

ROYAL OBSERVATORY, HONG KONG

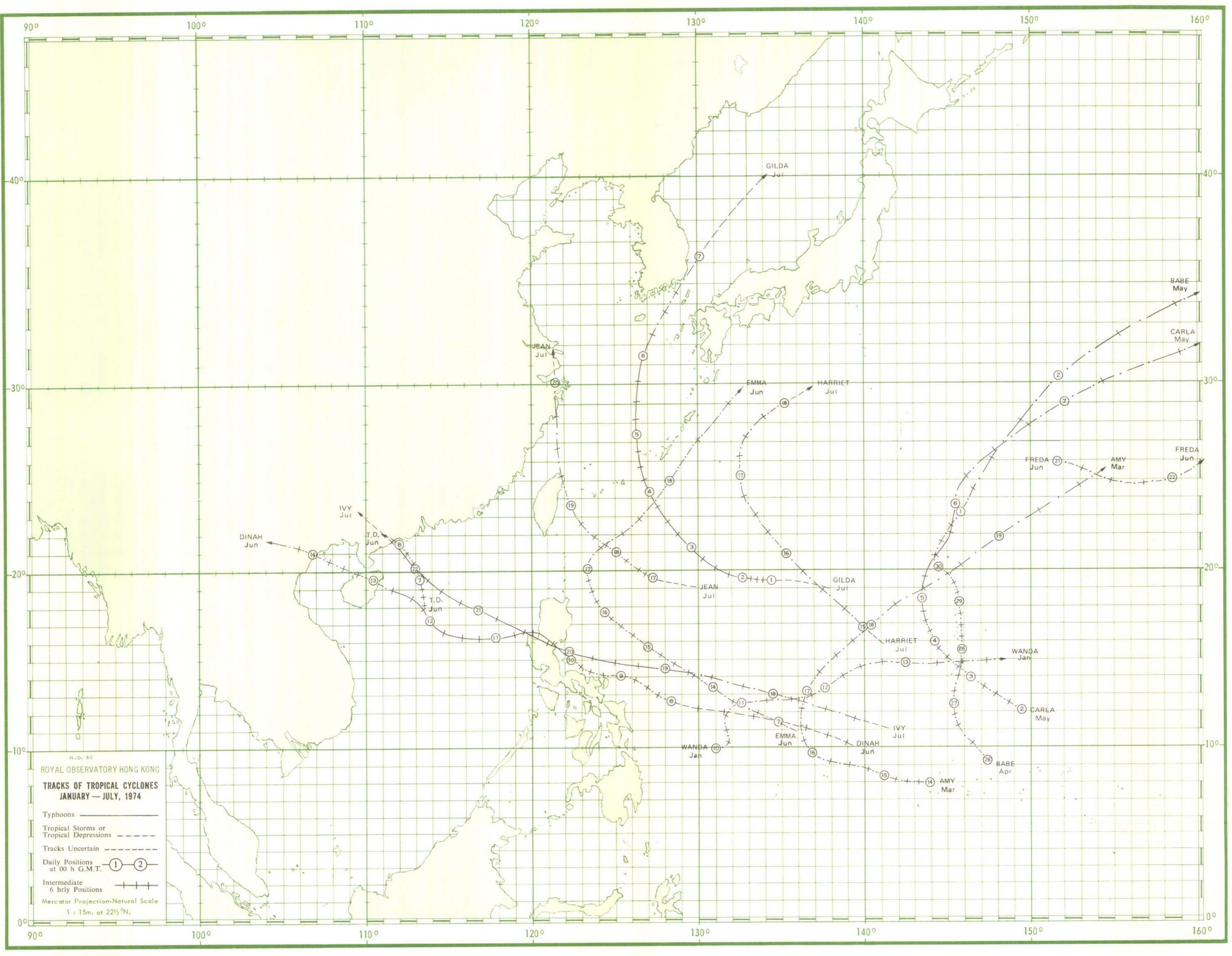
METEOROLOGICAL RESULTS
1974

PART III—TROPICAL CYCLONE SUMMARIES



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1975



R.O. 80
ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
JANUARY — JULY, 1974

- Typhoons —————
- Tropical Storms or Tropical Depressions - - - - -
- Tracks Uncertain - - - - -
- Daily Positions at 00 h G.M.T. ① ②
- Intermediate 6 hrly Positions + + + + +
- Mercator Projection-Natural Scale
 1 : 15m. at 22½°N.

DINAH Jun

IVY Jul

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WANDA Jan

EMMA Jun

DINAH Jun

IVY Jul

GILDA Jul

HARRIET Jul

WANDA Jan

CARLA May

FREDA Jun

AMY Mar

FREDA Jun

EMMA Jun

HARRIET Jul

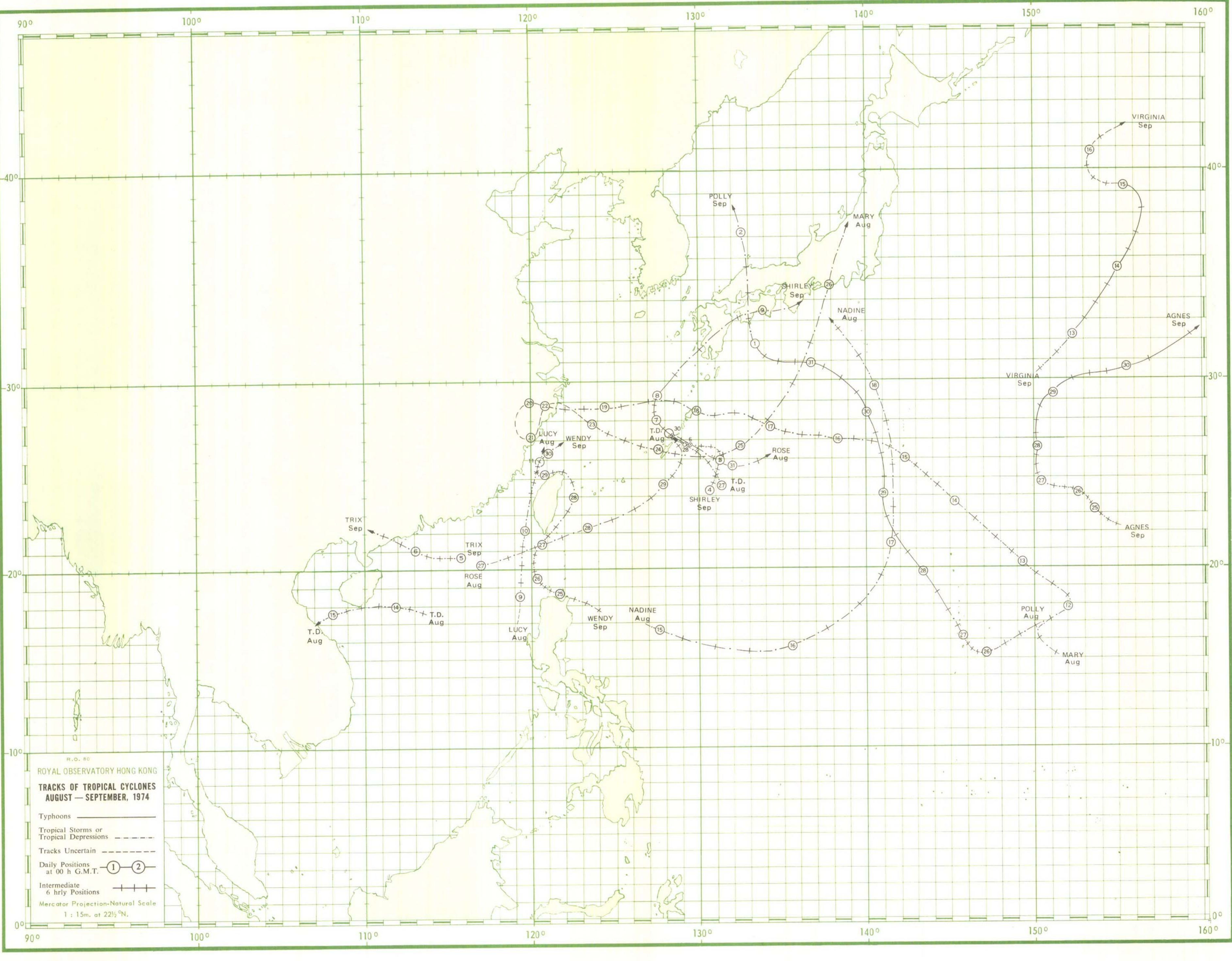
GILDA Jul

BABE May

CARLA May

JEAN Jul

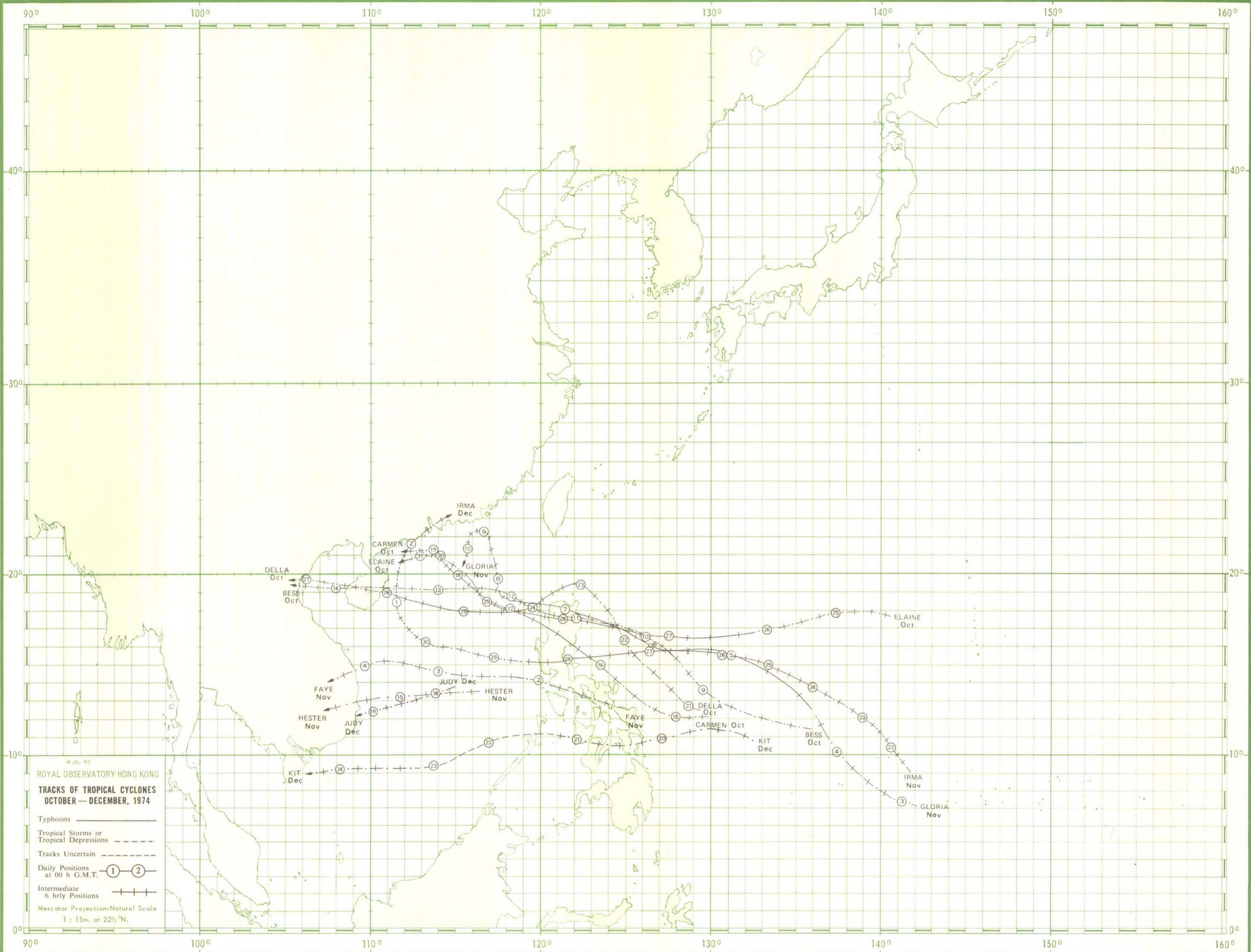
FREDA Jun



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ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
AUGUST — SEPTEMBER, 1974

Typhoons —————
Tropical Storms or
Tropical Depressions - - - - -
Tracks Uncertain - - - - -
Daily Positions
at 00 h G.M.T. ①—②
Intermediate
6 hrly Positions + + + + +
Mercator Projection-Natural Scale
1 : 15m. at 22½°N.

90° 100° 110° 120° 130° 140° 150° 160°



R.O. 80
ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
OCTOBER — DECEMBER, 1974

- Typhoons —————
- Tropical Storms or Tropical Depressions - - - - -
- Tracks Uncertain - - - - -
- Daily Positions at 00 h G.M.T. ① — ② —
- Intermediate 6 hrly Positions — + + + +

Mercator Projection-Natural Scale
 1 : 15m. at 22½°N.

METEOROLOGICAL RESULTS
1974

PART III—TROPICAL CYCLONE SUMMARIES

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INTRODUCTION

Apart from a short break 1940–1946, surface observations of meteorological elements since 1884 have been summarized and published in the Royal Observatory's Meteorological Results. Upper-air observations began in 1947 and from then onwards the annual volumes were divided into two parts, namely Part I—Surface Observations and Part II—Upper-air Observations. In 1971, 'Meteorological Results, Part III—Tropical Cyclone Summaries' was introduced and the first issue of the series was concerned with tropical cyclones over the western North Pacific and the South China Sea (i.e. the area bounded by the Equator, 45°N, 100°E and 160°E) in 1968.

During the period 1884–1939, reports on destructive typhoons were occasionally prepared and were included in the Appendices of Meteorological Results. However, since 1947, this practice was extended and information on all tropical cyclones which caused gales in Hong Kong was contained in the Annual Departmental Reports of the Director of the Royal Observatory.

Tracks of tropical cyclones in the western North Pacific and the South China Sea were published in Meteorological Results, Part I up to 1967. For the period 1884–1960, the tracks were plotted with day circle positions only. The day circle time varied to some extent but had remained fixed at 0000 G.M.T. since 1944. The day circle time used for each tropical cyclone is given in the Royal Observatory Technical Memoir No. 11, Volume 1. From 1961 onwards, 6-hourly intermediate positions were also shown on the tracks of all tropical cyclones.

Provisional reports on individual tropical cyclones affecting Hong Kong have been prepared since 1960; this was done in order to meet the immediate needs of the press, shipping companies and others. These reports were in cyclostyled form and were supplied on request. Initially, reports were only written on those tropical cyclones causing gale or storm signals to be hoisted in Hong Kong, but by 1968 it had become necessary to produce individual reports for every tropical cyclone for which any Tropical Cyclone Warning Signal‡ was raised.

In this publication, tropical cyclones are classified into the following four categories according to the maximum sustained winds within their circulations:

A TROPICAL DEPRESSION (T.D.) has maximum sustained winds of less than 34 knots and at this stage the centre is often not very clearly defined and cannot always be fixed precisely.

A TROPICAL STORM (T.S.) has maximum sustained winds in the range 34–47 knots.

A SEVERE TROPICAL STORM (S.T.S.) has maximum sustained winds in the range 48–63 knots.

A TYPHOON (T.) has maximum sustained winds of 64 knots or more.

Surface wind observations are made regularly at 10 stations in Hong Kong. Each station is equipped with either a Dines pressure-tube anemograph or a M.O. Mark IV cup generator type anemograph, all manufactured by R. W. Munro Ltd. Quick-run mechanisms are also fitted to the anemographs at the Hong Kong International Airport, Waglan Island, Tate's Cairn and Cheung Chau for recording the fine structure of the wind flow in typhoons for research purposes. Details of these stations are given below.

Station	Position		Elevation of barometer above M.S.L.	Elevation of ground above M.S.L.	Head of anemometer above M.S.L.	Type of anemometer
	Latitude N	Longitude E				
Royal Observatory	22° 18'	114° 10'	(m) 33	(m) 32	(m) 61	Dines
Hong Kong International Airport	22° 20'	114° 11'	24	4	16¶	Dines
Waglan Island	22° 11'	114° 18'	62	55	75	Dines
Tate's Cairn	22° 22'	114° 13'	*	575†	588	Dines
Cheung Chau	22° 12'	114° 01'	79	72	92	Dines
Cape Collinson§	22° 16'	114° 15'	48	46	59	Dines
Castle Peak	22° 23'	113° 59'	*	5	16	Dines
King's Park	22° 19'	114° 10'	66	65	78	Cup
Star Ferry	22° 18'	114° 10'	*	3	17	Cup
Green Island	22° 17'	114° 07'	*	76	90	Cup

* No barometer.

† Level of the ground floor of the building compound of the Radar Station.

§ Station closed on July 18, 1974.

¶ It was 10 m before May 31, 1974.

‡ Information on the operation of Hong Kong's system of visual Tropical Cyclone Warning Signals is contained in other publications of the Royal Observatory, Hong Kong. Gale or Storm Signals 5, 6, 7 and 8 were renumbered as 8 NW, 8 SW, 8 NE and 8 SE respectively with effect from January 1, 1973.

The reports in Section 5 present a general description of the life history of each tropical cyclone affecting Hong Kong from formation to dissipation. In more detail it states:

- (a) how the tropical cyclone affected Hong Kong;
- (b) the sequence of display of Tropical Cyclone Warning Signals;
- (c) the maximum gust peak speeds and maximum winds recorded at various stations in Hong Kong;
- (d) the lowest barometric pressure recorded in Hong Kong;
- (e) the daily amount of rainfall recorded at the Royal Observatory; and
- (f) the times and heights of the highest tides and maximum storm surges recorded in Hong Kong.

Whenever practical, radar photographs and cloud pictures of the tropical cyclone received from weather satellites are included along with information and data obtained from aircraft reconnaissance reports.*

It has proved necessary to use different times in different contexts in this publication. The reference times of Tropical Cyclone Warnings for Shipping are given in G.M.T., records of meteorological observations are kept in Hong Kong Standard Time (G.M.T. +8 hours), while Local Time used is either Hong Kong Standard Time or Hong Kong Summer Time (G.M.T. +9 hours). In 1974, Hong Kong Summer Time was in force from the beginning of the year to 3.30 (Hong Kong Summer Time) in the morning of October 20.

The following conventions are used in this publication:

- (a) Unlabelled times given in hours and minutes (e.g. 1454) on a 24-hour clock are in Hong Kong Standard Time;
- (b) Times expressed as a.m. or p.m. are in Hong Kong Local Time;
- (c) Times labelled 'G.M.T.' are in Greenwich Mean Time.

Distances are generally given in international nautical miles (n mile), 1 international nautical mile being 1852 metres exactly. In order to shorten the text, the words 'international' and 'nautical' are usually omitted. The unit of speed is one international knot (kn), which is equal to 1.852 km/h or about 0.514 m/s.

We wish to acknowledge with thanks the Joint Typhoon Warning Center, in particular, Captain Charles R. Holliday, for the DMSP satellite photographs used in this publication.

* The data from reconnaissance aircraft reports were taken directly from the eye-fix messages received operationally at the Royal Observatory, Hong Kong. No attempt was made to convert the wind speed reports into equivalent '10-minute mean winds' as normally reported by all surface stations.

DESCRIPTION OF TABLES

Table 1 is a list of tropical cyclones in 1974 in the western North Pacific and the South China Sea (i.e. in the area bounded by the Equator, 45°N, 100°E and 160°E). The names of these tropical cyclones are those used by the U.S. Fleet Weather Central/Joint Typhoon Warning Center, Guam. The dates cited cover the period during which the track of each tropical cyclone lay within the above-stated region and may not necessarily represent its full life-span. This limitation applies to all other elements in the table.

Table 2 gives the number of Tropical Cyclone Warnings for Shipping issued by the Royal Observatory, Hong Kong in 1974, the duration of these warnings and the time of validity of the first and last warnings for all tropical cyclones in Hong Kong's Area of Responsibility (i.e., the area bounded by 10°N, 30°N, 105°E and 125°E). Times are given in hours G.M.T.

Table 3 presents a summary of the number of occasions each of the Tropical Cyclone Warning Signal was hoisted, and also the total time throughout the year 1974 that each signal was displayed. The sequence in which signals were displayed in each tropical cyclone affecting Hong Kong and the number of Tropical Cyclone Warning Bulletins issued in each case are also given. Times are given in hours and minutes in Hong Kong Standard Time which is 8 hours ahead of G.M.T.

Table 4 shows the number of occasions on which Tropical Cyclone Warning Signals were hoisted and their annual total duration during the period 1946-1974. The Strong Wind Signal, No. 3, was not introduced until 1956 and Gale or Storm Signals 5, 6, 7 and 8 were renumbered as 8 NW, 8 SW, 8 NE and 8 SE respectively with effect from January 1, 1973.

Table 5 gives the annual number of tropical cyclones in Hong Kong's Area of Responsibility between 1946-1974. The annual number of tropical cyclones which caused Tropical Cyclone Warning Signals to be raised in Hong Kong is also included.

