, where a dome was built for it. Astronomical observations for azimuth were made at the new site, for setting the telescope pillar.

*Visibility of the New Moon.*—These observations were continued as regularly as possible during the year. A table of the approximate positions of the moon, in altitude and azimuth, is computed beforehand, and an upper air theodolite is used to range for it. The pointers of the theodolite are then available as an aid to pick out the moon with the naked eye.

#### PUBLICATIONS.

The present report is on the same lines as last year, the principal change being the inclusion of a table of sunshine. The amount of sunshine is now measured according to the standard method described in the *Observer's Handbook* of the London Meteorological Office, 1934 edition, and monthly means are given for each hour, as far as possible, between 0700 and 1700, local solar time.

The average monthly totals of those rainfall stations whose records reached a length of 10 years in 1936 were reduced to the standard period, 1911–30, by comparison with neighbouring *reseau* stations.

Routine publications have been similar to those of last year, and included daily reports in the *Post Office Daily List* and newspapers, and monthly summaries in the *Government Gazette* and the *Tropical Agriculturist*. Copies of the latter are also supplied to the newspapers. The usual astronomical ephemeris was prepared and published in the *Ceylon Almanac*, and a table of the dates of probable first visibility of the New Moon was prepared for the Ceylon Muslim League, to appear in the same publication. The times of rising and setting of the sun and moon at Colombo were supplied daily to local newspapers.

It must be remembered that a good many observations are made here which are not published in the report and Blue Book, owing to exigencies of space and the expense of printing. Among these may be mentioned measurements of amount of cloud, surface and underground temperatures, evaporation, &c. Information on these points can be obtained on application to the Observatory.

A number of section E. (Meteorology) of the *Ceylon Journal of Science* was published in May. This contained the following papers or notes:—

- Pilot Balloon Observations at Colombo, 1922–34, by D. T. E. Dassanayake.
- The North-east Monsoon Rains of Ceylon, 1870–1934, by H. Jameson.
- The North-east Monsoon Rains of January, 1933, in Ceylon, by H. Jameson.
- World Changes in Yearly Mean Barometric Pressures, 1910–20, by H. Jameson.
- Note on the Exposure of Thermometers in Ceylon, by H. Jameson.

As in previous years, publications have been received from a large number of observatories and other organizations. While their receipt has been acknowledged individually by letter, I am glad to take this opportunity of thanking the donors collectively.



All times are in Greenwich Mean Time.

