

## Appendix F.

### REPORT OF THE DIRECTOR OF THE ROYAL OBSERVATORY, HONG KONG, FOR THE YEAR 1926.

#### I.—GROUNDS AND BUILDINGS.

The grounds were kept in order by the Botanical and Forestry Department with the assistance of the Observatory coolies.

The wireless house was completed in November and the receiving set was removed from its temporary shelter in the old Telescope dome to the new house on November 30. This house is situated 51 yards to the south of the main building. It is a rectangular building, 44 feet long by 18 feet wide, with brick walls 12 feet high at the eaves, and a gabled roof of Canton tiles. It contains an engine and battery room, 18 feet long by 12 feet wide, and a main instrument room 32 feet long by 18 feet wide. The Receiver is a Marconi "Press" type RP 2 B, with a wave range of 750 to 26,000 metres. The Transmitter is a Marconi type "Q",  $1\frac{1}{2}$  Kw. with wave range of 250 to 1,000 metres. Frequency 300 cycles. The systems used are:—

Continuous wave.

Interrupted Continuous wave.

Telephone.

*Underground Chamber for Seismograph and Clocks.*—The diurnal inequality of temperature in the underground chamber is negligible and the change in 24 hours seldom exceeds  $0^{\circ}.3$  F. The annual range amounted to  $11^{\circ}.3$  (F) in 1925 and  $9^{\circ}.1$  (F) in 1926. Changes of humidity are at times considerable; as, for example, from January 15d. 21h. to 16d. 13h. when the relative humidity decreased from 71% to 51%, from March 12d. 12h. to 13d. 2h. when it increased from 61% to 85%, from May 7d. 16h. to 8d. 9h., when it decreased from 90% to 65%, and from December 7d. 17h. to 8d. 12h. when it decreased from 75% to 55%. From June 22 to September 17 the humidity was never less than 93%.

In the following table the mean monthly temperature and humidity in the Underground Chamber are compared with the temperature and humidity in the open air. As the air in the Underground Chamber is always still, humidity tables for calm air have been computed and used for obtaining the relative humidity from the readings of the dry and wet bulb thermometers.

*Mean Monthly Temperature and Relative Humidity in the  
Underground Chamber and in the Open Air,  
during the year 1926.*

Month 1926.	In Underground Chamber.		In the Open Air.		Excess of Under- ground Chamber over Open Air.	
	Temper- ature	Relative Humidity	Temper- ature	Relative Humidity	Temper- ature	Relative Humidity
	°	%	°	%	°	%
January, ..	71·9	54	61·1	72	+10·8	-18
February, ..	70·7	61	60·0	82	+10·7	-21
March, .....	70·5	70	63·8	82	+6·7	-12
April, .....	71·4	81	68·9	87	+2·5	-6
May, .....	73·4	88	76·1	83	-2·7	+3
June, .....	75·3	89	77·8	83	-2·5	+6
July, .....	77·8	96	82·1	81	-4·3	+15
August, ...	79·1	94	82·1	83	-3·0	+11
September	79·6	92	81·5	80	-1·9	+12
October, ..	78·0	74	74·5	74	+3·5	...
November,	75·9	71	68·9	73	+7·0	-2
December,	73·5	66	62·7	69	+10·8	-3
Range.....	9·1	42	22·1	18	...	...

II.—METEOROLOGICAL INSTRUMENTS.

*Barometers.*—The Marvin compensated syphon barometer has worked satisfactorily, except that the buzzer for overcoming inertia and friction, and the time-break apparatus, have failed occasionally. In the month of February, a combined buzzer and time-break apparatus was fitted by Mr. Evans.

The coils of an electric bell were screwed to the base plate near the suspension thread of the conical steel float and a one-inch nail inserted in the suspension thread at the same height as the coils. The minute signal circuit to the thermograph buzzer was lead through these coils, which therefore acted as a buzzer and vibrated the nail on the float suspension. The hourly signal was also lead through the coils thus attracting the nail and causing an appreciable mark on the register.

This scheme works well provided the battery strength remains fairly constant and the thermograph buzzer works well.

The station barometer No. 1323 and the large Casella barometer were compared with the Observatory Standard on April 30, and June 26.

*Beckley Anemograph.*—This instrument was oiled and the orientation of the vane checked once a month.

*Dines-Baxendell Anemograph.*—The bearings of the vane were oiled and its orientation checked once a month. The spindle of the float was cleaned and oiled once a week, but the instrument still works erratically at low wind velocities.