Table 6 shows the maximum, mean and minimum duration of display of each Tropical Cyclone Warning Signal during the period 1946-1974.

Table 7 presents the casualties and damage figures associated with tropical cyclones in Hong Kong for the period 1937-1974. The information is compiled from local newspapers and from the Marine Department's records.

Table 8 contains the particulars of ships sunk, damaged, grounded, etc., by various tropical cyclones which gave rise to persistent gales at the Royal Observatory, Hong Kong for the period 1971-1974. The information is compiled from local newspapers and from the Marine Department's records.

Table 9 presents the maximum storm surges recorded by the tidegauges at North Point, Tai Po Kau and Chi Ma Wan (Lantau Island) for each tropical cyclone affecting Hong Kong in 1974. The maximum 10-minute and 60-minute mean winds and maximum gust peak speeds recorded at the Royal Observatory and Waglan Island together with the minimum sea-level pressures and total rainfall recorded at the Royal Observatory are also included. All data, other than the rainfall, refer to the period when the Tropical Cyclone Warning Signals were hoisted.

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TROPICAL CYCLONE SUMMARIES FOR 1974

During the year 34 tropical cyclones were detected in the western North Pacific and the South China Sea, of which 14 attained typhoon intensity. Six tropical cyclones crossed the coast of China while three dissipated over the northern part of the South China Sea. Four tropical cyclones skirted the coast of Taiwan while eight either entered or passed near the coast of Vietnam. Nine tropical cyclones moved across the Philippines and three passed over Japan. Only one tropical cyclone affected Korea. The monthly distribution of these tropical cyclones is shown in Figure 1 and a brief summary of their tracks is contained in Table 1.

Twelve tropical cyclones entered Hong Kong's Area of Responsibility for Tropical Cyclone Warnings for Shipping (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E) while another nine developed within this area. Altogether 336 Warnings for Shipping were issued by the Royal Observatory, Hong Kong. Out of these 21 tropical cyclones, an unprecedented number of eleven affected Hong Kong and necessitated the display of Tropical Cyclone Warning Signals.

The first tropical cyclone reported in the year was Severe Tropical Storm 'Wanda' which formed to the east of the southern Philippines on January 10 and dissipated to the east of Luzon on January 14. No tropical cyclones were observed in February. However, there was one tropical cyclone in each of the following three months. They all formed to the southeast of Guam and recurved to the northeast.

Out of the four tropical cyclones in June, two came within 400 miles of Hong Kong and caused deterioration in the local weather. One June 6, a tropical depression formed about 240 miles south of Hong Kong and moved northwards dissipating over west Kwangtung two days later. Typhoon 'Dinah' originated near the Caroline Islands on June 6 and passed about 240 miles to the south-southwest of Hong Kong around midnight on June 12/13 before degenerating into an area of low pressure over North Vietnam on June 14. Severe Tropical Storm 'Emma' also formed near the Caroline Islands but dissipated to the south of Japan. Tropical Storm 'Freda' developed to the southeast of Japan and weakened rapidly as it moved eastwards.

In July, four tropical cyclones were reported in the area but only Typhoon 'Ivy' affected Hong Kong. On July 17, 'Ivy' developed to the north of Yap and moved west-northwest, passing about 130 miles to the southwest of Hong Kong. It entered the coast of west Kwangtung on July 22.

Although seven tropical cyclones were reported in the area in August, none came sufficiently close to affect Hong Kong. This was the first occasion since 1969 when no signals were hoisted in August.

Out of the five tropical cyclones reported in September, two, Tropical Storm 'Trix' and Severe Tropical Storm 'Wendy', necessitated the hoisting of Tropical Cyclone Warning Signals in Hong Kong. Typhoon 'Shirley' formed to the southeast of Okinawa and entered the south coast of Japan after crossing the Ryukyu Islands. The other two originated well to the east of the western North Pacific and both became extratropical to the east of Japan.

In October, a series of four typhoons in the western North Pacific moved westwards into the South China Sea in succession and resulted in heavy rain, landslides and floodings of low-lying areas in Hong Kong. This is the first occasion when four tropical cyclones affected Hong Kong in October. Typhoons 'Carmen' and 'Elaine' came within 100 miles of Hong Kong, causing gale force winds and widespread heavy rain. The total rainfall recorded at the Royal Observatory on October 18-20 amounted to 459.5 mm, which made 'Carmen' the wettest tropical cyclone in October and the fourth wettest since record began in 1884. Typhoon 'Bess' and 'Della' passed to the south of Hong Kong and filled over North Vietnam.

Altogether six tropical cyclones were observed during the last two months of the year. Typhoon 'Gloria' came near the south China coast about 110 miles east of Hong Kong on November 9, causing fresh winds and periods of light rain while Typhoon 'Irma', the first tropical cyclone which necessitated the hoisting of Tropical Cyclone Warning Signals in the month of December, came within 30 miles of Hong Kong and brought strong winds and heavy rain on December 1-2. The other four moved westwards across the South China Sea and did not affect Hong Kong.

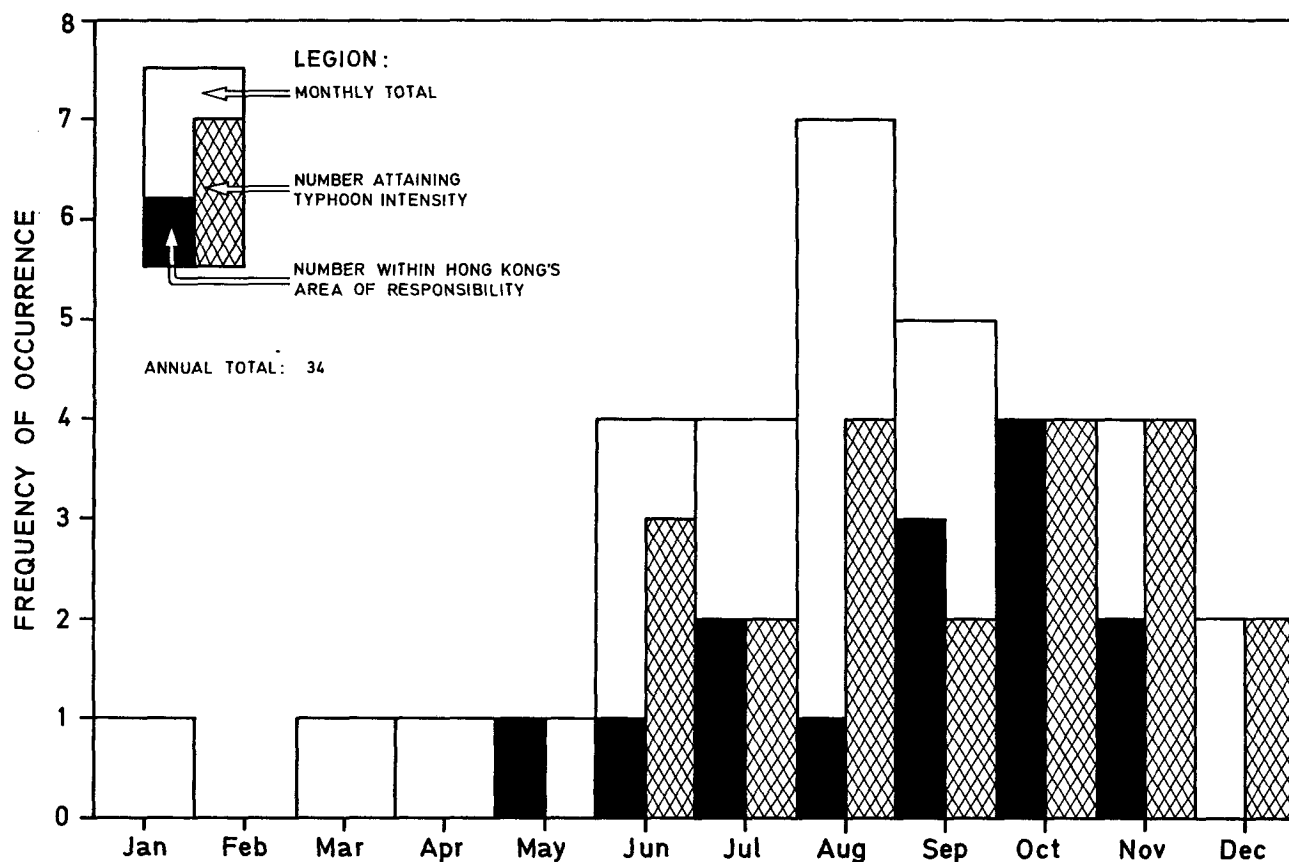


Figure 1. Monthly distribution of the frequency of occurrence of tropical cyclones and typhoons in the western North Pacific and the South China Sea in 1974 (classified in accordance with the month of the first day circle of each track).

REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1974

TROPICAL DEPRESSION

June 6-8, 1974

The track of this tropical depression is shown in Figure 2

A trough of low pressure crossed the south China coast from the north on June 3 remained almost stationary over the northern part of the South China Sea during the following 2 days. On June 5, the northeast monsoon intensified over the northern part of the South China Sea and in Hong Kong, the Strong Monsoon Signal was hoisted from 8.30 p.m. in the same evening until 5.30 p.m. the next day.

During the morning of June 6, satellite pictures received at the Royal Observatory indicated that a tropical depression was developing on the trough near the Paracel Islands. During the afternoon, the centre of the depression formed about 240 miles south of Hong Kong and the Stand By Signal, No. 1, was hoisted at 6.00 p.m.

The tropical depression drifted slowly northwards at a speed of about 5 knots during the night of June 6 but its circulation remained weak and the maximum winds near its centre estimated from satellite pictures received on June 7 were only about 30 knots (Figure 3). Radar observations made at the Royal Observatory on the same day also indicated that the centre of the depression was not well defined (Figure 4).

At 7.30 p.m. on June 7, the tropical depression moved to a position about 130 miles southwest of Hong Kong and the Stand By Signal was replaced by the Strong Wind Signal, No. 3. The depression entered the south China coast about 130 miles west-southwest of Hong Kong in the morning of June 8 and dissipated over west Kwangtung in the same afternoon. All signals were lowered by 8.15 a.m. on June 8.

Winds over Hong Kong freshened from the east during the evening of June 5 and remained fresh to strong until the evening of June 7. The maximum winds recorded were 36 knots at Waglan Island and Tate's Cairn, 28 knots at Cape Collinson and 26 knots at the Hong Kong International Airport. Showers affected Hong Kong in the afternoon of June 6 and became squally and more frequent from the afternoon of June 7 until the next morning.

The following daily amounts of rainfall were recorded at the Royal Observatory:

June 5	Nil
June 6	0.1 mm
June 7	17.1 mm
June 8	5.1 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.5	June 7	11.00 a.m.	0.4	June 7	9.00 p.m.
Tai Po Kau	2.5	June 7	9.00 a.m.	0.6	June 7	9.00 p.m.
Chi Ma Wan (Lantau Island)	2.7	June 7	11.15 a.m.	0.7	June 7	2.20 p.m.

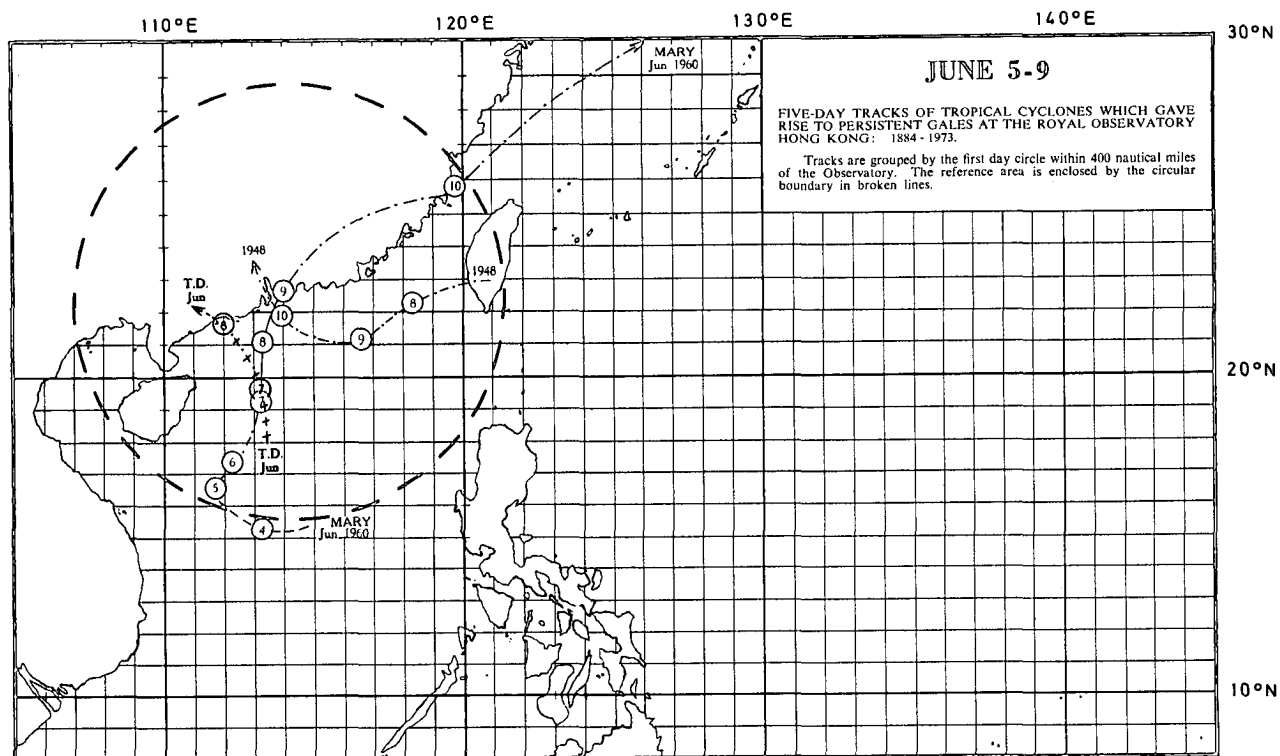


Figure 2. Track of Tropical Depression: June 6-8, 1974.

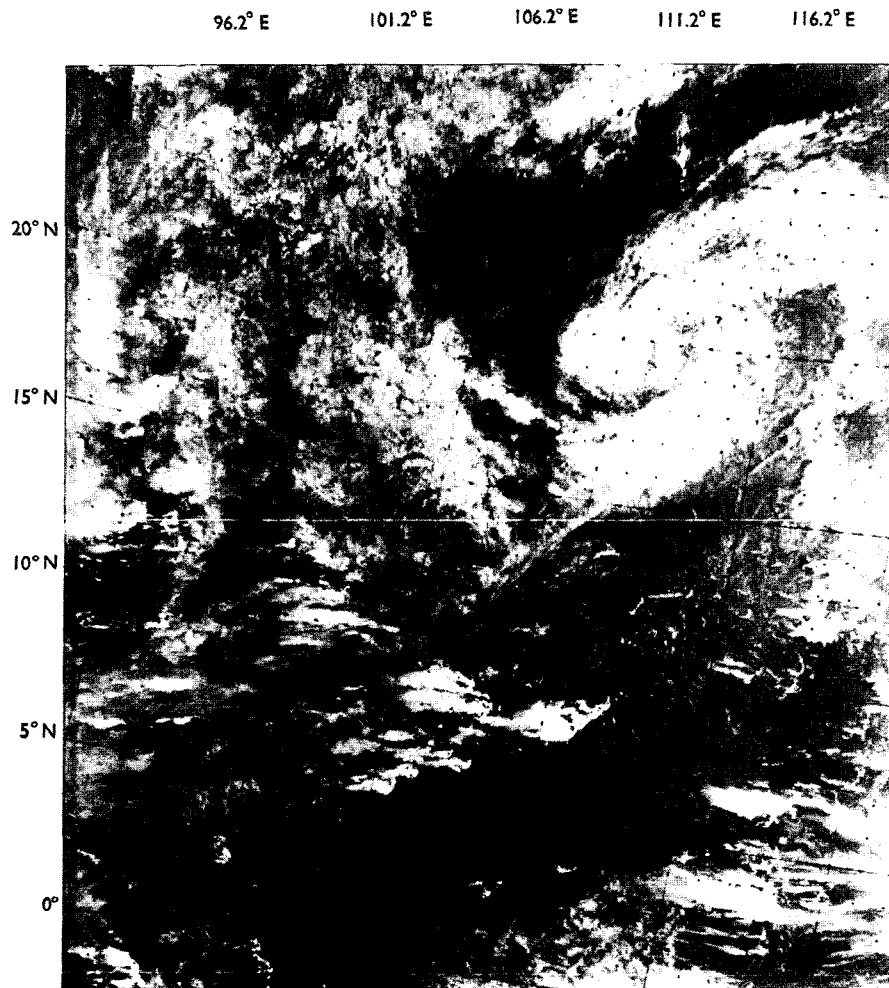


Figure 3. Imagery of the tropical depression taken at 11.12 a.m. on June 7, 1974. (U.S. DMSP imagery)

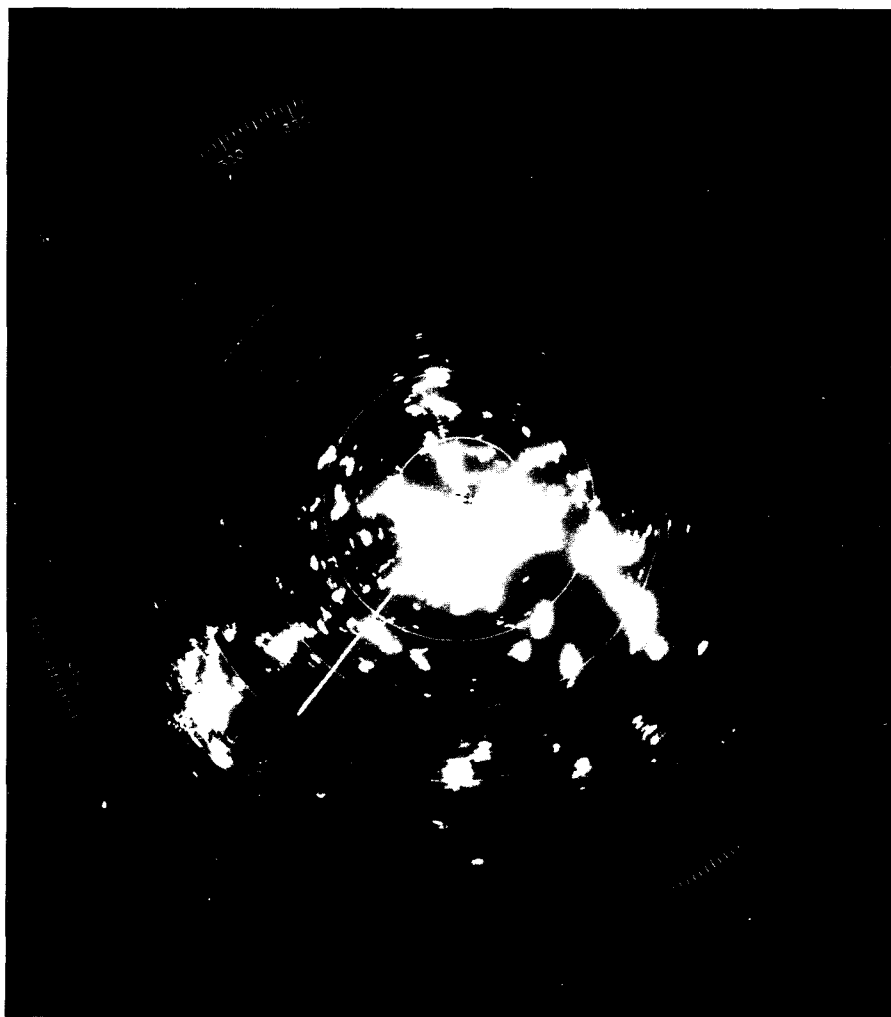


Figure 4. Radar picture of the tropical depression taken at the Royal Observatory at 3.00 p.m. on June 7, 1974 (Range markers at 40 n mile intervals).

TYPHOON 'DINAH'

June 6-14, 1974

The track of this typhoon is shown in Figure 5

On June 6, a tropical depression developed over the western North Pacific near the Caroline Islands and moved west-northwest at about 14 knots towards central Luzon. It intensified into a tropical storm named 'Dinah' during the morning of June 8, when a reconnaissance aircraft reported maximum surface winds of 45 knots near its centre.

'Dinah' became a typhoon in the morning of June 10 when it was centred about 100 miles east-northeast of Manila, and its speed of movement was reduced to only 8 knots. At 11.35 a.m. on the same day, a reconnaissance aircraft reported that the minimum sea-level pressure near the centre of 'Dinah' had dropped to 974 millibars and the maximum surface winds reached 65 knots. Satellite pictures received at the Royal Observatory during the same morning revealed that the cloud mass of the typhoon covered an area about 300 miles in diameter with large spiral cloud bands to the northeast and southwest of the circulation (Figure 6).