No.	Date 1936. January	P			S			L			Maximum.			End.		Amplitude. MM	Remarks.							
		H	M	S	H	M	S	H	M	S	H	M	S	H	M									
1909	2	..	00	59	47	..	—	..	—	..	01	22	27	..	01	58	..	0.4	..	—				
1910	2	..	17	34	37	..	17	40	59	..	17	48	08	..	17	51	22	..	18	29½	..	0.4	..	—
1911	2-3	eP	22	39	02	..	22	42	29	..	22	44	20	..	22	44	52	..	02	34	..	17.8	..	—
		iP	22	39	12																			
1912	4	..	01	11	04	..	01	11	52	..	—	..	01	13	07	..	01	15½	..	0.2	..	M not pronounced	—	
1913	13	..	18	14	50	..	—	..	—	..	M <sub>1</sub>	18	19	08	..	19	02½	..	1.6	..	—	—		
											M <sub>2</sub>	18	20	50	..			..	1.6	..	—	—		
1914	14	..	05	58	58	..	—	..	—	..	06	19	11	..	08	20	..	1.0	..	—	—			
1915	14	..	14	30	29	..	—	..	—	..	14	51	39	..	15	56	..	0.3	..	—	—			
1916	14-15	..	18	02	56	..	—	..	—	..	18	36	02	..	19	07½	..	0.3	..	—	—			
1917	20	..	17	04	48	..	17	11	24	..	17	19	35	..	18	23½	..	0.8	..	—	—			
											M <sub>1</sub>	17	26	20	..	18	23½	..	0.8	..	—	—		
											M <sub>2</sub>	17	29	30	..			..	0.8	..	—	—		
February																								
1918	6	..	04	09	00	..	—	..	—	..	04	23	34	..	05	22	..	0.5	..	—	—			
1919	6	..	20	48	21	..	—	..	—	..	21	21	27	..	21	35½	..	0.3	..	—	—			
1920	7	eP	09	03	25	..	09	08	59	..	09	17	19	..	09	19	57	..	11	09½	..	4.3	..	—
		iP	09	04	56																			
1921	8	..	12	22	04	..	12	30	46	..	—	..	12	47	18	..	13	22½	..	0.2	..	M not pronounced. Wave of longest period given as M	—	
1922	15	..	12	56	28	..	13	03	59	..	13	13	51	..	13	19	35	..	15	59	..	7.0	..	—
1923	21	..	06	29	57	..	—	..	—	..	06	44	43	..	07	01½	..	0.3	..	—	—			
1924	21	..	16	57	56	..	17	17	08	..	17	31	22	..	17	38	20	..	18	00	..	0.2	..	M not pronounced. Wave of longest period given as M
1925	22	..	15	45	18	..	15	55	40	..	16	14	42	..	16	19	23	..	18	29	..	6.0	..	—
1926	22	..	19	46	20	..	—	..	—	..	20	10	10	..	20	53	..	0.3	..	—	—			
1927	26	..	02	43	59	..	—	..	—	..	02	57	15	..	03	40	..	0.3	..	—	—			
1928	27	..	10	12	43	..	10	19	35	..	10	32	35	..	10	36	00	..	11	24	..	0.6	..	Time marks are faint and the times are to the nearest five seconds only, except for P
1929	28	..	16	23	53	..	16	28	05	..	16	32	56	..	16	37	54	..	17	05½	..	0.4	..	—
March																								
1930	1	..	10	40	55	..	10	44	30	..	10	53	20	..	10	55	20	..	12	22	..	2.5	..	—
1931	2	..	03	29	54	..	03	38	47	..	03	54	35	..	04	05	55	..	05	14½	..	1.0	..	—
1932	17	..	19	53	50	..	19	57	26	..	19	58	36	..	20	02	38	..	21	30	..	0.5	..	—
1933	18	..	22	27	46	..	22	31	36	..	22	33	10	..	22	35	34	..	23	23	..	0.2	..	—
1934	21	..	01	57	51	..	02	02	36	..	02	03	23	..	02	07	56	..	03	40	..	2.7	..	—
1935	22	..	12	28	09	..	12	38	05	..	—	..	13	11	19	..	14	12½	..	0.2	..	M not pronounced, the wave of the longest period given as M	—	
April																								
1936	1	eP	02	17	42	..	02	24	35	..	02	32	16	..	02	35	13?	..	04	31	..	(64)?	..	Amplitude given to the nearest mm, as part of the maximum wave is off the sheet
		iP	02	17	53																			
1937	1	eP	20	16	01	..	20	26	07	..	20	36	07	..	20	41	35	..	22	05½	..	1.5	..	—
		iP	20	19	26																			
1938	2	eP	06	27	54	..	06	30	54	..	06	38	26	..	06	38	34	..	08	09	..	0.5	..	At every phase there is a slight shift towards the east, which is about 1 mm at maximum phase
		iP	06	28	17																			
1939	9	..	16	14	55	..	—	..	16	25	28	..	16	26	13	..	17	52	..	0.6	..	—	—	
1940	12	..	21	00	45	..	21	08	39	..	21	22	14	..	21	29	39	..	23	09½	..	1.5	..	—
1941	19	..	05	19	13	..	05	29	05	..	05	50	00	..	05	52	58	..	Lost	..	9.5	..	End lost in the beginning of the following shock	
1942	19	..	09	07	07	..	09	10	17	..	09	11	13	..	(09 11 55)	..	—	..	15.5	..	The trace begins to be faint about 09.12. M is given to the nearest 5 seconds, and is taken within the discernible portion of the trace. Possibly the true M is a couple of minutes later.	—	—	
1943	20	..	18	07	49	..	—	..	—	..	18	19	19	..	19	06	..	0.4	..	—	—			
1944	28	..	05	51	16	..	06	01	36	..	—	..	—	..	07	23½	..	—	..	The light spot has been centred about the time of maximum phase, which is probably masked by the consequent artificial movements. The amplitude in the undisturbed trace is of the order of 0.3 mm	—	—		
1945	28	..	13	44	28	..	13	51	28	..	—	..	Not pronounced	..	14	29½	..	about 0.2	..	—	—			
May																								
1946	8	..	09	17	04	..	09	22	35	..	09	26	06	..	Not pronounced	..	10	27½	..	about 0.2	..	—	—	
1947	11	eP	17	38	21	..	17	48	33	..	—	..	Not pronounced	..	19	08	..	about 0.2	..	—	—			
		iP	17	39	05																			



