

THE COLOMBO OBSERVATORY.

1937



International
Seismological
Centre

REPORT OF THE ACTING SUPERINTENDENT OF THE OBSERVATORY.

TABLE OF CONTENTS.

	PAGE		PAGE
Administration	1	Weather Summary	6
Time	1	Meteorological Tables	9
Meteorological	1	Tables of Statistics as published in the Ceylon	
Miscellaneous	3	Blue Book	Y1-Y12
Publications	3	Maps and Diagrams.	
Seismograph	4		

ADMINISTRATION.

Staff.—I returned to Ceylon on September 4, after an absence of two years on study leave spent at the Imperial College of Science and Technology, London. On September 15, Dr. H. Jameson, the Superintendent, proceeded on vacation leave and I took charge as Acting Superintendent, Mr. A. P. Kandasamy acting as Assistant Superintendent.

There were two changes in the clerical staff. Messrs. K. Vairamuttu and P. Rasanayakam were transferred to outstations, and their places at the Observatory were taken by Messrs. C. Kumaranayaka and K. S. Ponnampalam.

Buildings.—A garage of corrugated iron sheeting to accommodate three cars was added in January. A new lavatory for the use of clerks was completed in March.

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 Fournier 72 was very satisfactory during the year. The cord carrying its driving weight snapped on November 27. The opportunity was taken to give the clock an overhaul, and it was restarted with a fresh cord on December 1. The other clocks, whose rates are 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 09.00, Ceylon Standard Time (0330 G.M.T.) on all days, inclusive of Sundays and public holidays.

There were no failures during the year. The only previous years when 100 per cent. success was attained were 1930 and 1933.

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 to produce so satisfactory a result.

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 and since August also at 20.00, the chimes and strike of this clock are included regularly in the broadcasting programme as a time signal and precede the news bulletins commencing at these hours. In view of the popularity of these signals, opportunity is now taken to include the chimes of the town clock at other hours as well, whenever possible.

The error of the clock is noted every day at noon. The majority of these checks gave errors of three seconds or less, the largest error being 12 seconds on one day. On November 24 and 25, the clock was found several minutes slow and, as its behaviour was found to be erratic, the chimes were not broadcast on these days. The trouble was traced to flying ants getting into the wheels of the clock and interfering with their working.

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., and the evening one from 18.57–19.00 (1327–1330, G.M.T.) on 500 kc/s (600 metres), C. W. There is no curtailment on Sundays and 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 1937 there were 726 successful signals, out of a possible 730. Three of these failures were due to defects in the apparatus at the Wireless Station, while in the last case the signal was probably correct, but was cancelled as a fault in the receiving set at the Observatory prevented it from being checked.

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 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. From March till September, Colombo and Nuwara Eliya sent also 17 hours observations to India, but since September 6, the routine 15½ hours observations at these stations were telegraphed instead. The observations at 17 hours are used, in conjunction with values derived from the Colombo autograms, in preparing the evening weather report for issue from Colombo.

Mention must also be made of the climatological stations maintained by the Rubber Research Scheme at Dartonfield, Agalawatta; by the Tea Research Institute at St. Coomb's, Talawakele, and at Passara; and by the Coconut Research Scheme at Bandirippuwa. 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 438 stations, an appreciable increase since the previous year. 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.

Altogether 34 new stations were started during the year, while the only station to be discontinued was Potuwewa, with 8 years' records.

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 (Poonagala) for his weekly barograms; Mr. E. E. Megget (Detenagalla) for his sunshine charts and graphs, wind observations and anemograms, humidity and temperature graphs; Messrs. Ross Wyllie (Oakwell) and A. Pearson (Horakele) for sunshine charts; Mr. G. R. B. Williams (Hope) for wind observations; Mr. C. Erskine (Ben Hope) for post cards concerning heavy rain; Messrs. G. Huntley (Vincit), J. M. Hodgson (Theydon Bois), G. P. Kelly (Nilloomally), and F. A. Bourke and L. P. Smith (Campion) 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 and R. Gordon Lallyett (Eheliyagoda), H. A. McLaren and H. A. F. McLaren (Geekiyanakanda), A. B. Gault (St. Martin's), M. H. Villiers (Panilkanda), F. A. Bourke and L. P. Smith (Campion), B. Gordon Graham (Dunedin), R. Neville Rolfe (Maliboda), H. C. Rodale (Yataderiya) and A. J. McKee and L. Annesley (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 surface observations at Colombo, the morning pilot balloon observations at Colombo and, since the beginning of November, also at Mannar, and such ships' messages as were available. Other sources of information were the telegram from Pamban, and the figures from outstations 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 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. Copies of the Indian messages are received regularly at Colombo, and use is made of any relevant parts.

Mention was made in last year's report of Indian and Ceylon Fleet Synoptic Messages broadcast from Matara. As a result of discussions between the Naval authorities and the Ceylon and Indian Meteorological Services, commencing from November 1, these messages, consisting of the 8 hours observations from a number of Indian and Ceylon coastal stations and a selection of ships' reports, were broadcast from the Naval Wireless Station at Bombay Fort at 11.30 A.M. and repeated from Matara at noon. An inference for the Ceylon Area was broadcast from Matara at 3.24 P.M.