On June 10, 'Dinah' crossed north Luzon causing considerable damage to property and leaving a toll of more than seventy deaths in the Philippines. The typhoon entered the South China Sea in the evening of June 10 and moved westwards at about 10 knots. The circulation of 'Dinah' remained extensive and gales were reported about 250 miles from its centre. In Hong Kong, the Stand By Signal, No. 1, was hoisted at 7.00 a.m. on June 11 when the typhoon was still some 430 miles to the south-southeast.

Early on June 11, winds at Pratas Island strengthened and reached 30 knots later in the afternoon when the typhoon was about 260 miles to its south. The Stand By Signal was replaced by the Strong Wind Signal, No. 3, at 6.45 p.m. on the same day when the typhoon was about 370 miles south-southeast of Hong Kong.

Typhoon 'Dinah' moved northwestwards during the night of June 11 but changed to a west-northwesterly course towards the northeastern part of Hainan Island in the evening of June 12. The typhoon was closest to Hong Kong around midnight on June 12/13 when it was about 240 miles to the south-southwest. 'Dinah' weakened rapidly after crossing Hainan Island in the morning of June 13 and all signals were lowered at 6.15 p.m. on the same day. 'Dinah' entered the coast near Haiphong early on June 14 and dissipated over North Vietnam later in the afternoon.

Strong gusty easterly winds affected Hong Kong shortly after midnight on June 11/12 and persisted until the afternoon of June 13. Gales were occasionally experienced in exposed places and offshore on June 12. Scattered showers developed during the night of June 11 and became heavy and squally in the evening of June 12. Winds turned slowly to southeasterly late on June 12 and began to moderate during the afternoon of June 13 but the weather remained cloudy and showery. The maximum sustained winds and maximum gust peak speeds recorded at various locations in Hong Kong were as follows:

<i>Location</i>	<i>Maximum sustained wind (kn)</i>	<i>Maximum gust peak speed (kn)</i>
Royal Observatory	21	64
Hong Kong International Airport	28	53
Cape Collinson	30	50
Cheung Chau	35	53
Waglan Island	37	61
Tate's Cairn	35	64
Star Ferry	34	55

The following daily amounts of rainfall were recorded at the Royal Observatory:

June 11	Nil
June 12	34.4 mm
June 13	0.3 mm
June 14	9.0 mm
June 15	0.1 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.4	June 12	3.00 p.m.	0.7	June 12	10.50 p.m.
Tai Po Kau	2.5	June 12	4.00 p.m.	1.1	June 13	12.30 a.m.
Chi Ma Wan (Lantau Island)	2.6	June 12	2.25 p.m.	0.9	June 13	12.10 a.m.

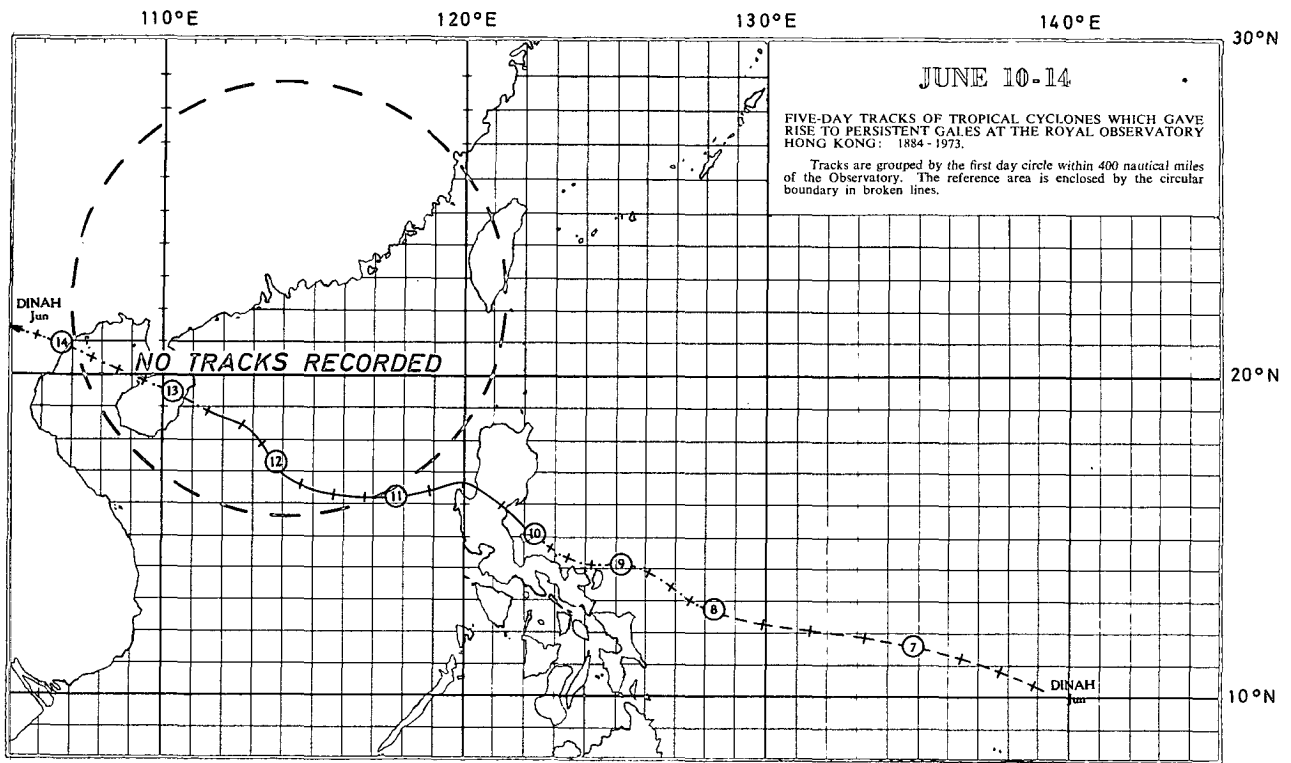


Figure 5. Track of Typhoon 'Dinah': June 6-14, 1974.

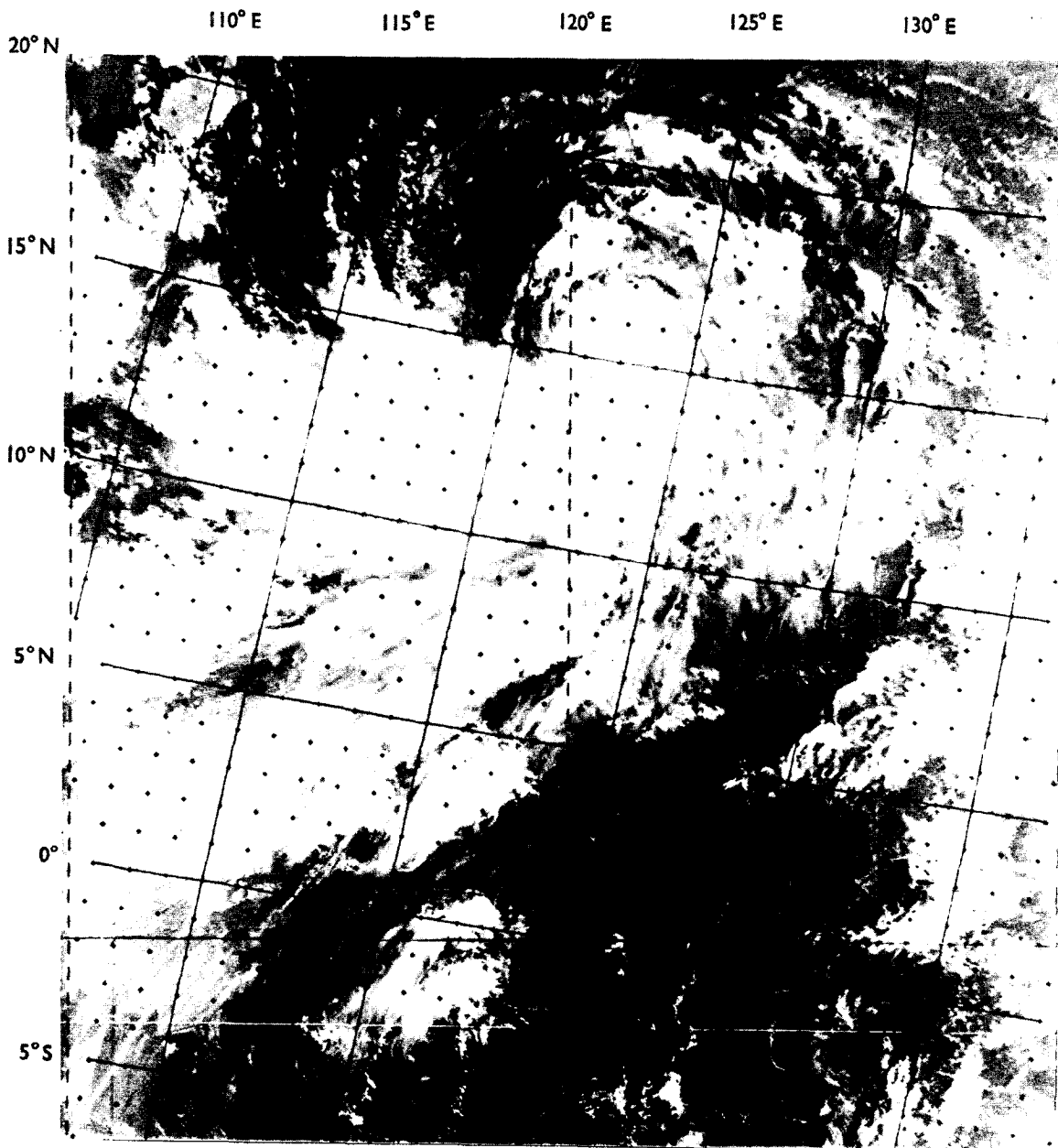


Figure 6. Imagery of Typhoon 'Dinah' taken at 9.17 am. on June 10, 1974. (U.S. DMSP imagery)

TYPHOON 'IVY'

July 17-23, 1974

The track of this typhoon is shown in Figure 7

On July 17, a tropical depression developed over the western North Pacific to the north of Yap and moved west-northwest at about 14 knots towards Luzon. It intensified into a severe tropical storm named 'Ivy' the next day, when a reconnaissance aircraft reported maximum surface winds of 60 knots near its centre. 'Ivy' became a typhoon during the night of July 18 when it was centred about 480 miles east of Manila. At 6.30 a.m. on July 19, a reconnaissance aircraft reported that the minimum sea-level pressure near the centre of 'Ivy' had dropped to 971 millibars and the maximum surface winds reached 100 knots.

In the evening of July 20, 'Ivy' entered the South China Sea after crossing Luzon near Baguio and continued to move west-northwest at about 13 knots towards the south China coast to the west of Hong Kong. The circulation of 'Ivy' remained small and reports from ships indicated that gales did not extend to more than 120 miles from its centre. In Hong Kong, the Stand By Signal, No. 1, was hoisted at 7.10 a.m. on July 21 when the typhoon was centred about 320 miles to the south-southeast.

Typhoon 'Ivy' changed to a more northwesterly course and reduced its speed to about 10 knots during the morning of July 21. Satellite pictures received at the Royal Observatory in the same morning indicated that the cloud mass associated with the typhoon had become more extensive with spiral cloud bands feeding into the centre from all quadrants (Figure 8). The Stand By Signal was replaced by the Strong Wind Signal, No. 3, at 1.15 p.m. on the same day when the typhoon was about 270 miles to the south-southeast of Hong Kong.

During the night of July 21, the eye of 'Ivy' appeared on the Royal Observatory radar and remained visible until the typhoon crossed the south China coast about 150 miles west-southwest of Hong Kong in the evening of July 22. During this period, 'Ivy' moved steadily northwestwards at about 10 knots. Its eye was circular and well defined with a diameter varying from 20 to 40 miles (Figure 9). 'Ivy' finally dissipated over west Kwangtung during the night of July 22 and all signals were lowered by 5.45 a.m. on July 23.

Strong gusty easterly winds began to affect Hong Kong in the afternoon of July 21. Winds turned to south-easterly the next morning and increased to near gale force. Scattered showers developed in the afternoon of July 21 and became squally and more frequent the next day. Winds moderated slowly during the night of July 22 but scattered showers were still reported on July 23.

Apart from some interruption of air and sea traffic, no serious damage was reported in Hong Kong during the passage of 'Ivy'.

The maximum sustained winds and maximum gust peak speeds recorded at various locations in Hong Kong were as follows:

<i>Location</i>	<i>Maximum sustained wind (kn)</i>	<i>Maximum gust peak speed (kn)</i>
Royal Observatory	22	61
Hong Kong International Airport	29	54
Cheung Chau	36	63
Waglan Island	33	55
Tate's Cairn	35	72
Star Ferry	26	56

The radar indicated that the rainfall associated with the typhoon was relatively light and seldom exceeded 13.0 mm per hour. The daily amounts of rainfall recorded at the Royal Observatory were as follows:

July 20	5.5 mm
July 21	4.0 mm
July 22	35.8 mm
July 23	2.6 mm
July 24	Trace

An exceptionally high tide of 2.4 metres or about 8 feet was expected around noon on July 22 and there was some concern that the addition of a storm surge would cause some floodings on relatively low-lying areas. Warnings that tides would be increased by 2 to 4 feet were issued early in the morning of July 21 and thereafter. The sea level actually rose to 10.3 feet in the harbour and 11.3 feet in Deep Bay around midday on July 22. Heavy floodings in Yuen Long were also reported.

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.7	July 22	11.35 a.m.	0.5	July 22	9.15 a.m.
Tai Po Kau	2.6	July 22	1.00 p.m.	0.7	July 22	2.00 p.m.
Chi Ma Wan (Lantau Island)	3.1	July 22	11.05 a.m.	1.0	July 22	9.45 a.m.

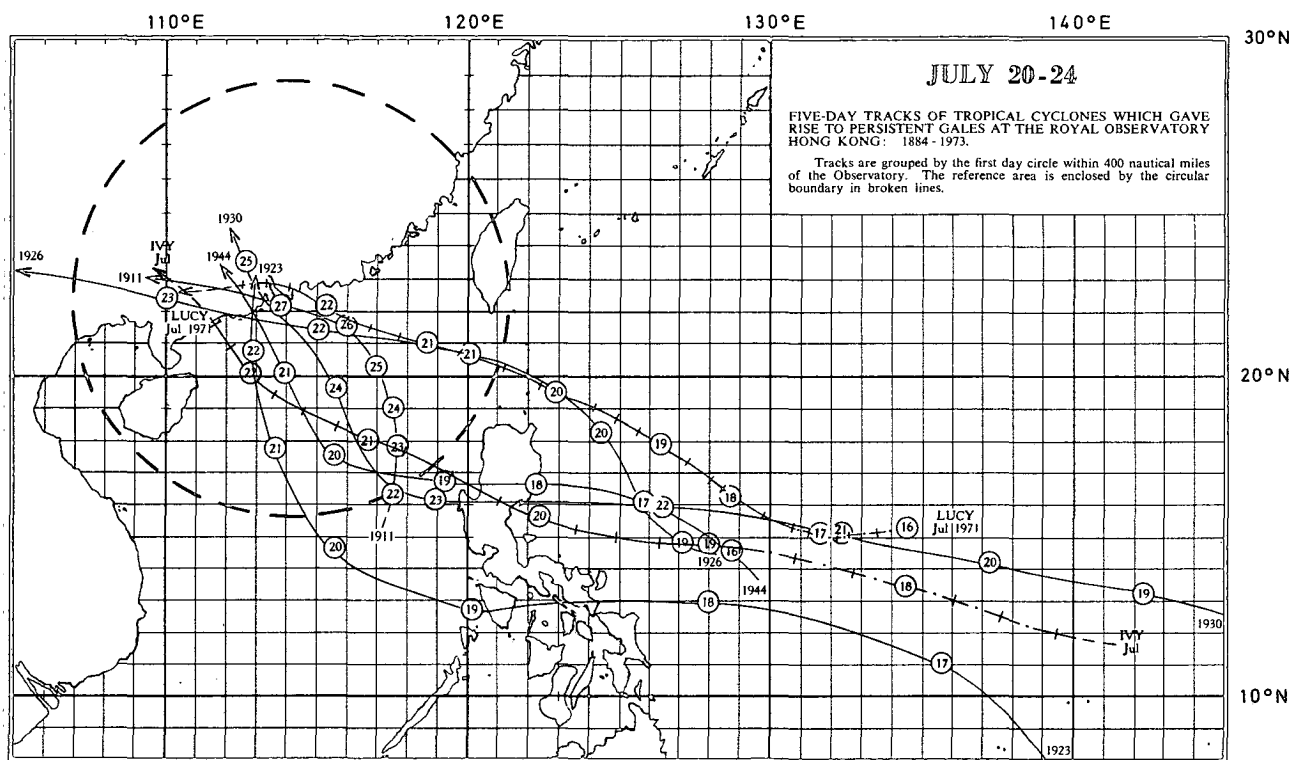


Figure 7. Track of Typhoon 'Ivy': July 17-23, 1974.

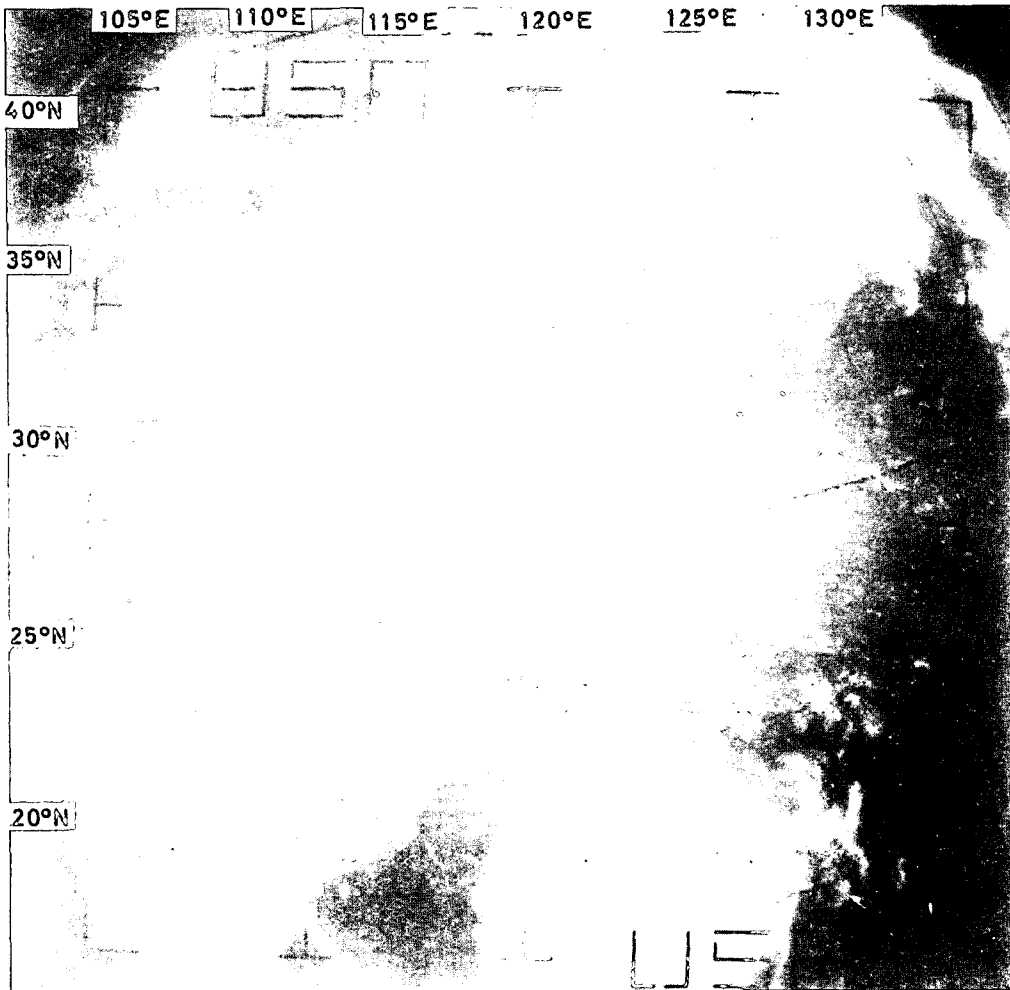


Figure 8. ESSA-8 APT picture of Typhoon 'Ivy' taken at 11.37 a.m. on July 21, 1974.