No.	Date 1936. May	P			S			L			Maximum.			End.		Amplitude.	Remarks.								
		H	M	S	H	M	S	H	M	S	H	M	S	H	M			MM							
1948 ..	16	..	07	12	02	..	07	17	10	..	07	22	?	..	07	23	?	..	09	06½	..	2.5	..	L and M doubtful, as the trace to faint	
1949 ..	19	..	20	57	35	..	Elusive	..	—	..	—	..	21	44	27	..	23	32½	..	1.2	..	L cannot be given definitely, for waves similar to seem to persist till about 1 minutes before M			
1950 ..	20	..	03	17	34	..	03	27	39	..	03	45	29	..	04	01	42	..	06	32½	..	1.2	..	—	
1951 ..	27	eP	06	24	05	..	06	28	05	..	—	..	06	36	37	..	—	..	18.6	..	End masked in microseisms				
1952 ..	28	iP	06	24	09	..	—	..	—	..	—	..	20	12	14	..	21	18	..	0.9	..	P approximate, as the trace is overlapping			
June																									
1953 ..	7	..	01	24	28	..	—	..	—	..	—	..	01	33	34	..	01	51	..	0.3	..	—	..	—	
1954 ..	9	..	16	41	09	..	16	45	02	..	16	46	55	..	16	48	51	..	—	..	1.2	..	End masked by microseisms		
1955 ..	10	..	03	34	34	..	03	39	50	..	03	43	25	..	03	48	15	..	—	..	1.1	..	End masked by microseisms		
1956 ..	10	..	08	34	48	..	08	43	57	..	08	50	07	..	09	02	02	..	—	..	0.9	..	End masked by microseisms		
1957 ..	10	..	17	21	05	..	—	..	—	..	—	..	17	31	13	..	17	51½	..	0.3	..	—	..	—	
1958 ..	11	..	09	53	36	..	—	..	—	..	—	..	10	02	53	..	10	33½	..	0.3	..	—	..	—	
1959 ..	14	..	17	10	17	..	—	..	—	..	—	..	17	33	54	..	18	14	..	0.2	..	—	..	—	
1960 ..	19	..	16	44	35	..	—	..	—	..	—	..	17	01	38	..	17	27	..	0.2	..	M not very definite			
1961 ..	29	..	14	36	08	..	14	42	20	..	14	49	52	..	14	51	51	..	15	34	..	1.0	..	—	
1962 ..	30	..	15	18	43	..	15	28	39	..	15	45	58	..	15	59	30	..	19	01	..	7.5	..	—	
1963 ..	30	..	19	34	35	..	19	43	15	..	—	..	Not pro-nounced	20	27½	..	—	..	0.3	..	P possibly earlier. This is probably an aftershock of the previous shock				
July																									
1964 ..	4	..	09	01	28	..	09	05	08	..	09	10	00	..	09	11	30	..	09	53½	..	0.4	..	—	
1965 ..	5	..	19	03	37	..	19	10	19	..	19	18	46	..	19	25	29	..	20	53	..	1.3	..	—	
6-17 .. Instrument taken down for overhaul																									
1966 ..	26	..	07	56	38	..	08	10	22	..	08	48	56	..	08	55	15	..	10	00½	..	1.5	..	—	
August																									
1967 ..	1	..	06	37	10	..	—	..	—	..	—	..	06	56	02	..	10	26½	..	0.3	..	—	..	—	
1968 ..	4	..	14	19	14	..	—	..	14	30	58	..	14	35	44	..	15	09	..	0.3	..	—	..	—	
1969 ..	13	..	P20	11	05	..	20	18	32	..	20	30	45	M <sub>1</sub>	20	31	50	..	21	54	..	2.0	..	—	
		..	Pr	20	17	50	..	—	..	—	..	—	M <sub>2</sub>	20	33	00	..	—	..	2.0	..	—	..	—	
1970 ..	17	..	14	11	54	..	14	21	27	..	—	..	14	50	03	..	15	29½	..	0.2	..	—	..	—	
1971 ..	22	..	06	59	35	..	07	05	55	..	07	12	34	..	07	16	14	..	09	10	..	8.5	..	—	
1972 ..	23	..	20	50	53	..	20	52	53	..	Not definite	20	55	16	..	—	..	1.9	..	End lost in the beginning of the following shock					
1973 ..	23	..	21	15	39	..	21	18	06	..	21	19½	—	..	Not later than 21 24	—	..	40	..	Trace too faint even to give an approximate time for M. Amplitude of the order of 40 mm. End masked by microseisms					
1974 ..	24-25	..	22	43	50	..	—	..	—	..	—	..	23	00	06	..	00	02½	..	0.5	..	—	..	—	
1975 ..	29	..	22	27	06	..	22	31	26	..	22	33	58	..	22	37	56	..	—	..	0.3	..	—	..	—
September																									
1976 ..	4	..	08	15	20	..	08	28	27	..	08	50	05	..	08	53	10	..	09	29	..	0.3	..	—	
1977 ..	6	..	18	04	32	..	—	..	—	..	—	..	18	47	43	..	19	33½	..	0.4	..	—	..	—	
1978 ..	19	..	01	05	57	..	01	09	19	..	01	10	23	..	01	13	20	..	04	50½	..	45.5	..	M is given to the nearest 5 seconds, as the time marks are faint, owing to the fast movement of the light spot	
1979 ..	19	..	06	34	34	..	06	38	04	..	06	40	09	..	06	40	44	..	08	58	..	3.2	..	—	
1980 ..	25	..	13	30	42	..	—	..	—	..	—	..	14	01	02	..	14	38½	..	0.3	..	—	..	—	
October																									
1981 ..	3	..	21	58	08	..	22	04	32	..	22	13	00	..	22	16	25	..	—	..	4.9	..	—	..	—
1982 ..	5	..	00	11	55	..	—	..	—	..	—	..	00	51	22	..	—	..	0.5	..	—	..	—	..	—
1983 ..	5	..	06	14	09	..	06	22	48	..	06	29	38	..	06	32	49	..	—	..	0.3	..	—	..	—
1984 ..	5	..	09	52	51	..	09	59	33	..	10	07	45	..	10	10	35	..	—	..	7.7	..	—	..	—
1985 ..	7	..	17	24	38	..	—	..	—	..	—	..	17	29	40	..	17	52	..	0.					