Copies of the Indian Synoptic Message were received at Colombo till the end of October. By the courtesy of the Naval Wireless Station at Matara, broadcasts from the American Naval Wireless Station at Cavite, Philippine Islands, of meteorological observations from an extensive selection of stations in the far East, included approximately between longitudes 100° and 150°E and latitudes 0° to 50°N, were received from June till October. During the earlier part of the year, Matara frequently received broadcasts of meteorological observations from stations in Italian Somaliland and Malaya. The additional information thus obtained enabled the preparation at the Observatory of synoptic charts over a considerably large area.

In accordance with resolutions of the Warsaw and Hong Kong Meteorological Conferences, commencing from June, monthly climatological data for four Ceylon stations, Colombo, Trincomalee, Hambantota, and Nuwara Eliya, were broadcast from Matara on the third of each month, at noon. If the third fell on a Sunday or public holiday, the broadcast was repeated on the fourth.

The number of ships from which telegrams were received during the year was 372, which is appreciably higher than the figure for the previous year (324). The number of telegrams received was also substantially higher, 3,929, as against 3,244 in 1936, an increase of 685. 88 telegrams were received from ss. Gneisenau, 72 from ss. Baloran, and 71 from ss. Mashobra, while others from whom 40 or more were received were ss. Badarpur, Marnix van St. Aldegonde, H. M. S. Endeavour, ss. Johan van Oldenbarnevelt, H. M. S. Investigator, ss. Potsdam, Jalatarang, Rahmani, and Masimpur. 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, since September, also at 3.30 P.M., and from Trincomalee, Hambantota, and, during certain seasons, from Batticaloa at 8 A.M. and 5 P.M., as a matter of daily routine, while extra storm warning telegrams are also sent at various times, when asked for by the Indian Meteorological Department. The number of storm telegrams sent in 1937 to Poona were:—Colombo, 10; Nuwara Eliya, 3; Trincomalee, 5; Hambantota, 7; and to Calcutta:—Colombo, 44; Trincomalee, 45; Hambantota, 28; Batticaloa, 34.

The results of the morning pilot balloon flight at Colombo and, since November, those at Mannar were telegraphed to Poona regularly. The morning observation at Colombo was also wired to Rangoon since June 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 until the new arrangements came into force on November 1 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.

Meteorological Conference.—As mentioned in last year's report, the Ceylon Meteorological Service was represented by Dr. H. Jameson, the Superintendent, at the Conference of the Far Eastern Meteorological Services held at Hong Kong in January. A report on the Conference, including proposals for the improvement of the Meteorological Service in Ceylon, to enable it to cope with the increased demands that aviation will make on it in the future, was forwarded to Government and is now under consideration.

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 Assistant Master Attendant, Galle, the Fishery Mudaliyar, Colombo, the Railway, and the Office of the Flood Scheme.

Information to Artillery.—Surface meteorological readings and occasional upper wind information at Colombo were supplied to the Royal Artillery and the Ceylon Garrison Artillery, for use during artillery practice.

Upper-Air Work.—Regular pilot balloon observations were only made at Colombo until this year. The establishment of a pilot-balloon station at Mannar at the end of October marks a further stage in the development of this work. As a temporary measure the station at Mannar is staffed at present by two Third Grade Surveyors, Messrs. C. Rasakariar and C. S. Veeravale, who have been specially trained in this work at the Observatory.

Rubber pilot balloons were in use at both stations, the tail method of observation being used. The quality of the balloons received was fairly satisfactory.

At Colombo, the total number of flights was 633, or 16 more than last year. The number reaching 5 kilometres was 132, of which 53 reached 7 kilometres, and 11 reached 10 kilometres, the highest altitude reached being 15.8 kilometres.

At Mannar, 108 flights were observed before the end of the year. Of these, only 9 reached a height of 5 kilometres, the highest altitude attained being 6.1 kilometres.

Vertical Temperature Gradient.—The four thermographs at the Welikada Wireless Station were in continuous operation till May 17, when the ground thermograph was withdrawn as defective. From August 30 to October 18 all instruments were out of action, as an aircraft warning light was being installed at the top of the mast. On October 19, two thermographs were put up, on November 2 a third was added, while on November 23 the last was included. Since then, till the end of the year, the full complement of instruments was in action.

Madras-Colombo Air Service.—With the inauguration of the Empire Air Mail Scheme early next year, an extension Air Service is expected to operate between Madras and Colombo. Special arrangements have been completed for supplying to the pilots of this service the necessary meteorological information in respect of the portion of the route lying over Ceylon.

MISCELLANEOUS.

Kelani Flood Forecasts.—On May 26, warning was given of the probability of a minor flood, and a further warning was given on May 27 of a major flood at Colombo. The river passed minor flood level (5 feet at Nagalagam Street) on the afternoon of the 27th, and was computed to reach between $7\frac{1}{2}$ and 8 feet on the morning of the 29th. It rose much more than was expected, however, and was $9\frac{1}{2}$ feet on the morning of the 29th, reaching a maximum height of 10 feet 6 inches on the evening of the 29th, after which it began to fall slowly. The discrepancy between the computed and the actual heights of the river was investigated. The evidence of the monthly reporting stations showed that a partial explanation was to be found in the fact that the mean rainfall recorded over some of the catchment areas was appreciably higher than was indicated by the figures from the daily reporting rainfall stations alone. The remaining discrepancy may perhaps be accounted for by the error caused by raingauges overflowing.