The Mean monthly results of comparisons with the records of the Beckley Anemograph from 1910-1925 are given in the following table, together with the results for 1926:—

*Factor for converting the actual run of the Beckley Anemograph cups to velocities recorded by the Dines Pressure Tube Anemograph.*

Month.	Factor (Dines $\div$ $\frac{\text{Beckley}}{3}$ ).	
	Mean 1910-1925.	1926.
January, .....	1'94	1'94
February, .....	1'97	1'95
March, .....	2'03	1'89
April,.....	2'05	1'90
May, .....	2'17	2'03
June, .....	2'11	1'94
July, .....	2'24	2'15
August,.....	2'20	2'10
September, .....	2'21	2'36
October,.....	2'12	2'04
November, .....	2'01	1'76
December,.....	1'93	1'70
Year.....	2'08	1'98

*Thermometers.*—All thermometers in use are compared with Kew Standard No. 647 in winter and summer.

### III.—METEOROLOGICAL OBSERVATIONS AT THE OBSERVATORY.

Automatic records of the temperature of the air and evaporation were obtained with a Richard dry and wet bulb thermograph, and of the direction and velocity of the wind with a Beckley and a Dines-Baxendell Anemograph, modified as described in the report of 1912. The amount of rain is recorded automatically by a Nakamura pluviograph and the amount of sunshine by two Campbell-Stokes universal sunshine recorders. Eye observations of barometric pressure, temperature of the air and of evaporation and the amount of cloud are made at each hour of Hong Kong Standard time. The character and direction of the motion of the clouds are observed every three hours. Daily readings are taken of self-registering maximum and minimum thermometers.

*Principal features of the Weather.*—The principal features of the weather in 1926 were:—

- (1) Phenomenal rainfall during a prolonged and very severe thunderstorm on July 19, when 21 inches of rain fell in 18 hours, causing severe floods and land slides.
- (2) Rainfall much above the average in April, July and September.
- (3) Typhoons which passed near Hong Kong on July 22 and September 27.
- (4) Heat waves in July, August and September, and relatively cold spells in April and June.

Barometric pressure was moderately above normal in January, February, March, and August. It was nearly normal in other months. The mean pressure for the year at station level was 29.857 ins. as against 29.845 ins. in 1925 and 29.843 ins. for the past 43 years. The highest pressure was 30.384 ins. on January 25, as against 30.343 ins. in 1925 and 30.509 ins. for the past 43 years. The lowest pressure was 29.229 ins. on July 22 as against 29.272 ins. in 1925, and 28.590 ins. for the past 43 years.

The temperature of the air was moderately above normal in January, February, March and September. It was considerably below normal in June, the mean value for the month, 77°.8, being the lowest on record; and moderately below in October, the mean value for the month, 74°.5, being the lowest on record except in 1911 and 1919 when it was 74°.3 and 74°.2 respectively. The mean temperature for the year was 71°.6 as against 71°.4 in 1925 and 71°.9 for the past 43 years. The highest temperature was 92°.5 on August 16, as against 92°.8 in 1925 and 97°.0 for the past 43 years. The lowest temperature was 43°.2 on December 26 as against 39°.7 in 1925 and 32°.0 for the past 43 years.

The rainfall was considerably above normal in April, July and September, and considerably below in May, June and August. The total rainfall for April, 17.16 ins., was the greatest on record, and the total fall for July, 29.79 ins., has been exceeded on only one occasion; in 1917 when it was 30.07 ins. The total for the year was 100.78 ins. as against 87.58 ins. in 1925 and 85.55 ins. for the past 43 years. The greatest fall in one civil day was 21.02 ins. on July 19, which is the highest on record for the past 43 years, and the greatest in one hour was 3.96 ins. between 3.30 a.m. and 4.30 a.m. on July 19, also the highest on record for the past 43 years.

The wind velocity was considerably above normal in June, moderately below in March and November, and slightly below in January, July, September, October and December. The mean velocity for the year was 12.2 m.p.h. as against 11.5 m.p.h. in 1925 and 12.6 m.p.h. for the past 43 years. The maximum velocity for one hour, as recorded by the Beckley Anemograph,

was 73 miles at 10 a.m. on September 27, as against 45 miles in 1925 and 108 miles for the past 43 years. The maximum squall velocity, as recorded by the Dines-Baxendell Anemograph, was at the rate of 101 m.p.h. at 8.51 a.m. on September 27, as against 65 m.p.h. on 1925 and 130 m.p.h. for the past 17 years.

The relative humidity was moderately above normal in February and November, slightly above in April, September and October, and nearly normal in the other months. The mean relative humidity for the year was 79% as against 75% in 1925 and 77% for the past 43 years. It frequently exceeded 95% and the lowest for the year was 17% at 2 p.m. on December 27.