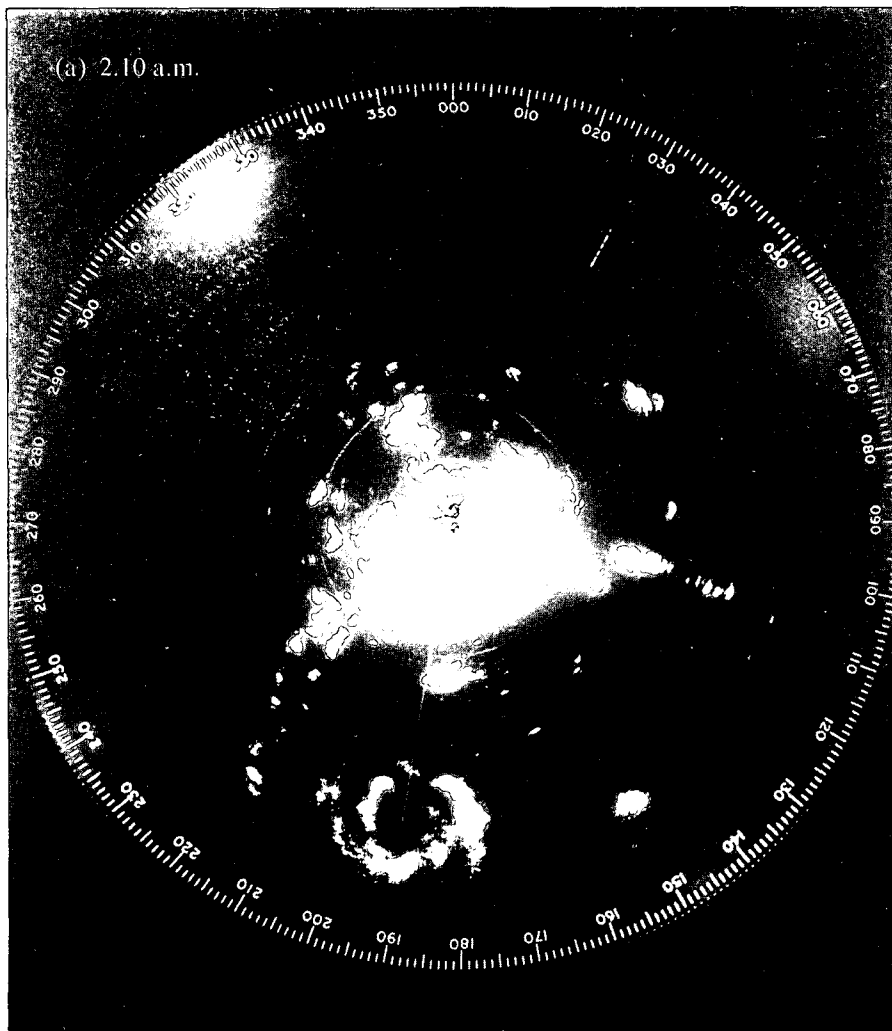
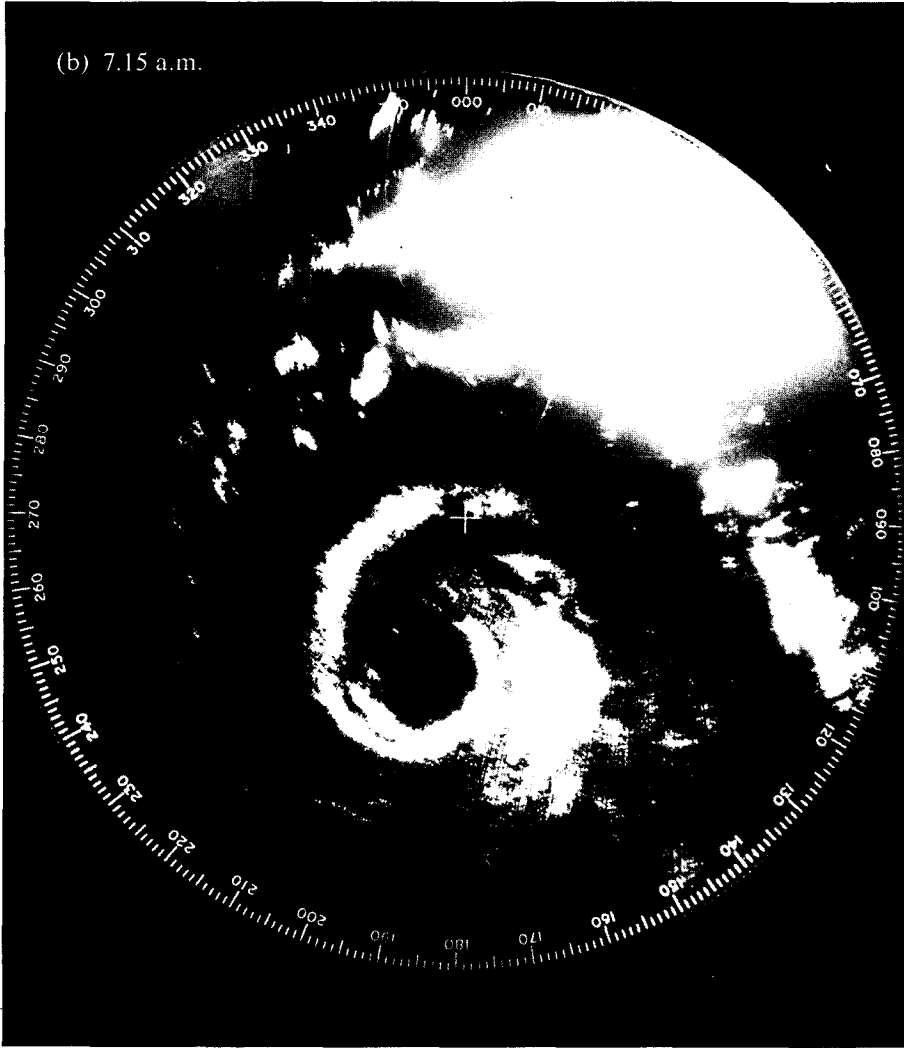
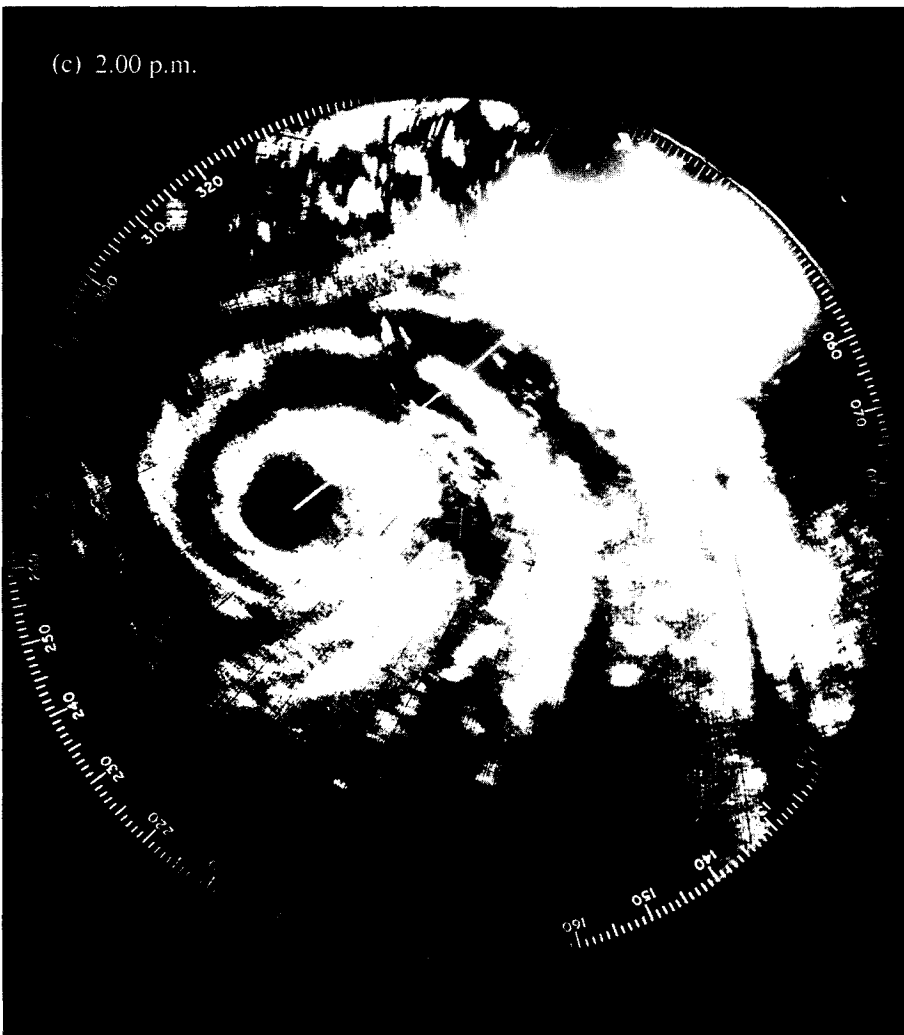


Figure 9. Radar pictures of Typhoon 'Ivy' taken at the Royal Observatory on July 22, 1974 (Range markers at 40 n mile intervals).

(b) 7.15 a.m.



(c) 2.00 p.m.



TROPICAL STORM 'TRIX'

September 5-6, 1974

The track of this tropical storm is shown in Figure 10

A trough of low pressure crossed the south China coast from the north on September 1 and remained almost stationary over the northern part of the South China Sea during the following four days. During the morning of September 5, satellite pictures received at the Royal Observatory indicated that a tropical depression had developed on the trough near Pratas Island (Figure 11). In Hong Kong, the Stand By Signal, No. 1, was hoisted at 11.15 a.m. when the depression was centred about 130 miles to the southeast.

The tropical depression drifted slowly westwards at about five knots during September 5 and was tracked continuously by the Royal Observatory's radar which indicated that the centre of the depression was not well defined. The maximum winds near its centre estimated from satellite pictures received earlier in the morning were only about 25 knots but winds of 32 knots were reported by a ship about 60 miles west of its centre later in the afternoon.

At 10.30 p.m. on September 5, the tropical depression moved to a position about 110 miles south of Hong Kong and the Stand By Signal was replaced by the Strong Wind Signal, No. 3. The depression was closest to Hong Kong around dawn on September 6 when it was about 110 miles to the southwest (Figure 12). The Royal Observatory radar indicated that the eye of the depression became well organized (Figure 13) and there were indications that the depression was changing to a more west-northwesterly course towards the south China coast to the west of Hong Kong.

Later in the morning of September 6, the depression intensified into a tropical storm, was named 'Trix' and continued to move west-northwest further away from Hong Kong. All signals were lowered by 10.15 a.m. on the same day. At noon, 'Trix' was very close to St. John's Island where winds of 38 knots and gusts of 58 knots were reported. Later in the afternoon, the tropical storm crossed the south China coast near Yang Chiang where a sea-level pressure of 990.2 millibars and winds of 40 knots with gusts to 54 knots were recorded. 'Trix' finally dissipated over west Kwangtung in the evening of September 6.

Winds over Hong Kong freshened from the east during the afternoon of September 5 and remained strong until the next morning. The maximum winds recorded were 33 knots at Waglan Island and 30 knots at Tate's Cairn. The maximum gust peak speeds recorded at these two places were 48 and 58 knots respectively. The weather was cloudy with sunny intervals in the morning of September 5 but showers affected Hong Kong later in the afternoon and became squally and more frequent from the evening until the next day.

The following daily amounts of rainfall were recorded at the Royal Observatory:

September 5	1.1 mm
September 6	14.1 mm
September 7	0.1 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.2	Sept. 6	12.40 a.m.	0.4	Sept. 6	9.50 a.m.
Tai Po Kau	2.2	Sept. 6	1.45 a.m.	0.4	Sept. 6	10.00 a.m.
Chi Ma Wan (Lantau Island)	2.4	Sept. 6	12.50 a.m.	0.6	Sept. 6	9.50 a.m.

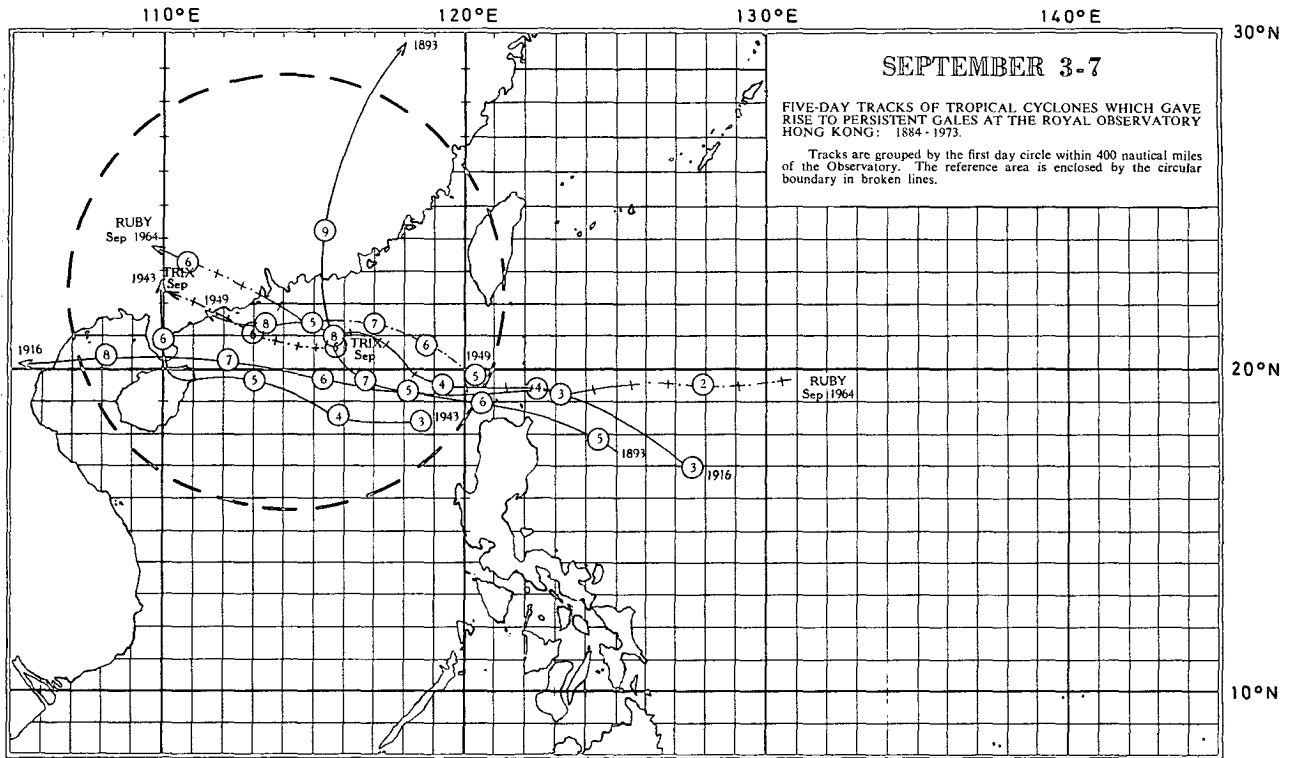


Figure 10. Track of Tropical Storm 'Trix': September 5-6, 1974.



Figure 11. NOAA-2 DRIR picture of Tropical Storm 'Trix' taken from 10.05 a.m. to 10.13 a.m. on September 5, 1974.

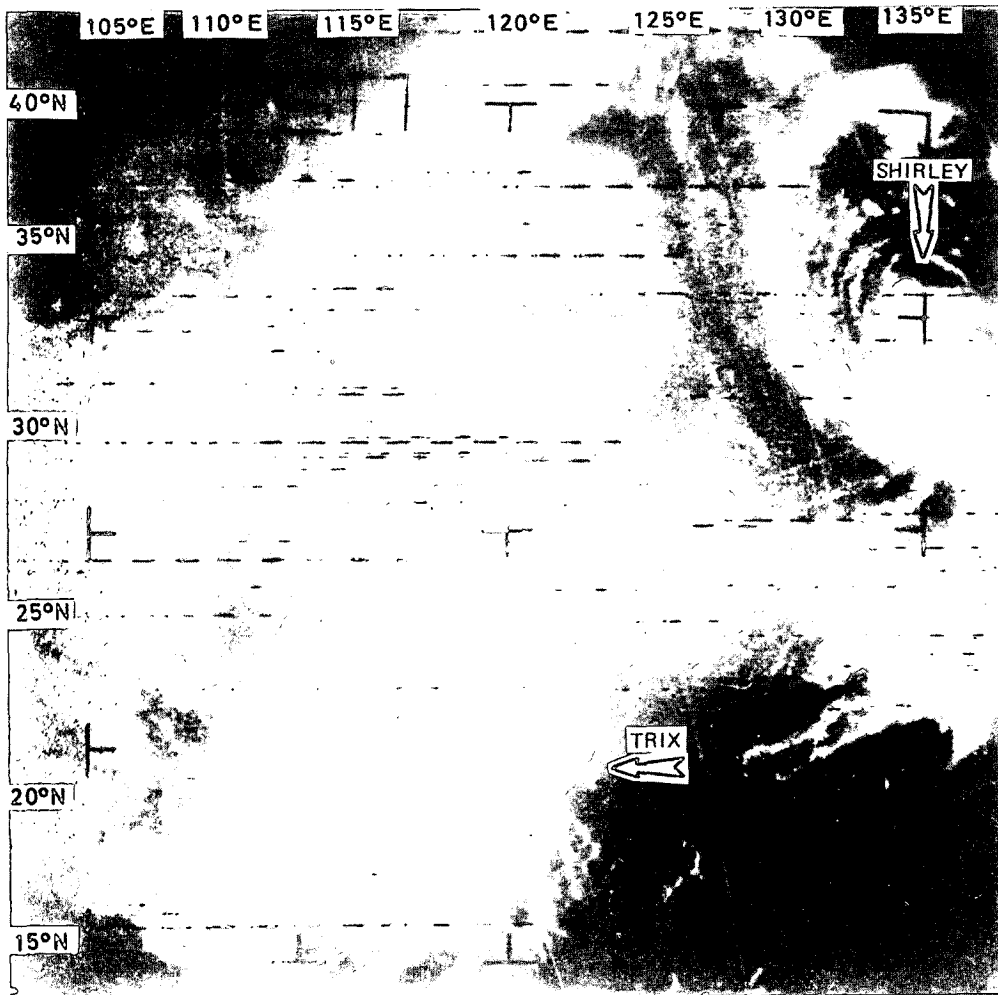
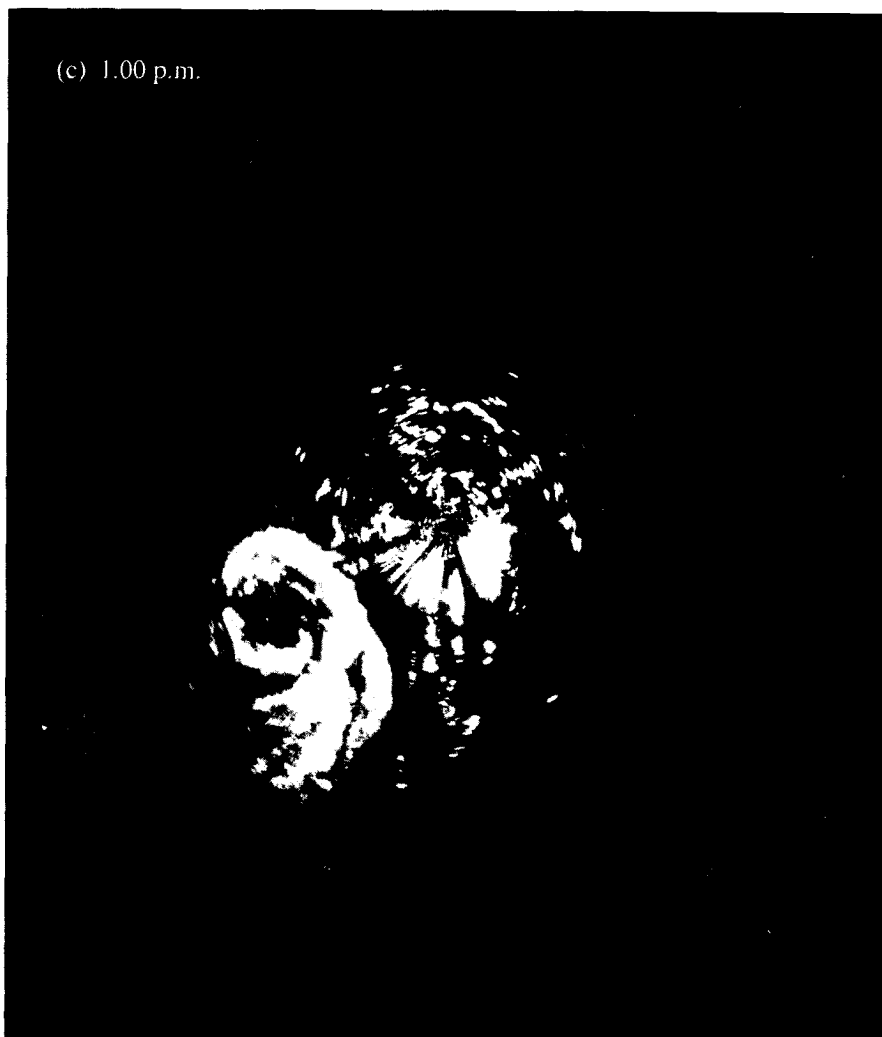
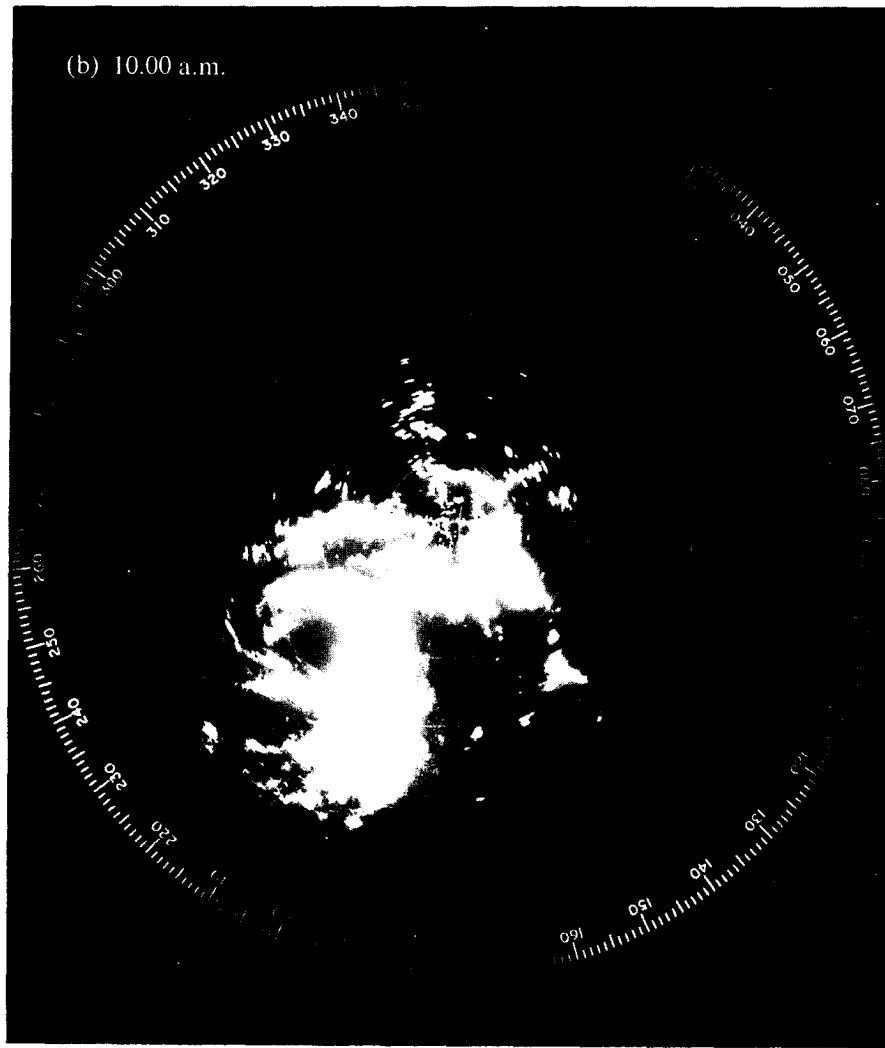


Figure 12. ESSA-8 APT picture of Tropical Storm 'Trix' taken at 11.30 a.m. on September 6, 1974.