On August 7, warning was issued of the possibility of a minor flood at Colombo on the 9th. The maximum height reached, however, was over 2 feet less than the predicted height, the river just failing to reach 3 feet.

On October 1, warning was issued of the probability of the Kelani river reaching 6 feet at Nagalagam street. As a result of further rains the possibility of a peak level of $6\frac{1}{2}$ feet was announced the next day. The actual maximum height reached was 6 feet $0\frac{1}{2}$ inches, in the early morning of the 4th.

Calver Equatorial Reflector.—This instrument was transferred to the Physics Department of the University College in September.

Magnetic Variation.—An officer from H. M. S. Stork, survey ship of the East Indies Squadron, took magnetic bearings of two distant points from a spot in the Observatory compound, from which the true bearings of the same points were known. The magnetic variation obtained was $3^{\circ} 11' W$, in good agreement with the value of $3^{\circ} 12' W$, determined by Dr. Jameson the previous year.

PUBLICATIONS.

The present report is on the same lines as last year. The average monthly totals of those rainfall stations whose records reached a length of 10 years in 1937 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 September. This contained the following papers or notes :—

Constant Frequency Graphs for Heavy Rainfall at Colombo and Labugama, by H. Jameson.
The Heavy Rains of May, 1933, in Ceylon, by H. Jameson.
Tables of Saturation Deficit for Ceylon, by H. Jameson.
Underground Temperatures at Colombo Observatory, by A. P. Kandasamy.
Evaporation in Rain-gauges, by A. P. Kandasamy.
An Air-Thermometer actuated Alarm for the Milne-Shaw Seismograph, by L. A. D. I. Ekanayaka.
Pens for Pressure Anemometers, by H. Jameson.



A paper on "The Burst of the South-West Monsoon near Ceylon" by Dr. H. Jameson was published in the *Marine Observer* for April. An article on "Atmospheric humidity" by Dr. Jameson and another on "Underground temperatures at Colombo Observatory" by Mr. A. P. Kandasamy appeared in the *Tropical Agriculturist* for August and October, respectively.

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.

SEISMOGRAPH.

The Milne-Shaw seismograph was in use throughout the year. Only minor adjustments were needed. There was some loss of record, mainly due to trouble with the clocks, or accidental tilting of the mirror. The only prolonged interruption was in April, when record was lost for three days continuously, due to trouble with the focussing lens.

In the past, another cause of loss of record was the occasional running down of the accumulators used for providing the necessary illumination. After some experiments, due to Mr. L. A. D. I. Ekanayaka, Junior Technical Assistant, since August a transformer was used on the 230 volts A. C. mains for lighting the bulb. This arrangement proved quite satisfactory.

The coupling was maintained as before at the 250 magnification throughout, and measurements of period, damping ratio, and sensitivity were made about once a month.

The free period was maintained at 12 seconds.

With occasional adjustment the damping ratio remained in the neighbourhood of its mean value of 1 in 20 ; extreme values were 1 in 14 and 1 in 34.

The sensitivity was usually of the order of 60 mm. per second of arc, the extreme values during the year being 51 and 72.

The list below, of 73 earthquakes, is restricted to definite shocks, and does not contain a number of small traces that were also recorded. The regular diurnal movement of the pillar is still a definite feature of the records.

All times are in Greenwich Mean Time.