*Rainfall at four Stations.*—In the following table the monthly rainfall for the year 1926 at the Observatory is compared with the fall at the Police Station, Tai Po; the Botanical Gardens; and the Matilda Hospital, Mount Kellet:—

Month.	Observatory (Kowloon).	Police Station (Tai-po).	Botanical Gardens (Hong Kong).	Matilda Hospital (Hong Kong)
	<i>inches.</i>	<i>inches.</i>	<i>inches.</i>	<i>inches.</i>
January, ....	0.215	0.00	0.31	0.35
February, ...	2.400	1.82	2.58	2.40
March, .....	4.840	3.44	5.03	4.68
April, .....	17.165	12.87	18.90	19.62
May, .....	5.730	9.02	5.84	3.70
June, .....	6.635	7.28	7.68	4.10
July, .....	29.790	23.25	20.84	22.53
August, .....	8.010	8.45	9.15	8.03
September,...	17.300	11.78	17.82	15.12
October, .....	3.275	4.86	3.44	2.84
November, ...	4.965	4.86	5.02	4.70
December, ...	0.455	0.00	0.16	0.16
Year....	100.780	87.63	96.77	88.23

*Floods.*—The heaviest rainfall occurred at the Observatory as follows:—

Period.		Amount.	Duration.	Greatest fall in 1 hour.	
d.	h.	inches.	hours.	Amount.	Time.
April...	10 1 to	April 16 4	10.96	71	2.225 April 10 13
July ...	19 0 to	July 19 14	20.83	14	3.965 July 19 .4
July ...	22 4 to	July 23 0	3.72	19	0.500 July 22 22
Sept. ...	21 0 to	Sept. 21 17	5.61	14	1.880 Sept. 21 14

The rain on July 19 caused very severe floods and land slides.

*Typhoons.*—The tracks of 12 typhoons and 30 of the principal depressions which occurred in the Far East, in 1926, are given in two plates in the Monthly Meteorological Bulletin for December, 1926.

On the morning of July 22 a typhoon passed a few miles to the south of Gap Rock on a WNW track. Winds of force 10 were experienced at Gap Rock at 10*h* and 11*h* and squalls at the rate of 80 to 85 m.p.h. were recorded at the Observatory between 8*h*. and 9*h*. A typhoon also passed near Gap Rock on September 27, travelling at the rate of 24 m.p.h. Winds of force 12 were experienced at Gap Rock at 10*h* and 11*h*, and squalls at the rate of 90 to 101 m.p.h. were recorded at the Observatory between 7*h* and 9*h*. In the first typhoon the lowest barometer reading at the Observatory, reduced to sea level, was 29.33 ins., at 8*h*. 45*m*. In the second typhoon it was 29.29 ins. at 7*h*. 15*m*.

#### IV.—PUBLICATIONS.

*Daily Weather Report and Map.*—A weather map of the Far East, for 6 a.m. of the 120th Meridian time, is constructed daily and lithographed at the Observatory. On the verso is printed the morning weather report, from about 40 stations in China, Indo-China, Japan, Borneo and the Philippines, and a weather forecast for the following districts:—

1. Formosa Channel.
2. S. E. Coast of China between Hong Kong and Lamocks.
3. Hong Kong to Gap Rock.
4. S. Coast of China between Hong Kong and Hainan.

This publication is exhibited on notice boards at the Hong Kong and Kowloon Ferry Piers, the Harbour Office and at the offices of the cable companies. It is also distributed to subscribers to the "Daily Bulletin". One copy is sent daily to the Institute of Engineers and Shipbuilders, to the Director of the Meteorological Observatory, Macao, to the Diocesan Boys' School, the Central British School, Kowloon, and to H.M.S. *Hermes* when at Hong Kong. Copies are sent weekly to the Hydrographic Office, Bangkok.

Since July 1, meteorological observations from 26 stations in the Far East have been broadcast by Cape d'Aguilar (V.P.S.) on a 600 metre spark at 0400 and 1200 G.M.T. and repeated on 2800 metres C.W. at 0500 and 1300, respectively. These messages are followed immediately by the weather reports and forecasts which were formerly broadcast at 0500 and 1200 G.M.T. The names of the observing stations included in the morning and evening broadcast, together with the hours at which the observations are taken at each station are given in Government Notifications 308 of 1926, May 28, and 428 of 1926, August 6.

A weather map for 2 p.m. of the 120th meridian time is also constructed daily. It is not published but an evening weather report and forecast is telephoned to the morning papers and exhibited on the notice boards.

*Monthly Meteorological Bulletin.*—The monthly Meteorological Bulletin, which includes the Daily Weather Report, was published as usual, and distributed to the principal observatories and scientific institutions in different parts of the world.

*Monthly Seismological Bulletin.*—The publication of a monthly seismological bulletin, giving particulars of earthquakes recorded by the Milne-Shaw seismograph, was continued throughout the year and distributed to the principal seismological Observatories.