## WEATHER SUMMARY, 1936.

*January.*—The rainfall was below normal over practically the whole Island. The only appreciable area showing excess was the coastal strip between Yala and Matara, but the excess there was only slight. Deficits were greatest in the low-country areas immediately to the north and north-east of the hills, where they ranged between 5 and 10 inches, and at several stations in the eastern half of the hill-country, most of which reported deficits of the same magnitude.

The dry spell which set in towards the end of the previous month lasted till the 5th, with the usual night temperatures. The minimum temperature at Nuwara Eliya reached  $29.0^{\circ}\text{F}$ . on the night of the 4th–5th, the lowest air temperature recorded there for nearly seven years. For the next few days there was slight or moderate rain, mainly in the east of the Island. On the 11th the rainfall increased, particularly in the north. The barometer then fell, the gradient steepened, and weather conditions became distinctly unsettled. On the 12th there was widespread rain, particularly heavy on or near the eastern slopes of the hills. The rain continued widespread, and heavy in places, for the next two days, with irregular barometric gradients. On the 15th another dry spell set in, with low minimum temperatures, but only lasted till the 19th, when the rainfall again increased. For the next few days the rain was widespread, and fairly heavy in places, particularly near the hills, but after the 23rd it was mainly reported from the south-west, as the result of local thunderstorms. On the 26th another dry spell set in, lasting till the 30th, when the rainfall increased slightly.

*February.*—The rainfall was on the whole above normal. Excesses and deficits were somewhat irregularly grouped. The extreme north of the Island was generally in deficit, as were also the western coastal districts from Jaffna down to Chilaw. Other districts reporting deficits were those between Colombo and Kurunegala, and those in the extreme south-east of the Island, while many stations up-country were also below average. Excess was most marked in the foothills adjoining the main hill-masses, in the adjoining low-country, and in the districts between Matara and Deniyaya.