No.	Date 1937.	January	P			S			L			Maximum.			End. Amplitude.			Remarks.		
			H	M	S	H	M	S	H	M	S	H	M	S	H	M	MM			
2016 ..	4-5	..	23	05	57	..	—	..	—	..	(00 18 07)?	..	01 16½	..	0.2	..	—			
2017 ..	5	..	21	47	32	..	21	55	05	..	..	Not pro- nounced	..	22 42½	..	0.2	..	—	
2018 ..	7	..	06	22	34	..	06	31	09	..	..	Not pro- nounced	..	07 16	..	<0.2	..	—	
2019 ..	7	..	13	27	17	..	13	35	—	..	13 43	—	..	13 49 04	..	17 27½	..	32.5	..	S and L approximate only, as the trace is faint about these times, due to rapid movement of the light spot. It so happened that the seismograph was examined and the intensity of the light spot temporarily increased in order to record the maximum.
2020 ..	23	..	11	07	32	..	11	17	03	..	11 33 06	..	11 36 03	..	—	..	0.7	..	Maximum wave not free of S waves.	
2021 ..	25	..	06	46	35	..	06	57	02	..	07 15 50	..	07 29 40	..	(10 07)?	..	3.7	..	—	
February																				
2022 ..	12	..	05	03	08	..	—	..	—	..	Not pro- nounced	..	06 16	..	about 0.3	..	—	..	—	
2023 ..	21	..	07	13	55	..	07	23	14	..	07 40 20	..	07 49 10	..	12 00½	..	21.5	..	M to the nearest 5 seconds, as the time marks are indistinct owing to the rapid movement of the light spot. There is a distinct change of phase at 07h. 27m. 8s.	
2024 ..	23	..	00	59	29	..	—	..	—	..	01 36 21	..	02 48½	..	0.5	..	—	..	—	
2025 ..	25	..	20	00	05	..	20	04	00	..	—	..	20 11 16	..	20 36	..	0.2	..	—	
2026 ..	28	..	15	00	55	..	—	..	—	..	15 10 50	..	15 39	..	0.2	..	—	..	—	
March																				
2027 ..	9	..	15	59	54	..	—	..	—	..	17 24 25	..	18 05½	..	0.3	..	—	..	—	
2028 ..	12	..	09	28	44	(S?)	09	38	32	..	?	..	09 52 39	..	12 13½	..	2.0	..	From 09h. 32m. till the time given for S, the waves are more like L waves with a Max. at 09h. 38m. 13s. Perhaps two shocks, one with P at 09h. 28m. 44s. and the other with M at 09h. 52m. 39s., have been superimposed on one another.	
2029 ..	14	..	P 12 15 32	..	Elusive	(13 06.6)?	..	13 13 10	..	—	..	0.5	..	..	..	0.5	..	End lost in Microseisms.	
2030 ..	15	..	—	..	(S?)	06 05 57	..	—	..	06 11 32	..	—	..	0.3	..	..	..	P lost in microseisms.	
2031 ..	16	..	15	53	24	..	15	59	59	..	16 06 01	..	16 11 22	..	16 46½	..	0.7	..	—	
2032 ..	21	..	16	17	05	..	16	21	15	..	?	..	16 28 54	..	17 12	..	1.0	..	—	
2033 ..	26	..	09	54	07	..	09	58	42	..	10 04 09	..	10 04 54	..	11 46½	..	2.5	..	—	
April																				
2034 ..	5	..	07	06	01	..	07	13	26	..	07 24 51	..	07 28 07	..	—	..	3.5	..	—	
2035 ..	7	..	18	44	17	..	—	..	—	..	18 58 34	..	19 26½	..	0.2	..	—	..	—	
2036 ..	16	..	—	..	—	..	—	..	—	..	(04 06 13)?	..	06 25	..	3.1	..	The record is lost till 04h. 05m. 30s. Time given for M is that of the max. of the recorded long waves.			