*Miscellaneous Returns.*—A monthly abstract of observations made at the Observatory is published in the Government Gazette, and monthly and yearly results are published in the Blue Book in the form suggested by the London Meteorological Office for the British Colonies. The monthly departures from normal of the barometric pressure at four China-Coast Ports are communicated to the Commonwealth Meteorologist, Melbourne, in connection with long range weather forecasts. Monthly Meteorological returns are forwarded to the Meteorological Magazine, and annual returns to the Stock Exchange Official Intelligence, the Colonial Office List and Whitaker's Almanack. Particulars of the calendar, eclipses, times of sunrise and sunset, &c., are communicated to the "Directory and Chronical" and the "Hong Kong Dollar Directory."

#### V.—WEATHER TELEGRAMS, FORECASTS AND STORM WARNINGS.

*Daily Weather Telegrams.*—In addition to the ordinary 6 a.m. and 2 p.m. observations those for 11 a.m. and 5 p.m. are now received from the following stations:—

Shanghai	Macao	Cape St. James.
Phulien	Tourane	

Additional observations at 11 a.m. have been received from Gutzlaff since December 1, 1925, and from Amoy since December 2, 1926. Those for 5 p.m. have been received from Gutzlaff since March 10, 1926 and from Amoy since January 1, 1927. Those for 11 a.m. and 5 p.m. have been received from Yunanfu since September 16.

By the courtesy of the Naval Commander-in-Chief arrangements were made at the close of the year 1925, for all cruisers, submarine depot ships and sloops on the China station, whilst

away from Hong Kong, at sea or in harbour, to make meteorological observations at 6 a.m., 11 a.m., 2 p.m. and 5 p.m., Hong Kong Standard Time, and transmit them to Hong Kong; also for gunboats on the Yangtze and West River to make and transmit observations at 6 a.m. daily.

This service forms a very valuable addition to the observations received by cable and from ships of the mercantile marine.

On February 8, Mr. C.W. Hsu, the officer in charge of the Pratas Radio and meteorological station, brought two meteorological observers for Pratas to view the Observatory. Observations at 6h. and 14h. (120th meridian time) have been received by radio telegraphy from this station, on a 600 metre wave, with commendable regularity, and also at 11h and 17h since April 16. During typhoon weather Mr. Hsu very kindly sent us hourly observations, which were of very great value in connection with storm warnings.

On July 26 the station was formally opened by Admiral Hsu. The Director was unable to be present as the Chief Assistant was on leave and the acting Chief Assistant was in Hospital.

Occasionally belated weather telegrams are received from South China but as a rule the observations from these districts are posted in batches to Hong Kong, as are those from Central China.

In January the Japanese Authorities agreed to use the Hong Kong 6-letter code for the daily weather telegrams. Its use was sanctioned by the Cable Companies in 1915 and the sanction ratified in September, 1926. Owing, however, to the absence in Europe of Dr. Okada, the Director of the Tokio Observatory, the details of the scheme have not yet been settled.

*Extra Weather Telegrams.*—The following stations send extra weather telegrams at half rates during typhoons, on receipt of certain code words from Hong Kong:—Amoy, Canton, Macao, Phulien, Sharp Peak and Taihoku. The Director of the Philippines Weather Bureau also sends extra telegrams, at his discretion, from Aparri or some other station nearer the typhoon centre. The 9 p.m. observations from Swatow, kindly sanctioned by the Chinese Telegraph Administration, were occasionally received the same evening, but usually on the next or following day.

In September, Dr. S. Teramoto, director of the Taihoku Observatory, very kindly consented to send extra weather telegrams from the two stations in Formosa nearest to the typhoon centre, instead of from only one station.

*Weather Telegrams from Ships by Radio.*—The following table gives the monthly number of ships from which radio meteorological messages have been received, and the number of messages received (each arrival and departure is counted separately):—

Month.	<i>British (including H.M. Ships).</i>		<i>Other National- ities.</i>		<i>Total.</i>		
	No. of ships.	No. of messages.	No. of ships.	No. of messages.	No. of ships.	No. of messages.	
January, .....	67	586	55	158	122	744	
February, .....	74	638	53	161	127	799	
March, .....	91	667	54	172	145	839	
April, .....	82	474	45	134	127	608	
May, .....	73	374	45	136	118	510	
June, .....	72	509	68	195	140	704	
July, .....	97	288	97	230	194	757	
August, .....	116	378	91	258	207	859	
September, .....	98	275	64	205	162	652	
October, .....	116	444	96	266	212	926	
November, .....	90	340	77	228	167	779	
December, .....	82	243	86	233	168	706	
Totals	1926, .....	1058	5216	831	2376	1889	8883
	1925, .....	687	2199	752	1762	1439	3961
	1924, .....	665	1703	852	1667	1517	3370
	1923, .....	196	409	431	698	627	1107
	1922, .....	280	732	369	702	649	1434

It will be seen that the number of British ships sending these messages increased from 687 in 1925, to 1058 in 1926. This was due in a large measure to the co-operation of the Navy, mentioned in a previous paragraph. The number of ships of other nationalities increased from 752 in 1925 to 831 in 1926 and the number of messages received from these ships increased from 1762 to 2376, an appreciable increase, but still representing only a small percentage of the ships within call of Hong Kong.