Figure 13. Radar pictures of Tropical Storm 'Trix' taken at the Royal Observatory on September 6, 1974 (Range markers at 40 n mile intervals).



SEVERE TROPICAL STORM 'WENDY'

September 24-30, 1974

The track of this severe tropical storm is shown in Figure 14

In the morning of September 24, satellite pictures indicated that a tropical depression had developed over the western North Pacific to the east of north Luzon (Figure 15). The tropical depression moved west-northwest at about 8 knots towards the Balintang Channel during the day and intensified into a tropical storm named 'Wendy' early next morning when a ship near its centre reported winds of 41 knots and a minimum sea-level pressure of 996 millibars.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 7.15 p.m. on September 25 when the tropical storm was centred about 400 miles to the east-southeast. However, the storm became almost stationary over the Balintang Channel during the night of September 25 and only began to drift slowly northwards towards Taiwan the next morning. 'Wendy' then took a northeasterly course during the morning of September 27 and the Stand By Signal was lowered at 10.15 a.m. when the tropical storm was centred about 380 miles east of Hong Kong.

'Wendy' intensified further into a severe tropical storm during the morning of September 28 and at 7.17 a.m. in the same morning, a reconnaissance aircraft reported maximum surface winds of 65 knots and a minimum sea-level pressure of 987 millibars near its centre. Later in the day, 'Wendy' changed to a westerly course and crossed the north coast of Taiwan near Taipei in the same evening. It finally dissipated over the East China Sea to the east of Foochow on September 30.

During the period September 25-27, winds over Hong Kong were mainly light and variable and the weather was generally fine apart from some cloudy intervals and isolated showers. The total rainfall recorded on these three days was 5.4 mm. There were no abnormal changes in tide heights during the period when the Stand By Signal was on display.

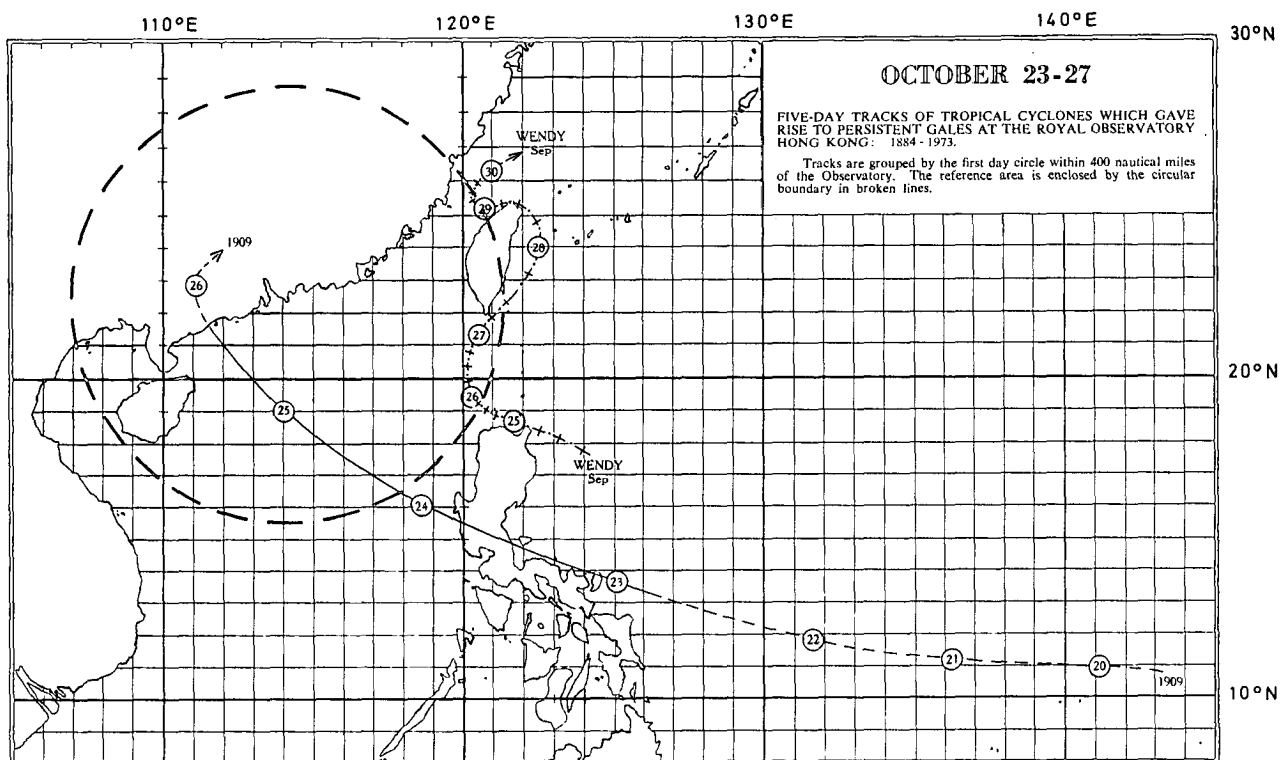


Figure 14. Track of Severe Tropical Storm 'Wendy': September 24-30, 1974.

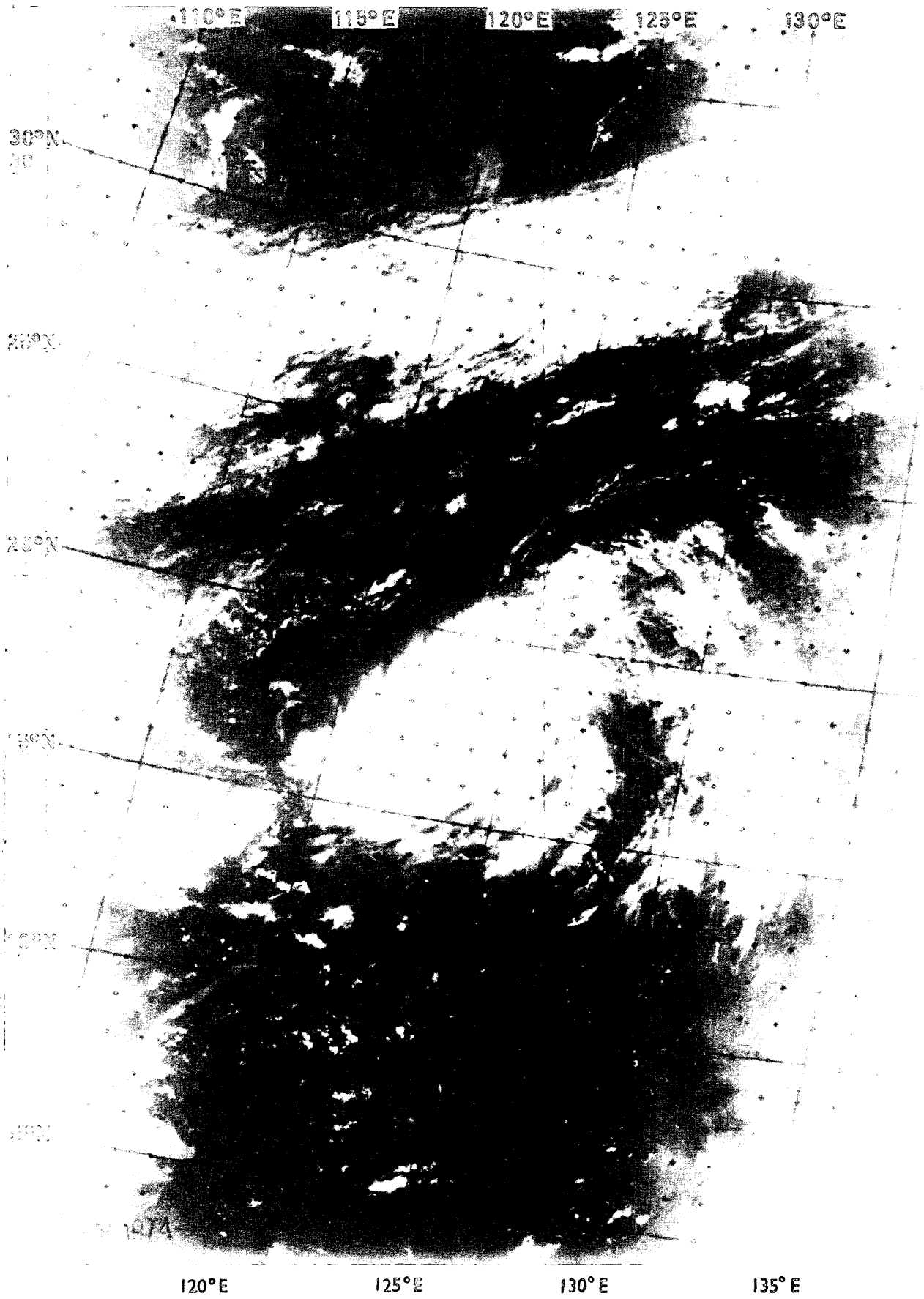


Figure 15. Imagery of Severe Tropical Storm 'Wendy' taken in the morning of September 24, 1974. (U.S. DMSP imagery)

TYPHOON 'BESS'

October 8-14, 1974

The track of this typhoon is shown in Figure 16

A tropical depression named 'Bess' developed from an area of low pressure near the Caroline Islands on October 8 and moved in a general direction towards north Luzon. During the next morning, satellite pictures received at the Royal Observatory indicated that the cloud cover associated with 'Bess' was very extensive with maximum winds of about 40 knots near its centre (Figure 17).

'Bess' became a severe tropical storm during the morning of October 10 and at 7.24 a.m. a reconnaissance aircraft reported maximum surface winds of 65 knots and a minimum sea-level pressure of 986 millibars near its centre. However, at 6.07 p.m. on the same day, reconnaissance aircraft reports indicated that the minimum sea-level pressure near its centre had dropped to 980 millibars and the maximum surface winds reached 75 knots. 'Bess' was therefore upgraded to a typhoon and it crossed the coast of north Luzon on October 11. Satellite pictures received at the Royal Observatory during the same morning revealed that the cloud mass of Typhoon 'Bess' covered an area about 300 miles in diameter with a strong outflow to the southwest of its circulation (Figure 18).

The typhoon entered the South China Sea early in the evening of October 11 and moved west-northwest at about 10 knots. The circulation of 'Bess' remained extensive and gales were reported about 250 miles from its centre. Meanwhile, a strong winter monsoon was blowing over the Taiwan Straits and the northern part of the south China coast and in Hong Kong the Strong Monsoon Signal was hoisted from 9.20 a.m. to 4.40 p.m. on October 11.

As the winter monsoon was expected to enhance the freshening of winds due to Typhoon 'Bess', the Stand By Signal, No. 1, was hoisted by the Royal Observatory at 10.20 p.m. on October 11 although the typhoon was still some 410 miles to the southeast of Hong Kong. This was soon replaced by the Strong Wind Signal, No. 3, at 20 minutes past midnight when the typhoon was about 390 miles to the southeast.

During the evening of October 12, Typhoon 'Bess' changed to a westerly course and moved at about 12 knots across the northern part of the South China Sea. At 6.00 p.m. it was centred about 95 miles south-southeast of Pratas Island where winds of 50 knots and mean sea-level pressure of 987.2 millibars were reported. Around 8.00 a.m. on October 13, 'Bess' was about 190 miles to the south of Hong Kong and headed towards Hainan Island.

While 'Bess' was moving across the northern part of the South China Sea, cool and dry air from China continued to feed into its circulation and caused it to weaken. A United States weather reconnaissance aircraft, with six persons on board, disappeared on October 12 while making observations near the centre of 'Bess'. Early on October 13 the Royal Observatory weather radar showed that the centre of 'Bess' was ill defined and there was very little rain associated with it.

'Bess' weakened into a tropical storm just before crossing Hainan Island during the evening of October 13 and dissipated over North Vietnam to the south of Haiphong the following evening. In Hong Kong all signals were lowered at 9.05 a.m. on October 14.

Due to the intensification of the winter monsoon, strong gusty northerly winds affected Hong Kong early on October 11 but the winds moderated in the afternoon. However, the northerlies began to increase again during the evening and became strong overnight. Gales were reported occasionally on hill tops and off-shore on October 12 and 13. Winds rapidly decreased in strength during the morning of October 14 and became light to moderate in the afternoon. The weather was fine on October 11 but it was cloudy with light rain from October 12 to 14. The maximum winds and maximum gust peak speeds recorded at various locations in Hong Kong were as follows:

<i>Location</i>	<i>Maximum Sustained wind (kn)</i>	<i>Maximum Gust Peak Speed (kn)</i>
Royal Observatory	19	49
Star Ferry	32	55
Hong Kong International Airport	25	46
Cheung Chau	30	52
Waglan Island	46	58
Tate's Cairn	46	61

Although 'Bess' caused heavy rain and flooding in the Philippines, it was one of the driest tropical cyclones recorded in Hong Kong and only a trace of rainfall was recorded at the Royal Observatory during October 11-14.

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	3.3	Oct. 13	8.00 a.m.	1.4	Oct. 13	8.00 a.m.
Tai Po Kau	3.6	Oct. 13	7.30 a.m.	1.5	Oct. 13	7.30 a.m.
Chi Ma Wan (Lantau Island)	3.4	Oct. 13	8.33 a.m.	1.5	Oct. 13	7.45 a.m.

Due to abnormally high tides during the passage of Typhoon 'Bess', low-lying areas were flooded with sea-water and resulted in some damage to property. The sea-water also seeped through the underground sewage system and caused minor flooding in the western district of Hong Kong Island. The abnormally high tides inside the harbour is depicted in Figure 19.

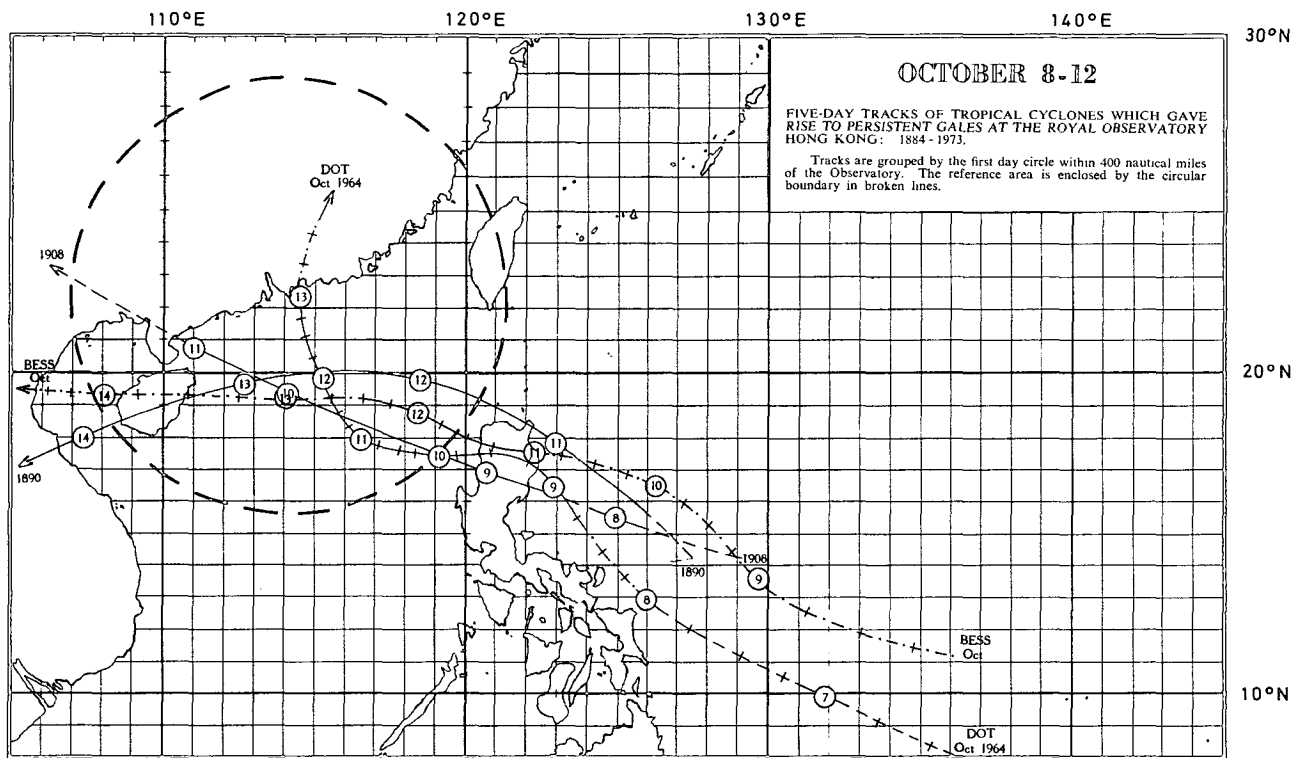


Figure 16. Track of Typhoon 'Bess': October 8-14, 1974.