No.	Date 1937.	P			S			L			Maximum.			End. Amplitude.			Remarks.					
		H	M	S	H	M	S	H	M	S	H	M	S	H	M	MM						
2037	9	..	15	07	10	..	—	..	—	..	..	15	35	00	..	16	15	0.3	Times are to the nearest 5 seconds as the time marks are indistinct.	
2038	10	..	P 15	42	38	..	—	..	—	..	..	15	52	31	..	16	03	0.2		
2039	12	..	(PR?) 15	48	02	..	03	00	20	..	03	03	50	..	03	04	10	0.8	Times are to the nearest 5 seconds as the time marks are absent between 02h. 19m. and 03h. 07½m.			
		..	02	55	50	..	—	..	—	..	..	—	..	—	..	—	..	—		
2040	12	..	13	12	49	..	13	16	29	..	13	17	27	..	13	22	52	..				
2041	28	..	20	05	34	..	—	..	—	..	..	20	13	31	..	20	31½	0.7		
June																						
2042	14	..	13	21	03	..	—	..	—	..	..	14	06	59	..	14	44½	0.2		
2043	21	..	15	33	02	..	S Elusive	..	16	35	49	..	16	41	45	..	—	11.2	M to the nearest 5 seconds, as the time marks are indistinct owing to the faintness of trace, due to rapid movement of light spot. End lost in Microseisms.			
							(SR?) 15	58	19													
July																						
2044	1	..	11	53	34	..	—	..	11	57	53	..	12	00	15	..	13	26	6.4	S cannot be picked out.		
2045	2	..	02	49	50	..	03	00	54	..	—	..	03	29	35	..	03	54½	0.4	P is uncertain.		
2046	10	..	20	57	50	..	—	..	—	..	..	21	11	06	..	21	27½	0.4		
2047	12	..	iP 00	06	16	..	—	..	—	..	..	00	14	02	..	lost	..	1.0		
2048	14	..	22	47	14	..	—	..	—	..	..	23	10	39	..	—	..	0.3		
2049	19	..	19	54	59	..	—	..	—	..	..	20	19	37	..	21	42	1.2		
2050	22	..	17	28	34	..	Elusive	..	18	00	01	..	18	06.6	..	20	26	11.3	M to the nearest tenth of a minute, as the trace is faint due to rapid movement of light spot.			
2051	26	..	04	06	58	..	—	..	05	05	36	..	05	16	43	..	05	48	0.5	M not pronounced.		
2052	26	..	20	07	08	..	20	15	35	..	20	28	04	..	20	40	20	..	0.7			
2053	31	..	P 20	43	50	..	20	50	13	..	21	01	10	..	21	04	00	..	2.0			
			PR	20	45	34																
August																						
2054	1	..	10	55	34	..	10	58	56	..	11	04	39	..	11	09	20	..	0.9			
2055	4-5	..	iP 23	38	49	..	—	..	—	..	..	23	44	20	..	00	30	..	0.8	
2056	20	..	06	43	35	..	—	..	06	52	04	..	06	52	50	..	08	16	0.6			
2057	20	..	12	07	10	..	12	13	29	..	12	19	50	..	12	32.3	..	15	47½	25.7	M to the nearest tenth of a minute as the time marks are indistinct, owing to faintness of trace due to rapid movement of light spot.	
2058	31	..	P 14	20	33	..	14	24	58	..	14	33	46	..	14	35	37	..	1.8			
			(PR?) 14	22	38																	
September																						
2059	1	..	08	56	52	..	09	06	05	..	09	27	22	..	09	38	59	..	0.4			
2060	3	..	19	01	21	..	19	11	39	..	19	26	07	..	Not pronounced	..	20	26½	about 0.6			
2061	8	..	01	04	26	..	01	13	09	..	—	..	Not pronounced	..	Not pronounced	..	01	59	0.6			
2062	9-10	..	23	42	34	..	23	46	49	..	—	..	Not pronounced	..	Not pronounced	..	00	07	0.2 approx.			
2063	15	..	12	39	52	..	—	..	—	..	..	Not pronounced	..	Not pronounced	..	13.55½	..	about 0.4		
2064	23	..	13	17	39	..	13	27	27	..	13	37	09	..	13	49	02	..	2.5			
2065	27	..	09	02	04	..	09	07	25	..	09	12	55	..	09	17	01	..	2.2			
October																						
2066	6	..	17	16	30	..	17	26	09	..	17	35	26	..	17	47	48	..	0.4	M not pronounced.		
2067	17	..	05	05	51	..	—	..	05	18	29	..	Not pronounced	..	Not pronounced	..	05	44½	0.5			
2068	20	..	01	33	21	..	01	36	18	..	01	40	50	..	01	40	58	..	1.0			
2069	22	..	16	18	44	..	16	22	23	..	16	24	15	..	Not pronounced	..	17	13½	0.5			
2070	29	..	eP 07	32	31	..	—	..	—	..	..	07	43	26	..	08	25½	..	1.1	
November																						
2071	7	..	19	19	09	..	—	..	—	..	..	19	23	07	..	19	32	..	0.7	
2072	13	..	12	02	51	..	12	08	06	..	12	10	51	..	Time indefinite	..	12	19½	0.3			
2073	14	..	11	04	08	..	11	08	15	..	11	10	17	..	11	15	40	..	40.4			
			SR	11	08	54																
2074	15	..	21	43	21	..	21	48	01	..	21	51	21	..	21	52	53	..	21.6			
2075	26	..	10	53	24	..	11	00	00	..	11	03	24	..	11	12½	—	..	11	27½	0.3	M not definite.
2076	28	..	05	28	33	..	05	30	05	..	05	32	55	..	05	40	05	..	09	27½	10.2	
2077	30	..	00	43	05	..	00	45	06	..	00	46	11	..	00	46	58	..	02	40	15.3	
2078	30	..	13	12	17	..	13	15	47	..	13	19	44	..	13	21	56	..	14	04½	2.5	
December																						
2079	6	..	04	44	49	..	04	53	19	..	—	..	05	16½	..	05	38	..	0.2	M not pronounced and hence to the nearest half minute.		
2080	8	..	08	40	—	..	08	45	—	..	08	55	—	..	09	00	—	..	10	20	5.0	Times are extrapolated, the time marks having failed, and hence given to the nearest 5 minutes.
2081	10	..	13	48	04	..	—	..	14	03	—	..	14	12	08	..	14	45	..	0.2	Time of L approximate.	
2082	13	..	—	—	—	..	(Between 17½h. and 20½h.)	..	—	..	—	..	—	..	—	..	—	..	4.8	Actual times of phases uncertain owing to overlapping traces.		
2083	16	..	08	30	29	..	(S?) 08	42	20	..	—	..	08	54	25	..	09	01½	..	0.2	M not pronounced.	
2084	17	..	04	37	48	..	—	..	—	..	—	..	—	..	—	..	—	..	about 0.5	S, L, M and E uncertain owing to overlapping trace.		
2085	17	..	09	40	18	..	—	..	—	..	—	..	10	00	—	..	—	..	1.5	S, L, E uncertain owing to overlapping trace, M to the nearest minute only.		
2086	18	..	13	32½	—	..	13	35	50	..	13	37	43	..	13	40	05	..	14	29½	5.1	P given approximately owing to overlapping trace.
2087	23	..	13	38	02	..	Elusive	..	14	27	50	..	14	57	34	..	16	54½	..	4.9		
2088	24	..	eP 06	40	37	..	—	..	—	..	—	..	07	48	57	..	08	28	..	0.9		

WEATHER SUMMARY, 1937.

January.—The rainfall was appreciably above normal on the northern and north-eastern slopes of the hills, and in the extreme south-western corner of the Island. The excesses reported, however, rarely exceeded 5 inches, except on the north-eastern slopes of the Knuckles range, where the stations generally reported excesses of 5 to 20 inches. A few stations on the south-east coast also reported excesses of 5 to 10 inches. In the remainder of the Island excesses and deficits were both generally small, deficits predominating in the north.