An appeal for regular observations from ships has been made through the International Commission for Maritime Meteorology.

*Results of Weather Forecasts.*—The results of comparison of the daily weather forecasts with the weather subsequently experienced are given below, together with the results of the previous five years:—

Year.	Complete Success.	Partial Success.	Partial Failure.	Total Failure.
	%	%	%	%
1921	65	30	5	0
1922	67	30	3	0
1923	66	30	3	1
1924	71	24	5	0
1925	62	34	4	0
1926	72	26	2	0

The forecast comprises wind direction, wind force, and weather. Complete success means correct in three elements. Partial success means correct in only two elements. Partial failure means correct in only one element. Total failure means correct in no element.

The method of analysis is described in the 1918 Report.

*Storm Warnings.*—The symbols of the China Seas Storm Signal Code are displayed on Kowloon Signal Hill.

The following Ports are warned by a telegraphic adaptation of the code:—Sharp Peak, Swatow, Amoy, Santuao, Macao, Canton, Wuchow, Phulien, Taihoku, Manila, Labuan, and Singapore. 156 storm warnings were sent in 1926. 110 were received from Manila and 106 from Zikawei. 28 were received from Phulien, via Quang Chau Wan Radio Station. The corresponding numbers in 1925 were 94, 119, 61 and 8 respectively.

At the request of the Director General of Indian Observatories arrangements were made with the Eastern Extension Telegraph Co., in 1925 to send warnings to Simla of any typhoon passing westward over Indo-China. Only one such warning was necessary during the year; namely, on November 8.

The Day Signals of the Local Code are displayed at the following stations:—

Royal Observatory	Green Island
H.M.S. Tamar	Hong Kong and Kowloon Wharf and Godown Co. Kowloon
Gough Hill	Field Officer's Quarters Lyemun.
Standard Oil Co. Lai Chi Kok.	
Harbour Office.	

The Night Signals are displayed at sunset, at the following stations:—

Royal Observatory	H.M.S. Tamar
Harbour Office	Gough Hill
Railway Station	

They have the same signification as the day signals.

A translation of both Day and Night Signals is displayed at the General Post Office and at the Upper Tram Station.

When local signals are displayed in the Harbour a Cone is exhibited at the following stations:—

Gap Rock	Stanley	Sau Ki Wan	Sha Tau Kok
Waglan	Aberdeen	Sai Kung	Tai Po

It has been decided to amend the supplementary storm warning after March 1st, 1927, as follows:—

When Local Signals are displayed in the Harbour, signals will be displayed as follows:—

When No 1 Signal is displayed in the Harbour.

Red T by day.  
2 Red Lights vertically by night.

When Nos. 2 to No. 7 Signals are displayed in the Harbour.

Black Cone by day.  
2 Green Lights vertically by night.

These Signals will be displayed at the following Stations:—

Aberdeen	Saikung
Cheung Chow	Shataukok
Gap Rock	Tai Po
Ping Shan	Tsun Wan
Stanley	Tai O
Shaukiwan	Waglan

In the following table are given the number of times and number of hours the local signals were hoisted in each of the years 1922-1926:—

Year.	Red Signals.		Black Signals.		Bombs.
	Number of times.	Number of hours displayed.	Number of times.	Number of hours displayed.	Number of times fired.
1922	7	181	6	154	...
1923	11	181	8	252	2
1924	10	186	4	85	...
1925	5	128	3	57	...
1926	5	50	4	103	1

The figures in the above table include the number of hours that night signals, corresponding to the day signals, were hoisted.

The red signal indicates that a depression or typhoon exists which may possibly cause a gale at Hong Kong within 24 hours. The black signals indicate that a gale is expected at Hong Kong.

Three bombs fired at intervals of 10 seconds indicate that wind of typhoon force is anticipated.

#### VI.—METEOROLOGICAL OBSERVATIONS FROM SHIPS, TREATY PORTS, &C.

*Logs received.*—In addition to meteorological registers kept at about 40 stations in China, meteorological logs were received from 230 ships operating in the Far East. These logs, representing 8,680 days' observations have been utilised for amplifying the weather maps and verifying typhoon tracks. The corresponding figures for the year 1925 were 158 and 6,697.

*Comparison of Barometers.*—The corrections to ships' barometers are usually obtained by comparing their readings while at Hong Kong with those of the Observatory Standard. Occasionally ship captains bring their barometers to the Observatory to be compared with the Observatory Standard.

#### VII.—MAGNETIC OBSERVATIONS.

Magnetic horizontal force, declination, and dip are observed once a month. In the dip observations 4 needles are used in rotation, the result for each month being the mean of determinations with two needles.