During the first week of February rain continued fairly widespread, and moderately heavy in places, as the result of local thunderstorms. It then fell off, and was now mainly confined to the neighbourhood of the hills. From the 15th to the 22nd very little rain was reported anywhere. The rainfall then again increased, as the result of local thunderstorms, and was widespread and fairly heavy on the 25th and 26th. At the end of the month a dry spell set in, with low night temperatures, particularly up-country.

There were three reports of hail-storms during the month; on the 1st, at Andiyamalatenna, near Adam's Peak; on the 13th, at Dabar estate; and on the 25th, at Holmwood estate.

*March.*—The rainfall this month was on the whole above normal. The principal districts reporting deficits were in the extreme south, and in the low-country to the west of the main hill-masses. Several stations up-country also reported slight deficits. Excess was most marked in the districts between Kurunegala and Anuradhapura, where many stations were over 10 inches above normal.

The dry spell which set in at the end of February continued for the first few days of March. Low night temperatures were experienced till the 3rd, particularly up-country, ground frost being reported at Nuwara Eliya on the nights of the 1st–2nd and 2nd–3rd. After this the rainfall increased, and widespread rain, moderately heavy in many places, was reported for the 4th and 5th, mainly as the result of evening thunderstorms. Thunderstorms continued to be fairly frequent during the remainder of the month, the resulting rains being heaviest and most widespread on the 8th–10th, 19th–21st, 26th, 29th–31st.

*April.*—The rainfall was below normal throughout the Island, only a very few stations reporting any excess. The greatest deficits were recorded by a few stations in Sabaragamuwa, while practically the whole of the western low-country from Galle to Anuradhapura and a large portion of the hills had deficits between 5 and 10 inches. The Jaffna Peninsula and the eastern and southern coastal districts had the smallest deficits.

The widespread rain towards the end of March gradually decreased, and a dry spell set in on the 6th and ended about the 10th, when there was again rain in the southern half of the Island. This was fairly heavy and widespread on the 13th–15th, and lasted till the 20th. Another dry spell with unusually warm nights set in on the 22nd and continued till about the end of the month. Thunderstorm activity was in evidence during the first three weeks and the rains were mainly due to this.

*May.*—The rainfall was above normal in the hills, and in the south and south-west, excesses being unusually heavy over a large area. Many places on the western slopes of the hills, and in the south-western low-country, were more than 20 inches above their average for May, and some were over 30 inches above. The greatest excess above normal was 40.45 inches, at Nilloomally estate. A large number of rain-gauge stations, chiefly in the south-west, reported monthly totals of over 40 inches, the highest being 59.12 inches, at Kenilworth estate, while totals of over 50 inches were also reported from Carney estate, Watawala, Norton Bridge, Maliboda, and Theydon Bois estates. For some of the stations in the south-west of Ceylon this was the wettest May on record.

A majority of the stations in the northern half of the Island, and in the country between the hills and the east coast, were below normal, most of these, except in the districts nearest the hills, reporting monthly totals of less than 2 inches.

185 daily falls of 5 inches or more were reported, chiefly for the 13th, 14th, 18th, 19th, 20th, 22nd, 23rd, 24th, and 31st. Of these, 23 were over 10 inches, the highest being 16.24 inches, at Ratmalana aerodrome, and 15.10 inches, at Hanwella Resthouse, both falls being for the 24 hours ending on the morning of the 19th.

Very little rain fell during the first three days of May. From the 4th weather conditions changed, and local afternoon or evening thunderstorms were common, the ensuing rain being generally heaviest in the hills and the south-west of the Island. It was particularly heavy on the 13th and 14th. From the 14th or 15th the barometric gradient seemed to become more noticeably south-westerly over Ceylon, and on the 18th and 19th there were unusually heavy rains in the south-west of the Island. The gradient then became irregular, and suggested the formation of a shallow low near Ceylon. On the 20th there was again unusually heavy rain in the south-west, and weather conditions, both on land and at sea, suggested that the monsoon was setting in. On the 21st the rain decreased, but between the 22nd and the 24th there were again many very heavy falls in the south-west, while conditions at sea near Ceylon continued rough. The heavy rains in the Kelani Valley, between the 18th and the 24th, were responsible for a major flood in the Kelani at Colombo. From the 25th to the 30th the monsoon rains decreased, though they were still fairly heavy, but on the 31st there was again unusually heavy widespread rain in the south-west of the Island.