During the greater part of the month the weather remained of the usual north-east monsoon type, with monsoon rains in the east and north-east of the Island, and local rains, sometimes accompanied by thunder, in the lee of the hills. There was particularly heavy widespread rain, on both sides of the hills, but particularly on their eastern and north-eastern slopes, on the 15th and 19th. About the 21st the weather changed, and a dry spell set in. Humidity was low, and there was very little rain reported, while, as a result of the increased radiation at night, night temperatures were appreciably below normal, particularly in the hills, ground frost being reported at Nuwara Eliya on several occasions. These conditions lasted until the 28th, after which conditions reverted to the usual north-east monsoon type, with increased humidity and rainfall.

February.—The rainfall was above normal over almost the whole of the southern half of the Island, except for a few stations on the northern and north-western slopes of the hills, and stations along the coast between Matara and Hambantota, which were in deficit. In the northern half of Ceylon excess and deficit approximately balanced, the only districts showing appreciable excess being those between Batticaloa and Trincomalee, and the district just south of Mannar.

The widespread rains of the last days of the preceding month continued till the 2nd, on which day the rainfall was fairly heavy. Dry weather set in on the 3rd and lasted till the 12th. On the 13th there was fairly heavy and widespread rain, as a result of thunderstorm activities. Thunderstorms continued more or less till the end of the month, but the rain was chiefly light and spasmodic. At the end of the month, another dry spell set in.

A hailstorm was reported on the 19th from Holmwood estate.

March.—The rainfall was generally below normal. Excesses and deficits were somewhat irregularly distributed, excess being most marked among the western foothills and the low-country districts immediately adjoining.

The dry spell which set in at the end of February continued for the first week in March, practically no rain being reported. The humidity was generally low, particularly up-country, and night temperatures were usually below normal. The tendency to rain then increased a little, while from the 11th till nearly the end of the month the weather was of the typically inter-monsoon type, with flat pressure gradients and local afternoon or evening thunderstorms, chiefly in the south-west of the Island. About the end of the month there were a few days with very little rain.

April.—The rainfall was on the whole below normal. There was appreciable excess in the districts just south of Batticaloa, and on or near the south-west coast, while other stations near the coast generally showed some excess. Inland and among the hills the rainfall was generally in deficit.

Weather conditions at the beginning of April were of the inter-monsoon type, with weak barometric gradients and local afternoon and evening thunderstorms. From the 9th weather conditions became slightly unsettled, and the rainfall increased. On the 13th weather conditions improved, but on the 15th a depression was reported in the Bay of Bengal, and the rainfall over Ceylon again increased. Weather conditions became more settled on the 18th, and very little rain was reported till the 24th. The barometric gradients now became more south-westerly and moderate rain was fairly widespread at first, but by the end of the month showed a tendency to concentrate in the south-west and the hills.

A hailstorm was reported near Diyatalawa on the 25th.

May.—The rainfall this month was generally above normal in the south-west of Ceylon, and below normal elsewhere. Excess was most marked in the low-country districts to the south-west of the main mountain masses. In the Jaffna Peninsula and the north-west of Ceylon, most stations reported no rain during May, while in other districts north of the Puttalam-Batticaloa line, very few stations reported monthly totals of as much as two inches.

For the first week of May there was rain, generally moderate, and mainly confined to the south-west of Ceylon. The rain was fairly heavy, however, on the 4th and 5th, particularly on the latter day. From the 7th to the 12th practically no rain was reported anywhere. The rain then increased, but was still mainly confined to the south-west of Ceylon. About the 19th the rain fell off, but increased again on the 21st. There was heavy rain in the south-west of the Island on the 25th, and further exceptionally heavy widespread rain in that part of the Island on the 26th, the latter rain being mainly responsible for a major flood in the Kelani Ganga, which reached its peak on the 29th-30th. The intensity of the rain then decreased, but it was still moderately heavy till just before the end of the month.

The barometric gradient remained consistently south-westerly during the month, and winds were generally westerly and above normal strength.

June.—The rainfall was everywhere below normal. Deficits below average were greatest on the lower western slopes of the hills, and in the low-country immediately adjoining. For many stations in the south-west of Ceylon this was the driest, or nearly the driest, June on record. The low monsoon rainfall in the wet zone must, however, have been compensated to some extent by its even distribution, the number of days with rain being, in general, only a little below normal.

The weather, as regards barometric gradient and wind, was of the usual monsoon type during June, both wind and gradient, however, being generally a little stronger than usual. The rain was mainly confined to the south-west of Ceylon, and was usually only light or moderate. At the end of the month, however, the weather became slightly unsettled.

July.—The rainfall was generally above normal in the south-west of Ceylon and below normal elsewhere. Excess was most marked on the south-west slopes of the hills. North of the Batticaloa-Chilaw line, no station reported any excess. No rain was reported during the month at most of the stations in the Northern and North-Central Provinces and the northern part of the Eastern Province.