In the following table are given the annual values of the magnetic elements in 1926, as derived from observations made in the new magnetic hut with magnetometer Elliott 83 and dip circle Dover 71:—

Declination (West) .....	0.29.6
Dip (North) .....	30.42.4
Horizontal Force (C.G.S. unit) .....	0.37323
Vertical Force (C.G.S. unit) .....	0.22167
Total Force (C.G.S. unit) .....	0.43409

The magnetic observatory buildings at Au Tau, for absolute observations and photographic registration of the magnetic horizontal force, vertical force, and declination were commenced in November. It is expected that they will be completed in February 1927.

The vertical force variometer was received on April 30, the horizontal force and declination variometers and earth inductor on June 22. These instruments are similar to those

supplied to the Greenwich Observatory by the Cambridge Instrument Company. A unifilar instrument for absolute determinations of Horizontal Force and Declination was received on January 24, 1927. It was constructed by Messrs. Cooke, Troughton & Simms, and is a modified form of the Indian pattern designed by Captain H.A.D. Fraser, R.E. for the Indian Government.

No aluminium was used in its construction as this metal perishes in the climate of Hong Kong. Micrometers with phosphor bronze screws and springs are fitted in place of verniers. They read to 0'.1 and to 0'.01 by estimation. The deflected magnet is fitted with a collimator lens at one end and a cross, ruled on optical glass, at the other end, thus eliminating Fraser's subsidiary collimator.

The vibration magnet is similarly fitted, the reading of the vertical line of the cross on each magnet being observed on a scale in the eye end of the telescope. The torsion weight for use with the deflected magnet is a zylonite disc mounted on a metal spindle. When used for the vibration magnet a metal disc of the proper weight is added, and a further weight when used in the moment of inertia determinations.

The observing telescope is capable of rotation about a horizontal axis and gives excellent definition at 24 diameters.

#### VIII.—TIME SERVICE.

*Time Ball.*—The Time Ball on Kowloon Signal Hill is dropped at 10 a.m. and 4 p.m. daily, except on Saturdays when it is dropped at 10 a.m. and 1 p.m., and on Sundays and Holidays when it is dropped at 10 a.m. only (120th Meridian Time).

The Ball is hoisted half mast at the 55th minute and full mast at the 57th minute. If the ball fails to drop at the correct time it is lowered at 5 minutes past the hour and the ordinary routine repeated at the following hour, if possible.

Time Signals are also given at night by means of three white lamps mounted vertically on the Observatory radio mast. The lights are extinguished momentarily every second from 8*h.* 55*m.* to 9*h.* 0*m.* p.m., except at the 28th, 29th, 54th, 55th, 56th, 57th, 58th and 59th seconds, of each minute. The 9 p.m. signals were repeated at midnight on December 31st, the last signal indicating the close of the year 1926. The hours refer to Hong Kong Standard Time (8 hours East of Greenwich).

The Time Ball was dropped successfully 655 times. There was one failure, on October 2nd, when the line was disconnected by P.W.D. workmen before 10*h.* thus causing the ball to fall prematurely. It was not raised at 11*h.* as work on the line was still in progress. The ball was not raised on July 22nd or September 27th at 10*h.* a.m. or 4*h.* p.m. owing to high wind.

In the following table is given the number of times different errors occurred in the years 1925 and 1926 :—

Error of Time Ball.	Number of Times.	
	1925	1926
0·3 sec. or less	631	650
0·4 "	12	4
0·5 "	8	...
0·6 "	5	...
0·7 "	3	...
0·8 "	...	1
0·9 "	2	...

The error of 0.8 sec, which occurred on February 18th, was owing to accidental over-correction of the Mean Time clock.

The Mean probable error of the time ball in each month of the past five years is given in the following table :—

Month.	Probable Error of the Time Ball.				
	1922	1923	1924	1925	1926
January, .....	±0·10	±0·16	±0·26	±0·38	±0·13
February, .....	'15	'14	'13	'22	'18
March, .....	'12	'11	'17	'22	'11
April, .....	20	'18	'27	'16	'13
May, .....	'10	'13	'23	'11	'10
June, .....	'11	'21	'27	'10	'10
July, .....	'14	'12	'21	'10	'10
August, .....	'10	'28	'16	'12	'10
September, .....	'15	'24	'13	'10	'10
October, .....	'10	'15	'18	'12	'11
November, .....	'17	'21	'14	'10	'10
December, .....	'10	'13	'12	'10	'13
Means, .....	±0·13	±0·17	±0·19	±0·15	±0·12

*Time Signals by Radio-Telegraphy.*—In addition to the time signals given by the Time Ball, and on the radio mast, signals are broadcast at 10h. and 21h. by radio telegraphy via Stonecutters. Particulars of the programme are given in Government Notification No. 428 of 6.8.26.