Temperatures generally showed no marked deviations from normal. In the hills, however, day temperatures were generally below normal, and night temperatures a little above. Day humidities were generally above normal, particularly up-country, while night humidities were on the whole about normal, except in the hills, where they were above average. Cloud was generally above average. Barometric pressure was appreciably below normal. Winds were generally above normal strength along the south-west coast, and about normal elsewhere, while their direction was mainly south-westerly.



*June.*—The rainfall was nearly everywhere below normal. Excess was mainly reported from stations along the west coast between Chilaw and Mannar, and along the east and south-east coasts between Batticaloa and Hambantota, but this excess was only small. Deficits were most marked on the lower south-western slopes of the hills, where the rainfall is usually heaviest this month, and in the low-country adjoining. North of the Mannar-Trincomalee line, very few stations reported any rain at all during the month.

The barometric gradient and the wind were consistently monsoonal during the month, while the rain was mainly confined to the south-west of Ceylon. During the first four days of the month it continued to be widespread in these districts, but was not particularly heavy. It then eased off, and not much rain was reported till the 14th. Between that day and the 15th the rain was widespread in the south-west, and fairly heavy in places. It then decreased, but increased again from the 20th, while fairly heavy widespread rain was reported in the south-west of Ceylon on the last two days of the month.

A hailstorm was reported, both from Hakgala and Blackpool, near Nuwara Eliya, on the 7th.

*July.*—The rainfall was generally above normal on the western and south-eastern slopes of the hills, in the extreme north, and in the north-east of the Island. Elsewhere it was generally below normal, though an appreciable number of stations in these districts also showed excess. Excess was most marked in or near the Ginigathena Pass. Deficits were greatest in the Western and Southern Provinces (except near Galle, where excess was reported) and in the districts between Matale and Maho. Most stations in the districts near Puttalam reported no rain at all during the month.

As regards wind and barometric pressure, conditions continued consistently monsoonal during the month. There was fairly heavy rain in the south-west of Ceylon during the first four days of July. The rain then decreased, and very little was recorded till the 11th. On that day some heavy falls were recorded, chiefly in the south-west, while monsoon rains continued fairly heavy, with occasional local thunderstorms on the other side of Ceylon, till the 19th. From the 20th till the 25th rain was again light. On the 26th it increased in the south-west, while on the 27th and 28th it was fairly widespread over the Island, and on the 27th it was particularly heavy in the south-west of Ceylon. During the last few days of July there was very little rain.

*August.*—The rainfall was below normal over practically the whole Island, only a few stations, mainly near Trincomalee, south-west of Vavuniya, and near Pottuvil, reporting excess. Deficits were most marked on the south-western slopes of the hills, where the rainfall is usually heaviest at this season. A number of stations, mainly in the northern half of the Island, and particularly on or near the coast between Chilaw and Mannar, reported no rain at all during the month.

As regards barometric pressure and wind, conditions continued to be of the usual monsoon type throughout the month. The rains were generally light, and mainly confined to the south-west of Ceylon, with occasional local thunderstorms elsewhere. On the 14th and 15th, however, there was some fairly heavy monsoon rain, and on the 21st there was heavy rain in the Kelani Valley.

A hailstorm was reported at Hakgala on the 21st.

*September.*—The rainfall was generally above normal. Deficits were, however, reported from a number of stations, chiefly in the Jaffna Peninsula, in the coastal districts to the south of Batticaloa, in the districts near Galle, and on the western slopes of the central hills. Excess was most marked on and near the steep southern edge of the central hills and in the Nitre Cave district.

For the first part of the month, the barometric gradient and the wind were of the usual south-westerly monsoon type, and there was only light rain, mainly confined to the south-west of the Island. From the 9th, local afternoon or evening thunderstorms became more frequent, and the resulting rains were now more widespread over the Island. About the middle of the month, the south-westerly gradient disappeared, the barometric gradients now becoming weak, while local thunderstorms continued to give fairly widespread rain, often heavy in places. About the 25th the pressure fell considerably, and south-west monsoon conditions set in again over the Island. The ensuing rains, though fairly widespread, were heaviest in the south-west of Ceylon, and were particularly heavy there on the 26th. Weather conditions continued unsettled near Ceylon until the end of the month, with fairly strong south-westerly winds, while a depression which formed in the Bay of Bengal about the 28th, probably as a result of the advance of the monsoon into the Bay, helped to maintain these conditions.