The weather, as regards barometric gradient and wind, was of the usual monsoon type during July. The rain was mainly confined to the south-west of Ceylon, and was typically monsoonal in that area. It was fairly evenly distributed throughout the first three weeks, but decreased somewhat towards the end of the month. Rain was particularly heavy on the 17th, and fairly heavy on the 1st, 4th and 6th.

August.—The rainfall was generally below normal in the Western, Southern, and Northern Provinces and in the Batticaloa and Nuwara Eliya Districts. Elsewhere the rainfall was generally above normal.

The month started with practically no rain, but from the 3rd to the 6th rain was fairly heavy. It was confined to the south-west on the 3rd and 4th while on the 5th and 6th it became widespread over the Island, chiefly due to thunderstorm activity. From the 7th the rain decreased and became patchy, only a few stations reporting any rain. On the 21st the rain was again widespread, but chiefly light. During the last week of the month, thunderstorm activity was responsible for widespread rain, which was heaviest on the 29th and 31st.

A sand-storm was experienced at Mannar at the beginning of the month, while hail was reported from Badulla on the 5th.

September.—The rainfall was generally below normal in the Southern, Central, and North-Central Provinces. It was in deficit too in parts of Sabaragamuwa, Uva, and North-Western Provinces. The largest excesses were recorded in the west and north-west, in the Badulla and Batticaloa Districts, in the north of the Island and in a region immediately to the north-west of Kandy.

After the first few days of the month, dry conditions set in about the 5th, and these more or less persisted till the 15th. Thunderstorm activity gave a slight increase of rain during the next three days, after which the rainfall again decreased. Under the influence of a depression that formed in the Bay of Bengal to the north-east of the Island, the last few days of the month were distinctly wet, fairly heavy rain occurring particularly in the south-west.

October.—The rainfall was generally in deficit over a considerable portion of the Island, the only area where appreciable excesses were recorded being the south-east.

The south-westerly gradient persisted well into the month. The first couple of days was generally wet, largely as a result of a mild depression in the Bay of Bengal which formed towards the end of the preceding month, but the weather cleared during the next three days. Moderately heavy rain was experienced on the 6th in the south-west quarter. The rainfall then gradually decreased, and the weather remained comparatively dry till the 20th. Thunderstorm activity was well in evidence and accounted for a fair amount of irregularly distributed rain during the last third of the month.

November.—The rainfall was in excess over the greater part of the Island. The only appreciable area reporting deficits was covered by lines joining Batticaloa, Badulla, Kurunegala, Anuradhapura, and Allai.

November proved to be a rainy month, the rain being more or less persistent throughout the period. Increased rainfall during the period 11th–13th was attributable to the influence of a depression that formed in the Bay of Bengal to the east of the Island, while the widespread heavy rain that fell on the 27th–28th was due to unsettled conditions that favoured the formation of another depression, which, however, failed to materialize.

December.—The rainfall was in deficit nearly everywhere. Slight excesses were recorded, however, between the central hills and the west coast a trifle north of Colombo, and from a small area to the west of Hambantota. The largest deficits were experienced on the eastern and north-eastern flanks of the central hills. St. Martin's total of 7.19 inches for the month was the smallest on record for December during the 50 years for which observations are available there. In spite of the general dryness of the month, there were no stations that did not report some rain.

December proved to be a dry month. During the first eleven days there was scarcely any rain. From then up to the 25th there was an appreciable amount of rain. The last few days were again dry.

There were two well-marked cold spells during the month, of which the first lasted from the 5th to the 11th and produced temperatures below freezing-point at Nuwara Eliya on the nights of the 7th and 8th. The second spell of about four days coming at the very end of the month was as intense and resulted in temperatures below freezing-point at Nuwara Eliya on the nights of the 28th, 29th and 30th. The low temperatures recorded during the month, however, did not constitute any records. Heavy frost was occasionally reported from Nuwara Eliya during both periods.

Year.—The rainfall was, on the whole, below normal, except along the coastal area from Mannar to Matara, and in the southern part of the Batticaloa District. Appreciable excess was also reported from a smaller area near Diyatalawa.

Colombo, July 7, 1938.

D. T. E. DASSANAYAKE, Ph.D., F.Inst.P.,
Acting Superintendent.

TABLE A.—Return of Rainfall in Ceylon during 1937, with the Offsets from Average (1911-30).