The following table gives particulars of the time-signals received by radio telegraphy during the year:—

Station:	Time of Emission.	No of Observations.
	<i>h</i>	
Pearl Harbour	8 a.m.	104
‡ Pearl Harbour	10.30 a.m.	21
* Nauen	8 a.m.	295
† Nauen	8 a.m.	275
Malabar	9 a.m.	45
Manila	11 a.m.	103
* Bordeaux	4 p.m.	153
† Bordeaux	4 p.m.	127

\*International Code

†Rhythmic Signals

‡International Longitude Commission Signals.

The regular observation of the Nauen time signal at 8h. a.m. continues to be an invaluable check on clock performance. The signal consistently maintains a high degree of accuracy; its regular reception, and the performance of the Cottingham clock, have eliminated all but small discrepancies in the computed clock errors over cloudy periods.

*Transit Instrument.*—Routine transit and level observations were made by the Chinese computers throughout the year. The Collimation and Azimuth determinations and occasional transit observations were made by the Chief and First Assistants.

The number of observations in the years 1925 and 1926 was as follows:—

	1925.	1926.
Transits .....	1375	1325
Level determinations .....	702	689
Azimuth determinations .....	54	119
Collimation determinations .....	54	102

To obviate any possible level effect of a lamp at one end of the transit axis, the wiring for the electric illumination of the transit instrument was altered on April 22, to enable both east and west lamps to be lighted simultaneously. Formerly a two-way switch lighted each lamp separately.

*Clocks.*—Sidereal clock Cottingham and Mercer, No. 507, has been in use as the Observatory Standard throughout the year.

Between January 1st and October 12th, the daily losing rate varied from  $-0s.36$  to  $+0s.33$ , following generally the variations in pressure in the clock case. The clock stopped on October 12th, and various adjustments were made between October 13th and October 30th. It has been undisturbed since, the rate varying with pressure from  $+0s.55$  to  $+0s.23$ . There has been no leakage into the clock case, the variations of pressure corresponding to those of temperature.

The Sidereal Clock, Dent 39741, was cleaned and the rate altered on February 4th; its rate was again altered on May 6th, May 9th, July 6th and August 28th, the tendency of previous years (a steady increase in losing rate), being particularly marked.

The Mean Time clock, Leroy 1350, was used for dropping the Time Ball, maintaining the electric time service in the Observatory, and sending hourly signals to the Railway, the Post Office, the Telephone Co., and the Eastern Extension Telegraph Co. The clock is corrected daily before 10 a.m. and before 4 p.m. by the electric regulating apparatus. The daily rate of the pendulum is kept below 0.5 sec. by the addition or withdrawal of weights. Mean Time clock Dent, 39740, has been corrected daily and its rate regulated as in the case of Leroy 1350.

Chronometer Dent No. 40917 is on loan to Stonecutters Radio Station.

*Batteries, Power Supply, &c.*—The necessary current for the Time Service has been supplied by accumulator batteries, charged as found necessary from the alternating mains of the China Light and Power Co., Ltd., by the rotary converter or the Tungar rectifier.

#### IX.—MISCELLANEOUS.

*Seismograph.*—210 earthquakes were recorded during the year by the Milne-Shaw Seismograph, as against 159 in 1925. The number for 1926 includes a series of 18 small earthquakes on August 5-6, 6 on August 7-8, and 4 on August 16. The seismograms have been forwarded to the President of the Seismological Committee, Oxford.

*Upper Air Research.*—35 flights with pilot balloons were made during the year, supplemented by 21 flights in seaplanes by Officers of H.M.S. Hermes and Vindictive, who observed the dry and wet bulb temperatures, usually at intervals of 500 feet up to 15000 feet; or the maximum possible under prevailing conditions.

The results of the observations have been communicated to the Secretary of the International Committee for Upper Air

Research, London. Of the days for international balloon ascents, May 7 and 8 were cloudy, a balloon was sent up on May 10, but burst after 15 minutes. On the morning of May 14 a balloon burst after 32 minutes' flight, one balloon burst before ascent and another after 2 minutes' flight.

Upper air temperatures were secured by Flying Officer N. Young, R.A.F. and the late Lieut. M.A. Maude R.N. on May 10, 11, 12, 13, 14 and 15.

*Eclipse of the Sun.*—The total Solar Eclipse of 1926, January 14 was observed at Hong Kong as a partial eclipse.

The sky was cloudless until 16h. 30m. when thin clouds gathered. The first contact occurred at 14h. 59m. 37s. (120th Meridian time) and the last contact (observed through thin cloud) occurred at 16h. 58m. 17s. The magnitude of the eclipse was 0.43.

One of the spots in the centre group of 2 spots was eclipsed at 15h. 45m. 07s. and emerged at 16h. 36m. 36s. The other was eclipsed at 15h. 59m. 40s. Its emergence was not observed.