Eight reports of hailstorms were received, all between the 11th and the 16th. These were from Hakgala, Hawa Eliya (Nuwara Eliya), and West Haputale estate, on the 11th, from Hawa Eliya and Anuradhapura, on the 12th, from Holmwood and Blackwood, on the 13th, and from Diyatalawa, on the 16th.

*October.*—The rainfall was generally below normal, excess being reported by only a few stations, chiefly along or near the south coast between Matara and Hambantota. Deficits were generally greatest on or near the western slopes of the hills, and in the Jaffna Peninsula. The heaviest rains for the month were reported from the low-country districts adjoining the western slopes of the hills.

The unsettled conditions which were affecting the weather over Ceylon at the end of September disappeared at the close of the month, and for the first week of October there was only light rain, mainly confined to the south-west of the Island. The barometric gradient continued moderate south-westerly, and moderate south-westerly winds prevailed. The gradient then weakened, and local afternoon or evening thunderstorms prevailed from the 7th. This type of weather continued over the greater part of the month, giving moderate, and sometimes locally heavy falls.

From the 25th a depression, forming in the Bay of Bengal, caused slightly unsettled conditions over Ceylon. The gradient became south-westerly, and the rain, though widespread over the Island, was generally only moderate in amount, except in the south-west of the Island, where it was fairly heavy. These conditions lasted till the 28th, when the depression crossed the Indian coast. Weather conditions still continued slightly unsettled, however, owing to a local disturbance north of Ceylon, and there was extensive fairly heavy rain in or near the hills on the 29th.

Hail was reported, both from Diyatalawa and Bandarawela, on the 11th.

*November.*—The rainfall was below normal over the greater part of the Island, excess being generally reported only from the south-western corner of Ceylon, from a coastal strip between Colombo and Mannar, and from a few stations south and south-west of Batticaloa. There was well marked excess near a line running northwards from Galle to Avissawella, Batapola reporting an excess of 21·80 inches, Hanwella one of 18·41 inches, and Baddegama one of 16·49 inches, while several other stations were over 10 inches in excess. Elsewhere excess was, on the whole, only small. Deficits were most marked on the north-western, northern, eastern, and south-eastern slopes of the hills, in the adjoining low-country districts, and in the Jaffna Peninsula.

The weather in Ceylon during November was chiefly of the inter-monsoon type, with local afternoon or evening thunderstorms. During the first ten days of the month disturbances in the Bay of Bengal and in the Arabian Sea also affected the weather over the Island. From the 22nd signs of the north-east monsoon began to appear, while local thunderstorm rains continued in the lee of the hills.

A hailstorm was reported from Diyatalawa on the 11th.



*December.*—The rainfall was above normal, except in the extreme south, where, however, deficits were generally small. Excess was most marked in the Eastern Province, in the eastern half of the North-Central Province, and on the eastern slopes of the central hills.

119 daily totals of at least 5 inches were reported during the month, a large majority of these having fallen on the 14th. The highest falls were 11·19 inches at Batticaloa and 10·00 on Uva estate, both on the 14th.

The weather was chiefly of the north-east monsoon type. During the first week rain was generally light or moderate and scattered. In the second week there was increased and more widespread rainfall over the Island, culminating in very heavy precipitation on the 14th. On the following two days also, rain was heavy, particularly on the north-east side. From the 17th to the 22nd, rain was widespread but generally light. Conditions were fairly settled from the 23rd to the 28th, when practically no rain was recorded. As the result of a deep depression of very small extent to the east of Ceylon, the weather became unsettled, and rain was heavy and widespread on the 29th. This depression crossed over the Island very quickly, but continued to give moderate and fairly general rain in the last two days of the month.

*Year.*—The rainfall was, on the whole, about normal during the year. Excesses and deficits were irregularly distributed, the latter predominating in the north, the former in the south.

Colombo, June 22, 1937.

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Superintendent.