Station and Abbreviation used on Maps.	Height above Mean Sea Level	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total for the Year.	Greatest daily rainfall recorded during 1937 and over the whole period during which observations have been taken.	No. of Years of Observations.	Date.
			Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.			
Akuressa (Aku.)	30	1937	8.46	6.71	12.00	8.69	14.13	4.91	9.55	6.24	6.27	8.25	12.23	7.73	105.17	5.90		May 26
Alagalla (Al.)	1,062	1937 (Offset	7.55 2.4	7.18 5.1	8.34 3.0	7.22 1.7	9.99 0.5	3.28 7.9	11.64 4.2	11.41 6.0	7.39 0.8	14.40 1.5	19.41 5.4	3.33 5.7	111.14 9.0	4.14 9.82	27	Nov. 11 June 24, 1911
Allai Tank	20	1937 (Offset	15.71 5.3	11.81 9.8	2.00 0.8	2.62 0.6	1.01 2.1	0.00 0.8	0.19 1.2	5.74 3.1	4.31 1.0	6.14 2.7	15.44 0.3	5.76 9.3	70.73 3.3	8.15 9.11	62	Feb. 18 Nov. 17, 1906
Alutnuwara	300	1937 (Offset	23.94 7.5	10.61 6.0	1.90 3.8	3.42 1.9	1.36 1.9	0.02 0.6	0.26 1.0	12.17 10.3	2.72 0.5	7.07 5.6	10.23 5.2	6.21 11.7	79.91 8.2	6.54 9.92	38	Jan. 15 Jan. 17, 1913
Ambalantota	15	1937 (Offset	4.46 0.9	1.10 0.2	3.16 0.6	2.83 0.4	2.59 1.0	0.18 2.7	1.66 0.5	0.82 0.2	0.23 2.4	5.13 0.9	8.61 0.8	9.10 2.2	39.87 4.6	2.75 5.27	16	Dec. 23 Nov. 4, 1929
Ambanpitiya (Am.)	663	1937 (Offset	4.23 0.6	4.72 2.4	11.05 3.2	7.91 1.9	19.44 9.1	4.27 9.5	9.88 1.7	8.73 3.3	10.01 0.3	13.50 4.6	12.13 2.8	4.05 3.9	109.92 3.2	9.90 16.65	66	May 26 Aug. 7, 1886
Ambepussa (Amb.)	—	1937 (Offset	6.29 0.4	4.44 2.4	3.87 4.6	10.49 0.3	24.23 11.4	6.86 7.7	5.90 2.4	6.63 1.2	8.23 0.8	7.12 9.6	18.92 1.7	1.58 4.2	104.56 13.2	13.10 13.10	10-11	May 26 May 26, 1937
Amparai Tank	90	1937 (Offset	16.08 1.4	11.58 7.9	1.87 2.0	10.76 7.8	4.51 0.9	0.35 1.5	3.09 1.3	0.46 2.3	7.06 3.0	3.93 2.9	12.59 1.4	2.98 11.7	75.26 3.2	5.10 19.20	62	Jan. 20 Dec. 7, 1881
Anamadua	258	1937	6.42	1.48	2.57	7.54	6.73	0.76	0.00	6.02	7.00	8.42	11.91	6.03	64.88	6.10		Sept. 29
Andankulam Tank, Trincomalee	40	1937 (Offset	10.46 0.1	5.91 3.7	3.33 1.1	6.30 4.4	0.20 3.2	0.00 1.1	0.00 1.7	6.29 3.0	2.91 0.3	4.95 3.2	23.31 8.5	2.30 11.9	65.96 0.7	4.40 13.30	47	Feb. 17 Nov. 18, 1904
Angoda Lunatic Asylum	—	1937	4.54	6.12	4.87	8.72	21.92	7.98	5.93	1.82	17.34	8.46	14.79	2.43	104.92	7.00		Sept. 28
Annfield Estate, Dikoya (An.)	4,300	1937 (Offset	4.01 0.4	8.28 6.2	7.15 0.5	6.07 2.6	12.00 2.4	7.07 8.2	18.39 3.6	8.82 2.5	5.41 5.7	9.70 1.8	7.90 2.1	3.89 1.8	98.69 12.3	3.70 8.79	50	July 17 Oct. 4, 1913
Anningkanda Estate, Deniyaya (Anng.)	1,550	1937 (Offset	13.02 3.4	6.42 0.5	10.99 2.0	7.22 4.1	15.29 2.2	4.61 7.2	12.56 3.2	5.45 0.8	3.32 7.4	15.05 0.4	17.39 1.1	13.14 0.8	124.46 12.2	4.18 7.98	60	July 17 Oct. 27, 1906
Anuradha- pura	295	1937 (Offset	8.28 2.6	0.90 0.6	6.32 2.7	3.32 2.5	0.07 3.1	0.01 0.9	0.00 1.4	3.37 2.1	2.19 1.7	7.62 2.2	13.44 1.9	3.45 4.2	48.97 7.2	3.79 9.32	68	March 12 May 20, 1891
Arachchi Amuna	135	1937 (Offset	8.59 2.9	1.88 0.2	6.44 2.3	4.29 1.0	0.05 3.1	0.14 0.5	0.00 1.4	3.94 2.3	2.22 2.1	4.40 5.2	13.06 1.8	3.11 5.1	48.12 8.8	3.24 7.56	15	March 12 Dec. 27, 1928
Aranayaka (Ar.)	1,000	1937 (Offset	6.14 2.4	2.90 0.6	3.37 4.2	9.24 3.8	8.93 2.5	2.83 3.0	6.32 1.5	2.40 1.2	2.96 2.3	5.35 1.4	17.99 8.2	8.68 0.2	77.11 6.6	5.20 7.40	21	May 26 Dec. 6, 1919
			5.78 0.9	5.35 3.5	9.56 3.8	6.63 0.8	10.45 2.4	6.26 7.6	13.82 3.8	8.44 2.0	7.02 1.1	13.64 0	15.16 3.3	6.25 0.9	108.36 9.1	4.71 9.30	3	May 26 Oct. 4, 1913