The observations were made with a 3-inch comet seeker by projecting a 4-inch image of the sun on to a screen. The last contact, however, owing to cloud, was observed in the telescope with a sun glass.

The diagram at the end of the report, constructed from eye observations made every minute, shows the variations of magnetic declination during the eclipse. No effect on the temperature or pressure of the air could be detected on the autographic records.

The diminution of light was only very faintly perceptible.

*International Longitude Determination.*—In October the vernier time signals sent out at 0001-0006 G.M.T. from Nauen were observed by ear on 27 days and those sent out at 0801-0806 G.M.T. from Bordeaux were observed on 16 days.

The 0340-0345 G.M.T. vernier time signals from Honolulu were heard on 13 days, but atmospheric conditions at that time were invariably adverse to satisfactory reception. The Time Signals from Manila were observed on 5 days.

From the 6th to the 17th of October, owing to a partial failure of an electric contract, the performance of the sidereal clock, Cottingham & Mercer, was poor.

In November the Nauen and Bordeaux signals were observed on 25 and 17 days respectively. The Honolulu signals were observed on 7 days and the Manila signals on 2 days. During this month, except for a cloudy period between November 14 to November 21, the determinations of local time were good.

Definite corrections to the received signals are not yet available, so that no further pronouncement on the question of the longitude of the transit instrument can be made at present.

*Additional Site for Non-Local Typhoon Signals.*—The new Peninsula Hotel having obscured the view of the Time Ball and Non-Local Typhoon Signals from certain parts of the Harbour, arrangements were made with the Hong Kong and Kowloon Wharf and Godown Co. to repeat the non-local typhoon signals on the roof of No. 49 Godown. The service will come into operation after 1st March, 1927.

The question of raising the existing Time Ball Tower is under consideration.

*Record Room.*—The Old Time Ball Tower in the grounds of the Water Police Station, which had for many years been used as a Record Room was handed over to the Police in May, in exchange for a room in the Police Station.

*Visitors.*—A party of 20 undergraduates from the Hong Kong University visited the Observatory on April 21, and two parties of 25 boys from the Union Middle School, Canton, on October 25 and 26. Also a party of 20 Y.W.C.A. girls on November 10.

On November 23, Professor Woodman of New York University, in charge of 400 undergraduates on an eight months' cruise on board the S.S. Ryndham came to the Observatory to obtain information on the Climate of Hong Kong for educational purposes. He was presented with the following publications.—

“The Climate of Hong Kong”

“The Winds of Hong Kong”

and Daily Weather Maps of the Far East for July to September 1926.

Father E. Gherzi S.J. of the Zikawei Observatory visited the Observatory on June 9 and 10, to compare his barometer with the Observatory Standard and to discuss meteorological matters generally. He was on a tour of inspection of meteorological stations belonging to the Chinese Maritime Customs.

Mr. Santiago Ribot of the Observatoria Fabra, Barcelona, visited the Observatory on October 9 and the Rev: Dr. E. F. Pigol S.J., director of the River View College Observatory, Sydney, on December 11.

Father Miguel Selga S.J., the successor to Father Algué as director of the Philippines Weather Bureau, visited the Observatory on his way to the Pan Pacific Conference at Tokio. We discussed meteorological matters in general, and the adoption by the Japanese Authorities of the Hong Kong telegraphic code in particular. Father Selga again visited the Observatory on his return from the Conference and informed me that as Dr. Okada, the director of the Tokio Observatory, was in Europe the question of adopting the Hong Kong telegraphic code would have to remain in abeyance until his return. Dr. Okada, with Dr. Fujiwhara, came to see me on his return from Europe and promised to consider the matter.

*Staff.*—No change occurred in the European or Local Staff during the year. Mr. C.W. Jeffries, Chief Assistant, was on leave of absence from March 6 to 1927, January 7. During this period Mr. B. D. Evans acted as Chief Assistant. Mr. Evans was on sick leave from July 24 to 27 and from December 12 to January 18, 1927.

Lau Pak Wah acted as Clerical Assistant during the absence on leave of Badan Singh from October 1, 1925, to June 14th, 1926.

*Expenditure.*—The annual expenditure on the Observatory for the past ten years is as follows.—

Year.	Total Expenditure.		Increase.		Decrease.	
	\$	c.	\$	c.	\$	c.
1917	26,890.	50	4,192.	72	.....	
1918	20,028.	24	.....		6,862.	26
1919	23,450.	57	3,422.	33	.....	
1920	25,965.	66	2,515.	09	.....	
1921	32,700.	51	6,734.	85	.....	
1922	38,350.	10	5,649.	59	.....	
1923	38,522.	58	172.	48	.....	
1924	52,638.	49	14,115.	91	.....	
1925	41,955.	51	.....		10,682.	98
1926						

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T. F. CLAXTON,

*Director.*

17th February, 1927.