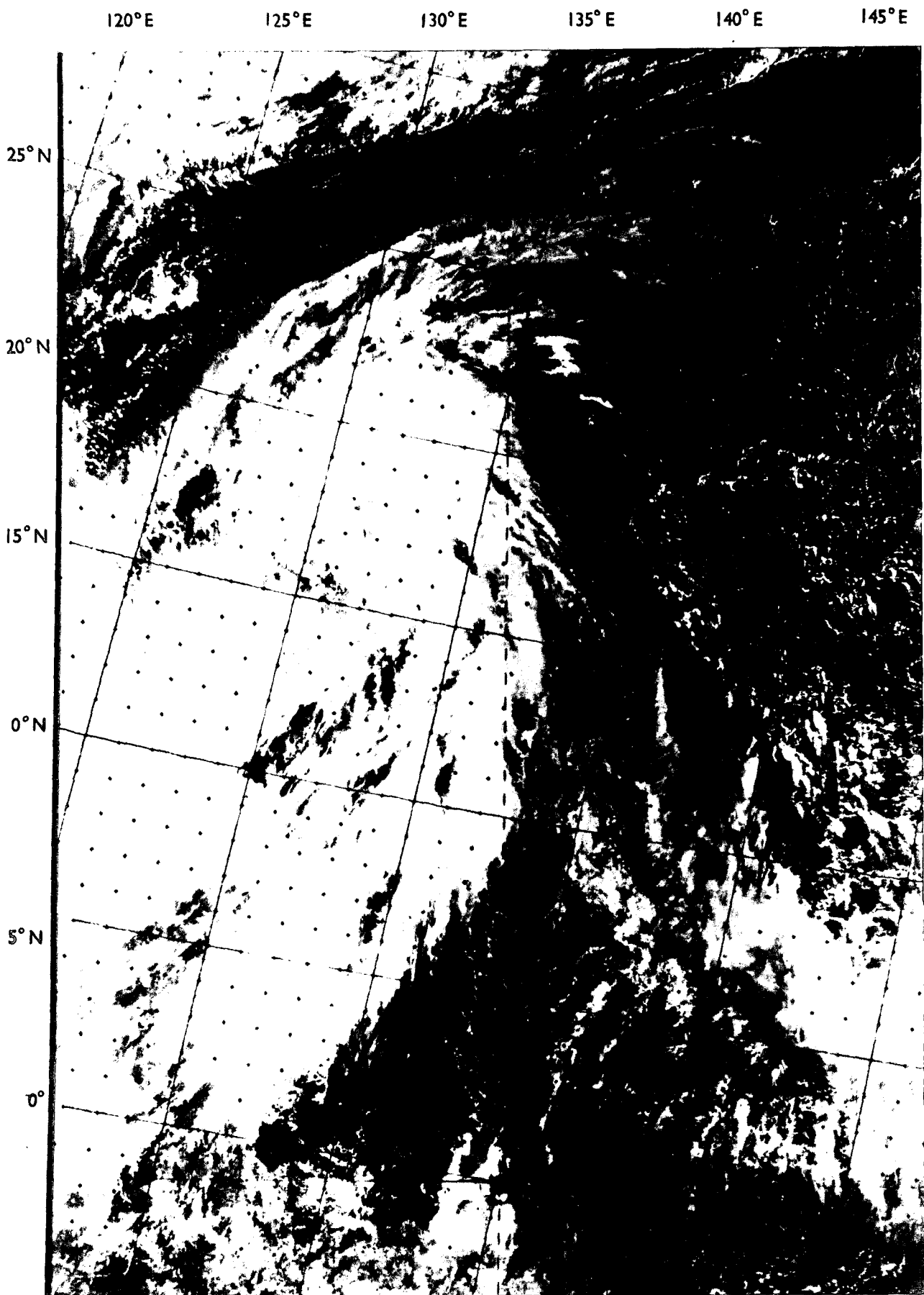


Figure 17. Imagery of Typhoon 'Bess' taken at 11.35 a.m. on October 9, 1974. (U.S. DMSP imagery)

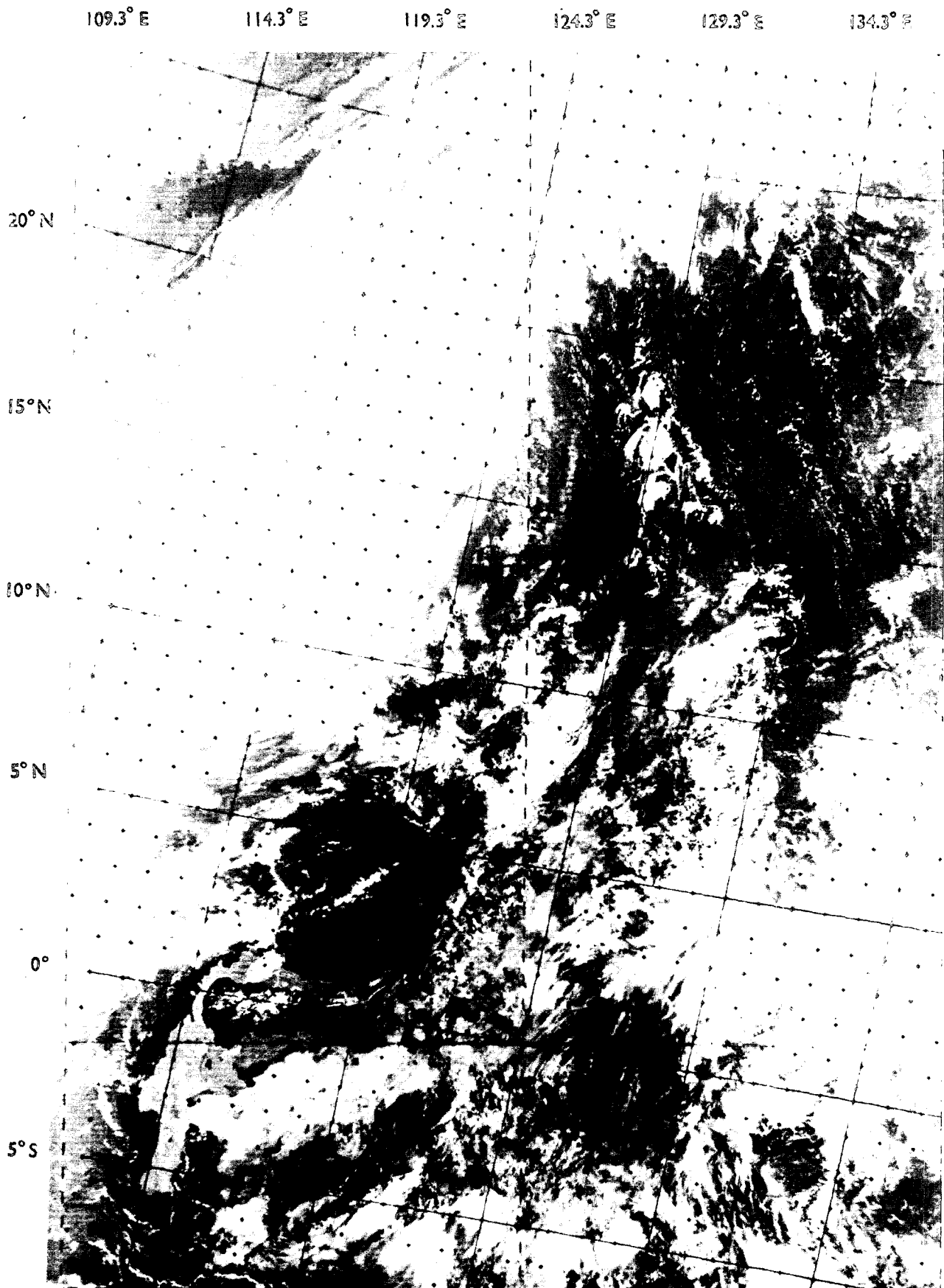


Figure 18. Imagery of Typhoon 'Bess' taken at 9.03 a.m. on October 11, 1974. (U.S. DMSP imagery)

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(電話: 2926 8250)

The copyrighted photo is available in the published version. The publication can be accessed at the Hong Kong Observatory Resource Centre.

Website of the Observatory Resource Centre:

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_e.htm
(Tel.: 2926 8250)

Figure 19. Abnormally high tides as observed from the City Hall complex. (By courtesy of South China Morning Post)

TYPHOON 'CARMEN'

October 14–20, 1974

The track of this typhoon is shown in Figure 20

On October 14, a tropical depression developed over the western North Pacific about 500 miles east-southeast of Manila and moved westwards at about 7 knots towards the central Philippines. The next morning, it intensified into a tropical storm named 'Carmen' and began to turn onto a northwesterly course towards Luzon at a speed of about 12 knots.

At 9.25 a.m. on October 16, satellite pictures received at the Royal Observatory indicated that the circulation associated with 'Carmen' was well organized with maximum surface winds of about 85 knots (Figure 21). About 4 hours later, a reconnaissance aircraft reported that the minimum sea-level pressure near the centre of 'Carmen' had dropped to 974 millibars. 'Carmen' was therefore upgraded to a typhoon during the morning of October 16. It continued to move northwestwards across Luzon and entered the South China Sea late in the same evening.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 10.55 a.m. on October 17 when the typhoon was centred about 330 miles to the southeast. At 3.00 p.m. on the same day, a ship about 95 miles northwest of its centre reported winds of 55 knots and a mean sea-level pressure of 991.5 millibars. As the typhoon was heading towards the south China coast near Hong Kong, the Strong Wind Signal, No. 3, was hoisted at 4.30 p.m. on the same day when the typhoon was centred about 280 miles to the southeast.

'Carmen' moved steadily northwestwards during the night of October 17 at a speed of about 9 knots. Satellite pictures received at the Royal Observatory during the morning of October 18 revealed that the circulation associated with 'Carmen' was intense with well-organized spiral cloud bands (Figure 22). The maximum surface winds near the centre were estimated to be about 85 knots.

The Northeasterly Gale or Storm Signal, No. 8 NE, was hoisted at 10.10 a.m. on October 18 when the centre was about 140 miles to the south-southeast of Hong Kong. In the same evening, the Royal Observatory weather radar indicated that the eye of 'Carmen' was very large with a diameter of about 60 miles (Figure 23). During the night of October 18, 'Carmen' began to drift north-northwest coming closer to Hong Kong and the Increasing Gale or Storm Signal, No. 9, was hoisted at 4.30 a.m. on October 19 when the typhoon was centred about 90 miles to the south. 'Carmen' came as close as 70 miles to the south-southwest around 9.00 a.m. on October 19 and then began to drift slowly westwards away from Hong Kong. At this time, St. John's Island, which was about 60 miles west-northwest of 'Carmen', reported winds of 60 knots with gusts up to 70 knots and a mean sea-level pressure of 995.6 millibars. As winds over Hong Kong were no longer expected to increase further, the No. 9 Signal was replaced by the Southeasterly Gale or Storm Signal, No. 8 SE at 11.00 a.m. later in the morning when the typhoon was about 75 miles to the southwest. This was followed by the Strong Wind Signal at 3.00 p.m. on the same day when the typhoon was about 95 miles to the southwest.

Due to the influx of cool and dry air from the north, 'Carmen' weakened into an area of low pressure to the south of St. John's Island in the morning of October 20. In Hong Kong, all signals were lowered at 10.00 a.m. on the same day.

In Hong Kong, the weather was fine at first on October 17, but became cloudy with showers in the evening. Although the rainfall associated with 'Carmen' was generally low from the radar presentation (Figure 24) widespread heavy rain and frequent squally heavy showers were reported from October 18 to 20 (Figure 25). Winds over Hong Kong freshened from the northeast during the evening of October 17 with gales reported during the next two days. The maximum winds and maximum gust peak speeds recorded at various locations in Hong Kong were as follows:

<i>Location</i>	<i>Maximum Sustained Wind (kn)</i>	<i>Maximum Gust Peak Speed (kn)</i>
Royal Observatory	24	70
Star Ferry	34	62
Hong Kong International Airport	34	60
Cheung Chau	40	65
Waglan Island	48	70
Tate's Cairn	50	75

The following daily amounts of rainfall were recorded at the Royal Observatory:

October 17	Trace
October 18	130.3 mm
October 19	246.0 mm
October 20	83.2 mm
October 21	9.8 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the passage of Typhoon 'Carmen' were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.9	Oct. 18	11.50 p.m.	0.9	Oct. 19	5.15 a.m.
Tai Po Kau	3.2	Oct. 17	midnight	1.1	Oct. 18	1.30 p.m.
Chi Ma Wan (Lantau Island)	3.1	Oct. 18	10.00 p.m.	1.0	Oct. 19	9.00 a.m.

Although Typhoon 'Carmen' brought much needed rain to Hong Kong (Figure 26), the heavy downpours flooded many low-lying areas and caused landslips and road collapses (Figure 27). More than a thousand people were required to evacuate from their homes during the floods and a girl was swept away by a strong current while crossing a stream in the New Territories. Heavy losses were inflicted on garden crops, fruit trees, farm houses and fish ponds. Two lighters went aground and four other vessels broke away from their moorings. A collision between two ships was also reported.

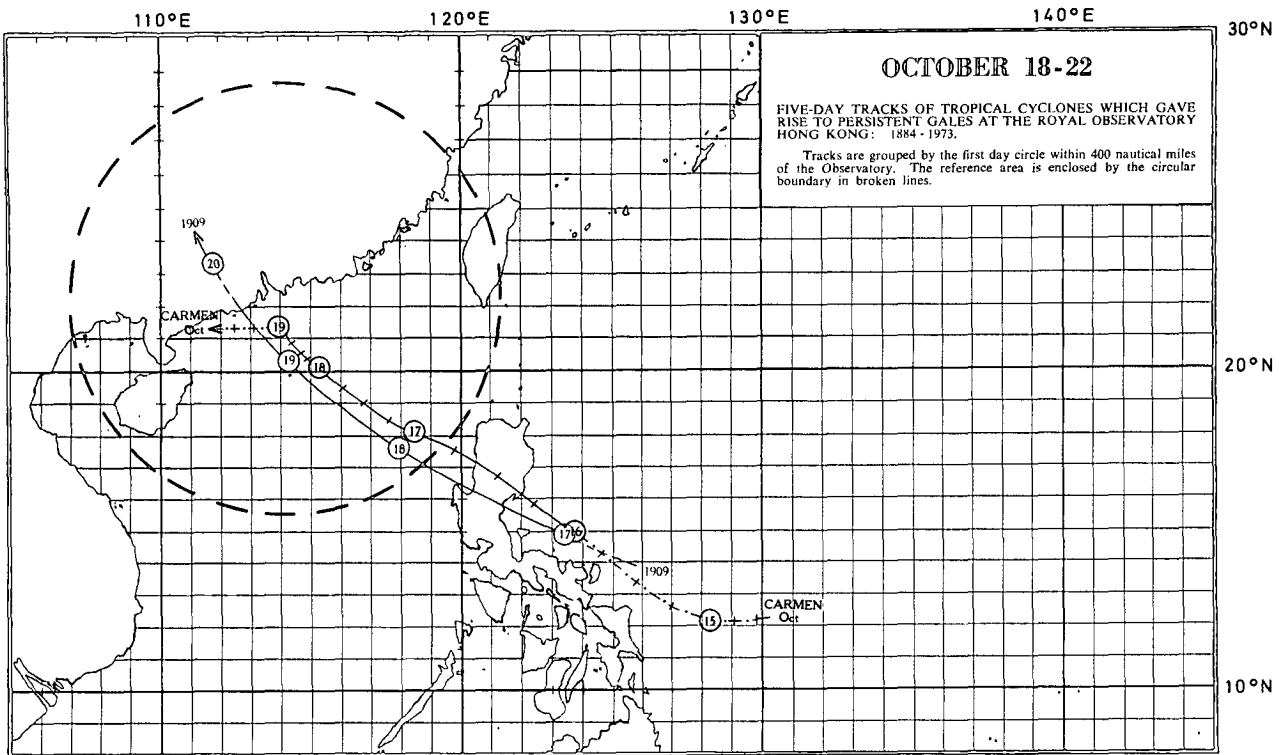


Figure 20. Track of Typhoon 'Carmen': October 14-20, 1974.

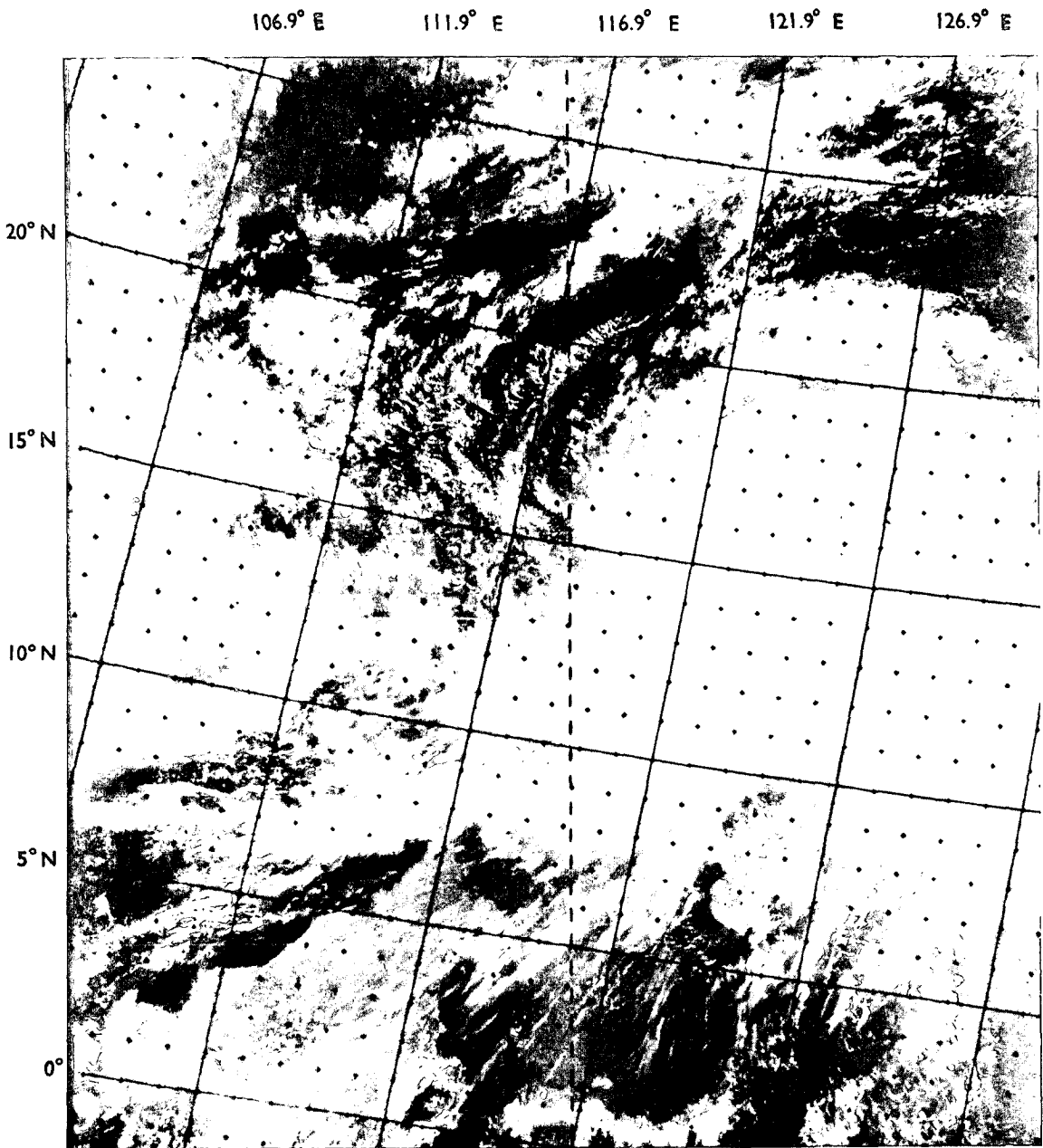


Figure 21. Imagery of Typhoon 'Carmen' taken at 12.48 p.m. on October 16, 1974. (U.S. DMSP imagery)



Figure 22. NOAA-3 DRIR picture of Typhoon 'Carmen' taken from 10.02 a.m. to 10.10 am. on October 18, 1974.

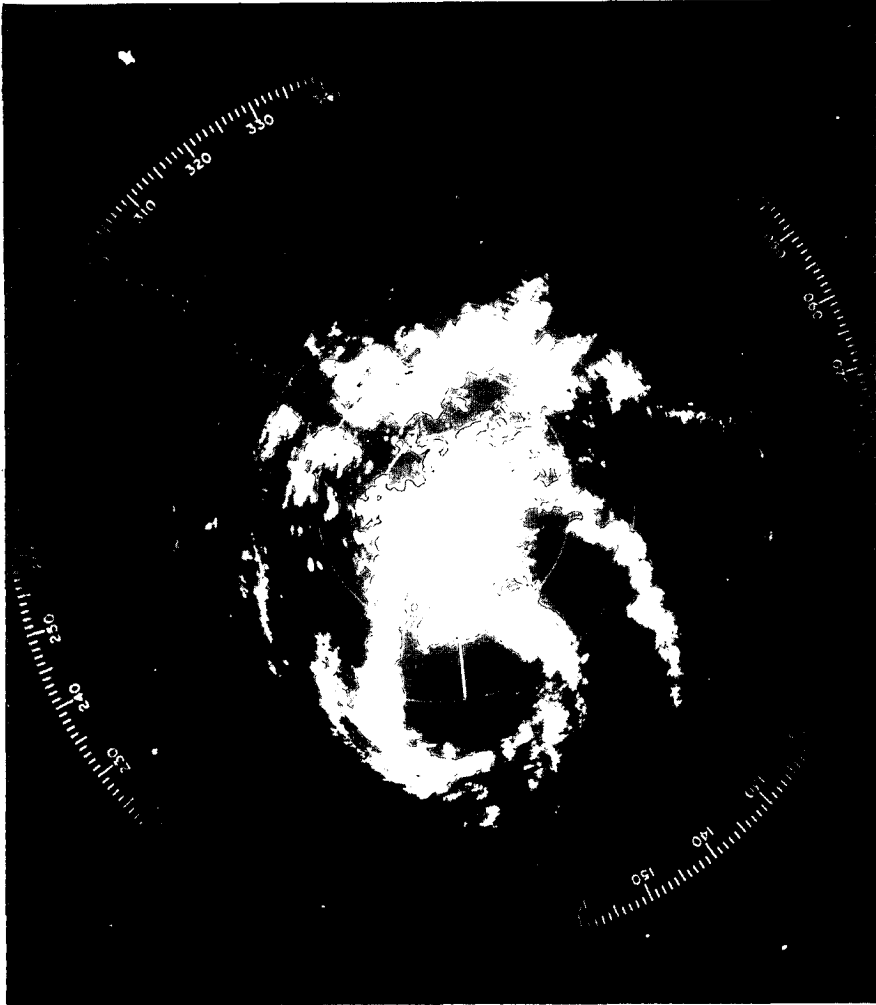


Figure 23. Radar picture of Typhoon 'Carmen' taken at the Royal Observatory at 10.00 p.m. on October 18, 1974 (Range markers a 40 n mile intervals).

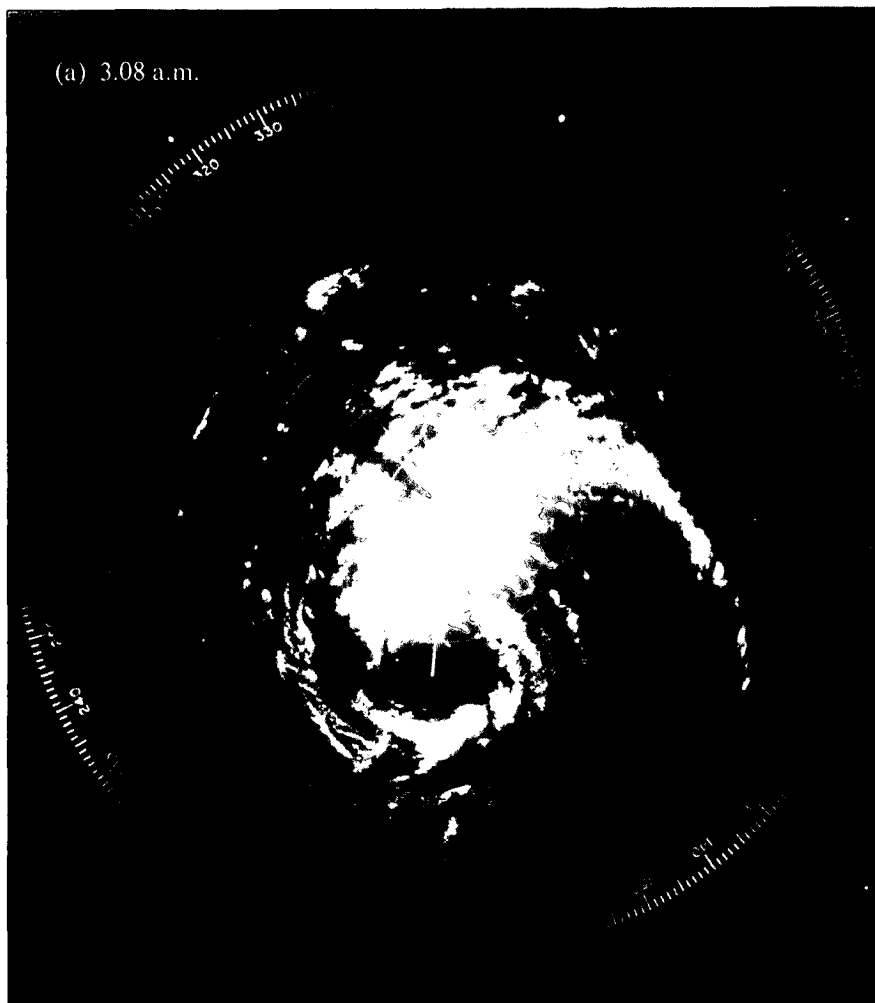
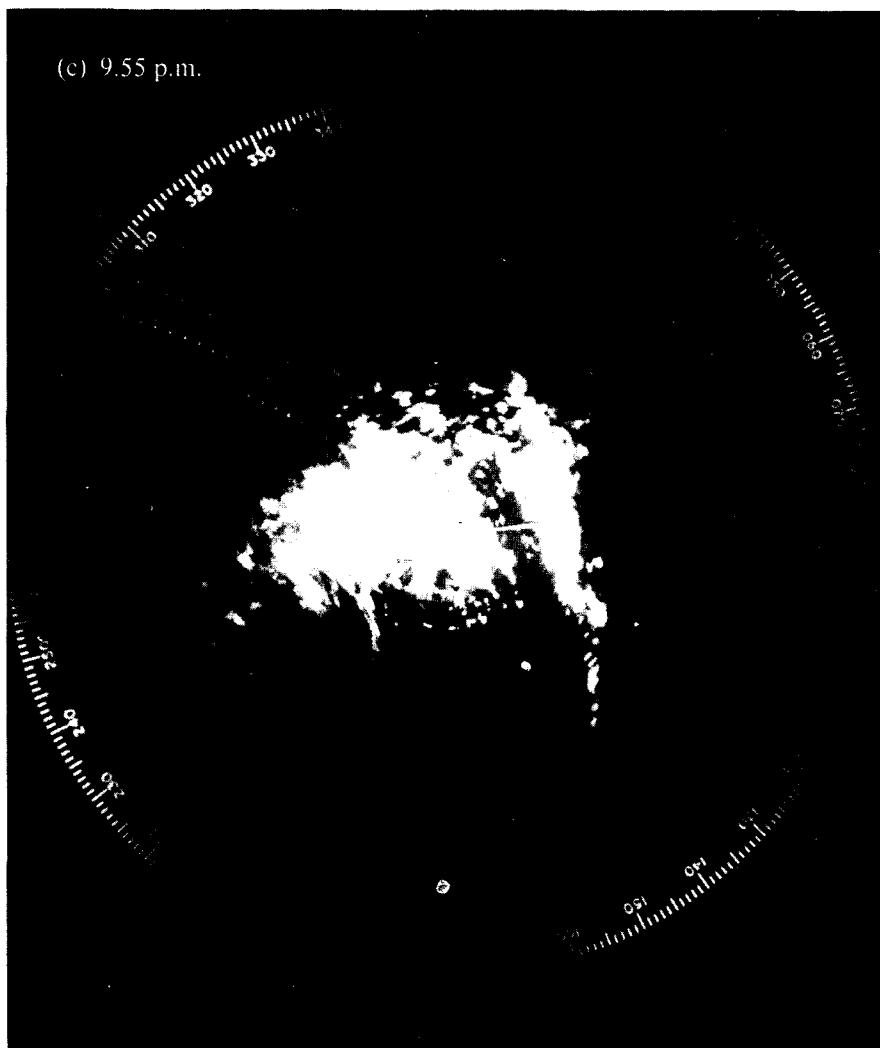
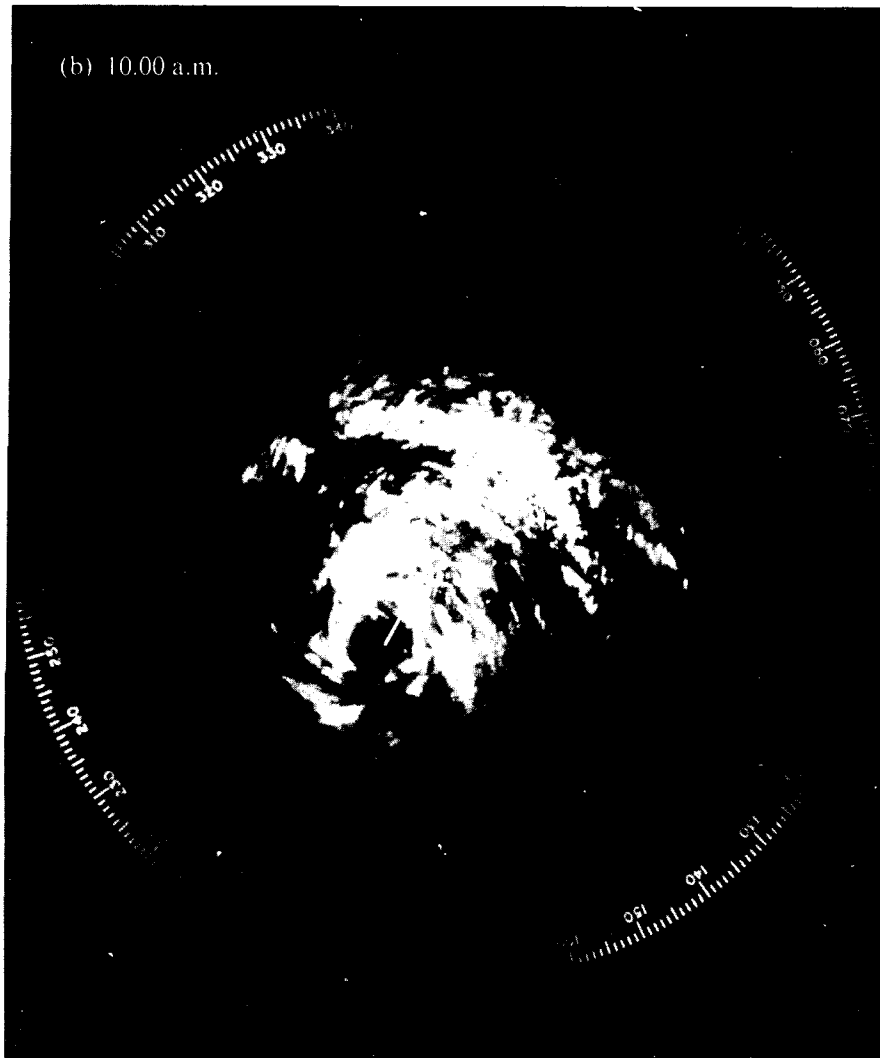


Figure 24. Radar pictures of Typhoon 'Carmen' taken at the Royal Observatory on October 19, 1974 (Range markers at 40 n mile intervals).



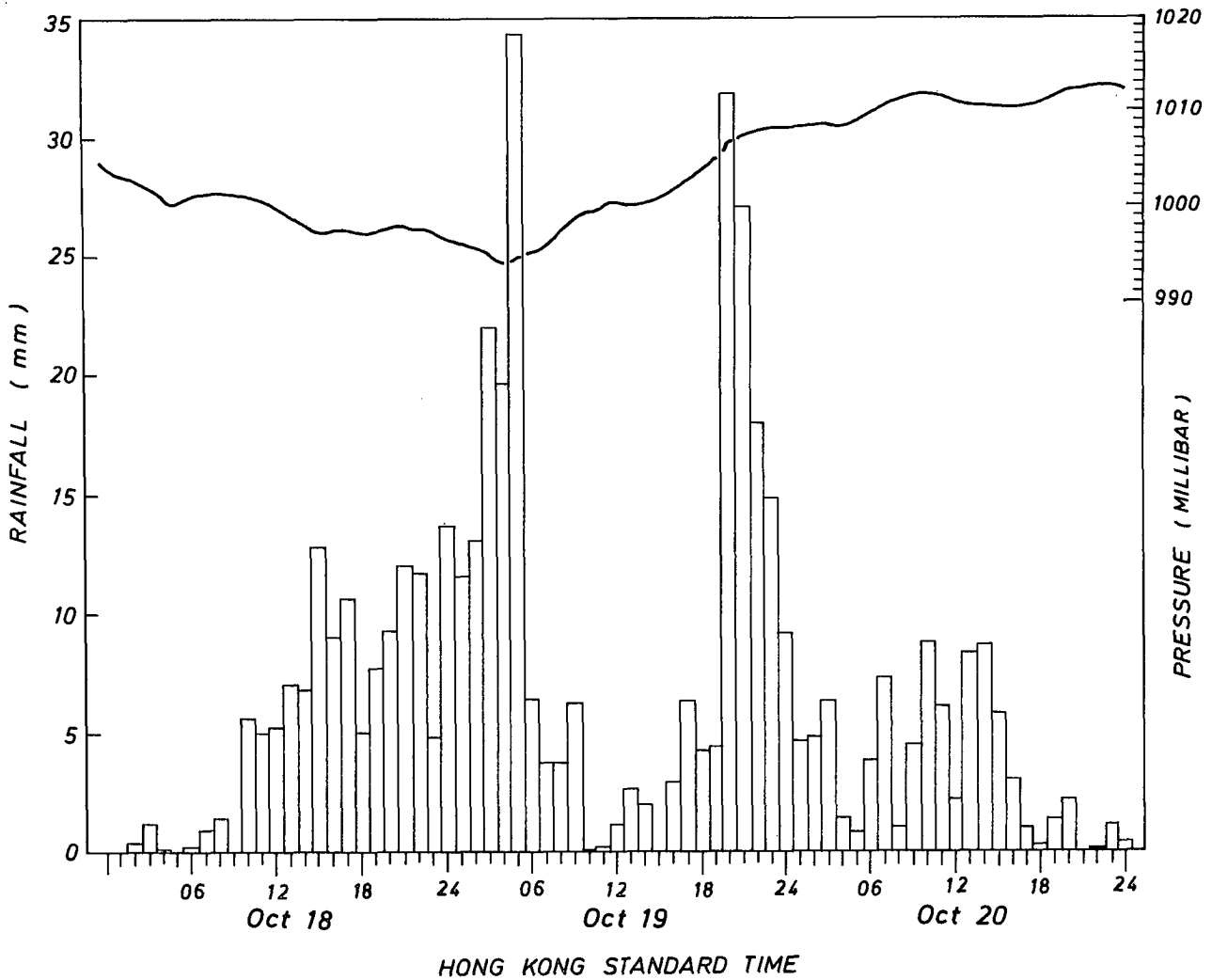


Figure 25. Hourly rainfall distribution and pressure profile as recorded at the Royal Observatory during the passage of Typhoon 'Carmen' on October 18-20, 1974.

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Website of the Observatory Resource Centre:

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_e.htm
(Tel.: 2926 8250)

Figure 26. Picture showing the Tytam Reservoir overflowing. (By courtesy of South China Morning Post)

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(Tel.: 2926 8250)

**Figure 27. Photographs of damage and disruption caused by Typhoon 'Carmen' in Hong Kong on October 19, 1974.
(a) A road collapse at Shek Pai Wan Road, Aberdeen. (By courtesy of South China Morning Post)**

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(b) Vegetable fields ruined by heavy flooding. (By courtesy of South China Morning Post)

TYPHOON 'DELLA'

October 21-27, 1974

The track of this typhoon is shown in Figure 28

In less than 24 hours after the dissipation of Typhoon 'Carmen' over the South China Sea on October 20, a tropical storm named 'Della' developed about 450 miles east-southeast of Manila and moved northwestwards at about 12 knots towards the Luzon Straits. At 11.20 p.m. on October 21, a reconnaissance aircraft reported that the maximum surface winds near the centre of the storm were about 40 knots with a minimum sea-level pressure of 996 millibars.

'Della' intensified into a typhoon during the morning of October 23 when reconnaissance aircraft reports indicated that the minimum sea-level pressure near the centre of 'Della' had dropped to 971 millibars and the maximum surface winds reached 75 knots. 'Della' changed to a west-southwesterly course over the Luzon Straits and entered the South China Sea early on October 24. Thereafter, the typhoon changed its course again and moved westwards at about 10 knots across the northern part of the South China Sea.

The circulation of 'Della' was very extensive over the South China Sea and winds of 50 knots were reported from a ship about 150 miles west-northwest of its centre. During the afternoon of October 24, a reconnaissance aircraft reported maximum surface winds of 90 knots near its centre with a minimum sea-level pressure of 967 millibars.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 6.30 p.m. on the same day when the typhoon was centred about 350 miles to the southeast. Satellite pictures received at the Royal Observatory in the next morning indicated that the cloud mass associated with 'Della' covered an area of about 240 miles in diameter with winds of 85 knots near its centre (Figure 29). 'Della' passed about 250 miles to the south of Hong Kong in the afternoon of October 25 and then began to turn onto a west-northwesterly course towards Hainan Island. It weakened rapidly after crossing Hainan Island during the afternoon of October 26 and dissipated over North Vietnam to the south of Hanoi the next morning. In Hong Kong, the Stand By Signal was lowered at 9.15 a.m. on October 26 when the typhoon was centred about 270 miles to the southwest.

In Hong Kong, the weather was fine and sunny on October 24 but became cloudy during the afternoon of October 25 with light rain in the evening and overnight. However, the weather improved rapidly the next day and sunny periods were experienced. Due to the enhancement of the winter monsoon, winds over Hong Kong freshened from the east in the evening of October 25 and were strong at times in exposed places and off-shore overnight.

The following daily amounts of rainfall were recorded at the Royal Observatory:

October 24	Nil
October 25	Trace
October 26	0.5 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.2	Oct. 25	4.15 a.m.	0.4	Oct. 25	6.30 a.m.
Tai Po Kau	2.3	Oct. 25	4.40 a.m.	0.6	Oct. 25	7.30 p.m.
Chi Ma Wan (Lantau Island)	2.3	Oct. 25	4.15 a.m.	0.7	Oct. 25	8.15 p.m.

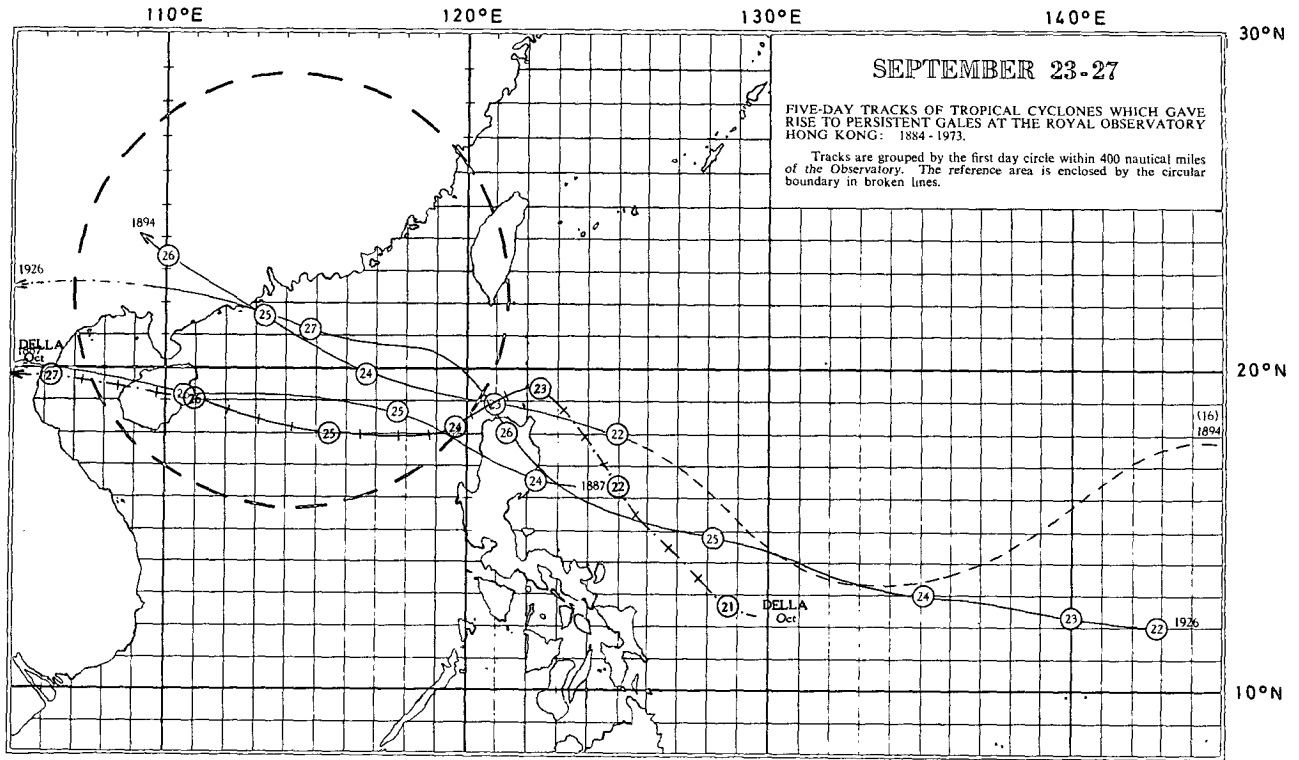


Figure 28. Track of Typhoon 'Della': October 21-27, 1974.

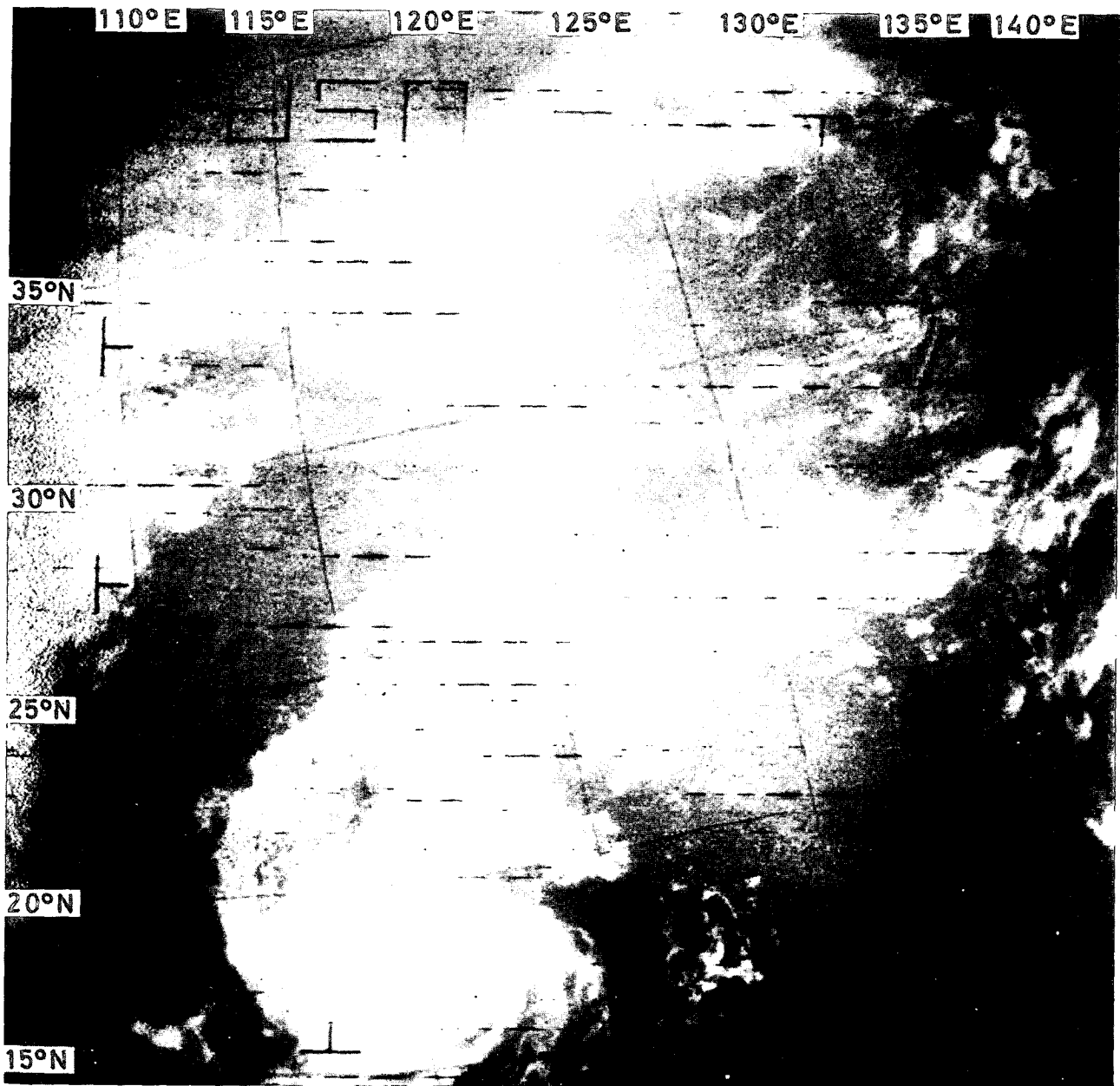


Figure 29. ESSA-8 APT picture of Typhoon 'Della' taken at 10.14 a.m. on October 25, 1974.

TYPHOON 'ELAINE'

October 24-31, 1974

The track of this typhoon is shown in Figure 30

While Typhoon 'Della' was moving across the South China Sea on October 24, a tropical depression formed near the Mariana Islands about 1,100 miles east of Manila and moved westwards at about 9 knots towards Luzon. It intensified into a tropical storm named 'Elaine' the next morning and became a typhoon on October 26 when satellite pictures received at the Royal Observatory during the morning indicated that the maximum winds near the centre of 'Elaine' had reached about 85 knots (Figure 31). On October 27, a reconnaissance aircraft reported a minimum sea-level pressure of 943 millibars in the eye of the typhoon.

'Elaine' crossed north Luzon during the morning of October 28 and entered the South China Sea later in the afternoon. In Hong Kong, the Stand By Signal, No. 1, was hoisted at 5.00 p.m. on October 28 when the typhoon was about 400 miles to the southeast. Later in the evening, winds of 55 knots were reported from a ship about 200 miles north-northwest of its centre. At this time, an intense anticyclone was centred over north China and as the northerly winds were expected to increase with the approach of 'Elaine', the Stand By Signal was replaced by the Strong Wind Signal, No. 3, at 11.05 p.m. on the same day when the typhoon was centred about 360 miles to the southeast.

'Elaine' turned onto a northwesterly track in the morning of October 29 and moved towards the south China coast at a speed of about 9 knots. However, the typhoon weakened slightly during the afternoon when a reconnaissance aircraft reported that the maximum surface winds near the centre of 'Elaine' had dropped to 40 knots with a minimum sea-level pressure of 977 millibars. 'Elaine' became a tropical storm during the night of October 29. Its centre was only poorly defined on the Royal Observatory radar even when it was within 100 miles of Hong Kong (Figure 32). On October 30, winds over Hong Kong gradually turned to easterly and were expected to increase. The Northeasterly Gale or Storm Signal, No. 8 NE was therefore hoisted at 10.10 a.m. when 'Elaine' was centred about 80 miles to the south. 'Elaine' changed its course again during the same morning and began to drift slowly westwards away from Hong Kong. The No. 8 NE Signal was then replaced by the Strong Wind Signal at 8.10 p.m. on the same day when 'Elaine' was centred about 90 miles to the south-southwest. This was followed by the Stand By Signal at 4.55 a.m. on October 31 when the tropical storm was centred about 100 miles to the southwest. 'Elaine' degenerated into an area of low pressure to the south of St. John's Island later in the afternoon and all signals were lowered at 3.30 p.m. on October 31.

In Hong Kong, the weather was fine on October 28 but became cloudy with light rain during the next day. Heavy rain and squally showers were experienced on October 30 and 31. Winds over Hong Kong freshened from the north in the evening of October 28 with gales reported during the night of October 29 and the next morning. Thereafter, winds began to decrease and became moderate to fresh during the night of October 30. However, due to the intensification of the winter monsoon, strong easterlies set in again early on October 31 and persisted throughout the same morning.

The maximum winds and maximum gust peak speeds recorded at various locations in Hong Kong were as follows:

<i>Location</i>	<i>Maximum Sustained Wind (kn)</i>	<i>Maximum Gust Peak Speed (kn)</i>
Royal Observatory	18	52
Star Ferry	30	47
Hong Kong International Airport	27	53
Cheung Chau	34	49
Waglan Island	43	55
Tate's Cairn	46	65

The following daily amounts of rainfall were recorded at the Royal Observatory:

October 28	Nil
October 29	6.4 mm
October 30	102.3 mm
October 31	116.5 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the passage of Typhoon 'Elaine' were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.8	Oct. 29	8.35 p.m.	0.7	Oct. 30	3.45 a.m.
Tai Po Kau	3.0	Oct. 29	9.00 p.m.	1.0	Oct. 29	9.00 p.m.
Chi Ma Wan (Lantau Island)	3.0	Oct. 29	8.30 p.m.	0.9	Oct. 29	8.30 p.m.

Apart from some flooding of the low-lying areas and some minor landslips due to the heavy rain associated with 'Elaine', no serious damage to property was reported in Hong Kong during the passage of 'Elaine'.

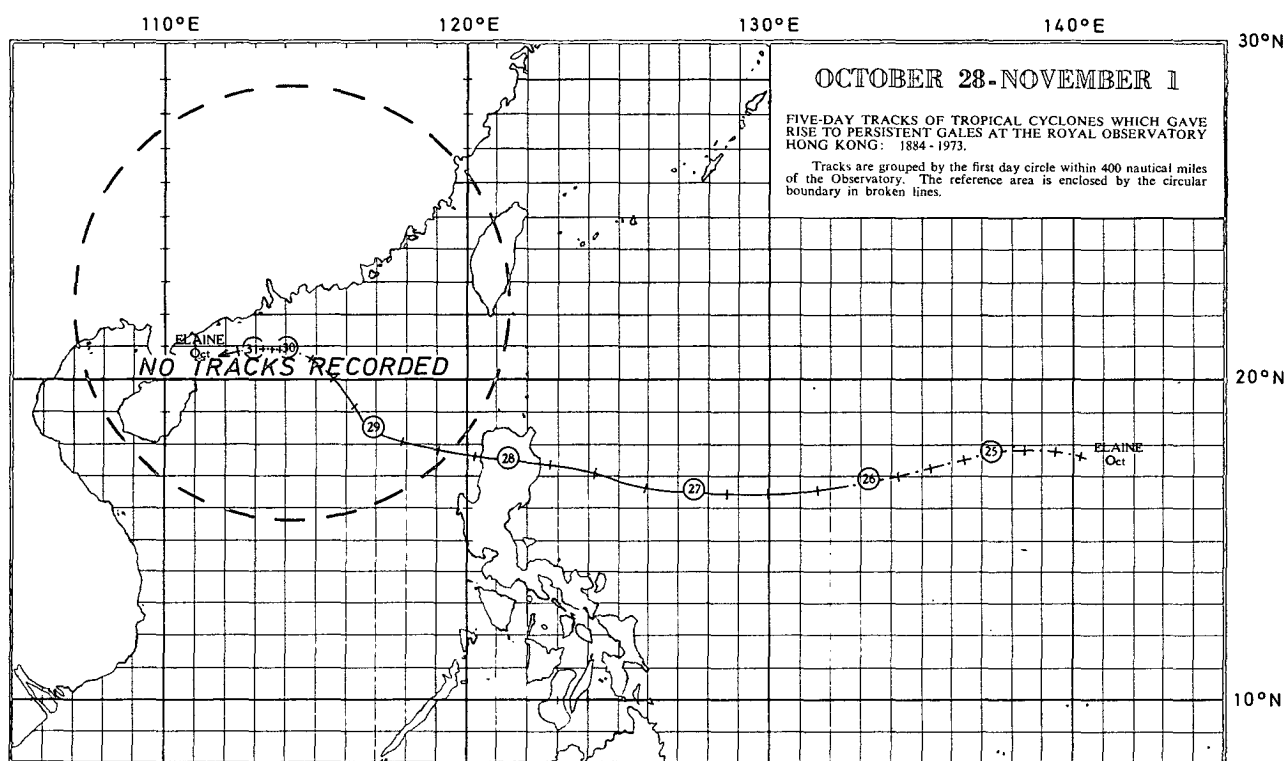


Figure 30. Track of Typhoon 'Elaine': October 24-31, 1974.

123.2° E

128.2° E

133.2° E

138.2° E

143.2° E

148.2° E

25° N

20° N

15° N

10° N

5° N

0°

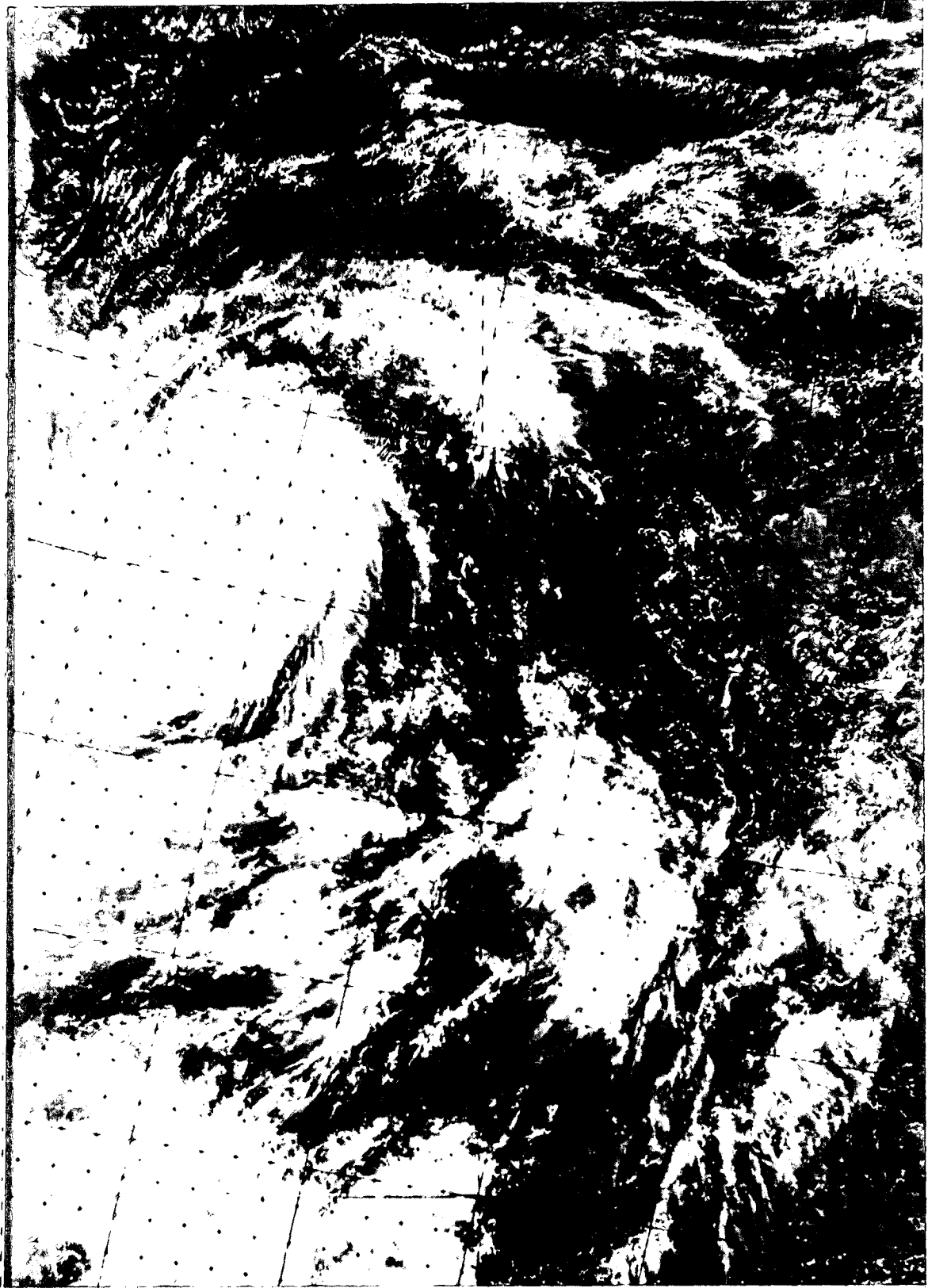


Figure 31. Imagery of Typhoon 'Elaine' taken at 10.24 a.m. on October 26, 1974. (U.S. DMSP imagery)

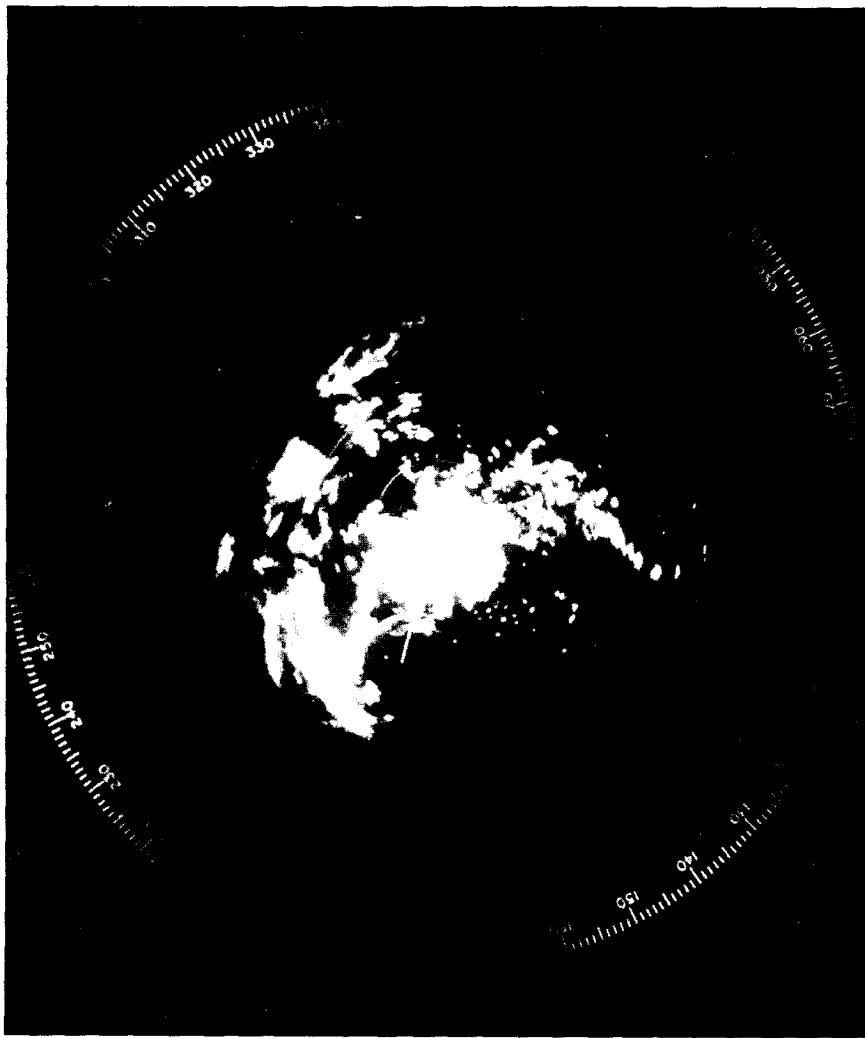


Figure 32. Radar picture of Typhoon 'Elaine' taken at the Royal Observatory at 11.00 a.m. on October 30, 1974 (Range markers at 40 n mile intervals).

TYPHOON 'GLORIA'

November 3–10, 1974

The track of this typhoon is shown in Figure 33

'Gloria' was one of the few typhoons which threatened Hong Kong in the month of November. The last occasion when tropical cyclone warning signals were hoisted in November was in 1972 when Typhoon 'Pamela' passed about 120 miles to the west of Hong Kong.

'Gloria' developed from an area of low pressure near the Caroline Islands on November 3. It moved rapidly northwestwards and became a typhoon in the evening of November 4 when a reconnaissance aircraft reported a minimum sea-level pressure of 976 millibars and maximum winds of 75 knots near its centre. Thereafter, the typhoon turned onto a west-northwesterly course and headed towards north Luzon. Reconnaissance aircraft reports on November 5–6 indicated that the typhoon was very intense with maximum winds of 140 knots and minimum sea-level pressure of 931 millibars.

The typhoon moved westwards across north Luzon into the South China Sea early in the afternoon of November 7 and began to weaken. However, its circulation remained extensive and maximum winds near its centre as estimated from satellite pictures received at the Royal Observatory were about 85 knots (Figure 34). At 2.00 p.m. on the same day, a ship about 70 miles from the centre of the typhoon reported winds of 70 knots. In Hong Kong, the Stand By Signal, No. 1, was hoisted at 3.15 p.m. on the same day when the typhoon was centred about 400 miles to the southeast. On November 8, 'Gloria' weakened into a tropical storm and turned onto a north-northwesterly course towards Swatow. Reconnaissance aircraft reports during the afternoon on the same day indicated maximum winds of only 40 knots and minimum sea-level pressure of 987 millibars. Winds of only 36 knots were reported at Pratas Island when 'Gloria' was about 40 miles away to the east.

In the morning of November 9, 'Gloria' came to a position about 70 miles south of Swatow where winds of only 18 knots were reported. It then began to drift slowly southwestwards under the influence of a strong northeast monsoon over the Taiwan Strait. Due to the influx of the cold and dry air from the north, 'Gloria' weakened further to a tropical depression in the afternoon of November 9 when the radar at the Royal Observatory indicated only a few rainbands associated with the circulation (Figure 35). In Hong Kong, the Stand By Signal was lowered at 7.10 p.m. on the same day. 'Gloria' maintained a well-marked circulation over the relatively cool waters of the northeastern part of the South China Sea for more than 24 hours and finally dissipated about 60 miles west of Pratas Island in the afternoon of November 10. At the 850-millibar level, winds of over 50 knots were still reported at Swatow earlier in the morning.

In Hong Kong, the weather was fine and sunny on November 7 but was cloudy with light rain in the next three days. Winds were moderate to fresh northerly on November 8. Due to the intensification of the winter monsoon, strong northerlies were experienced in exposed places during the following two days and the Strong Monsoon Signal was hoisted from 11.35 p.m. on November 9 to 9.50 p.m. the next day. The maximum gust peak speeds recorded at Waglan Island and Tate's Cairn were respectively 40 and 50 knots.

The following daily amounts of rainfall were recorded at the Royal Observatory:

November 7	Nil
November 8	1.5 mm
November 9	1.7 mm
November 10	0.4 mm

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.3	Nov. 10	7.00 p.m.	0.3	Nov. 10	7.00 p.m.
Tai Po Kau	2.5	Nov. 10	7.30 p.m.	0.6	Nov. 10	7.30 p.m.
Chi Ma Wan (Lantau Island)	2.5	Nov. 10	6.45 p.m.	0.5	Nov. 10	6.45 p.m.

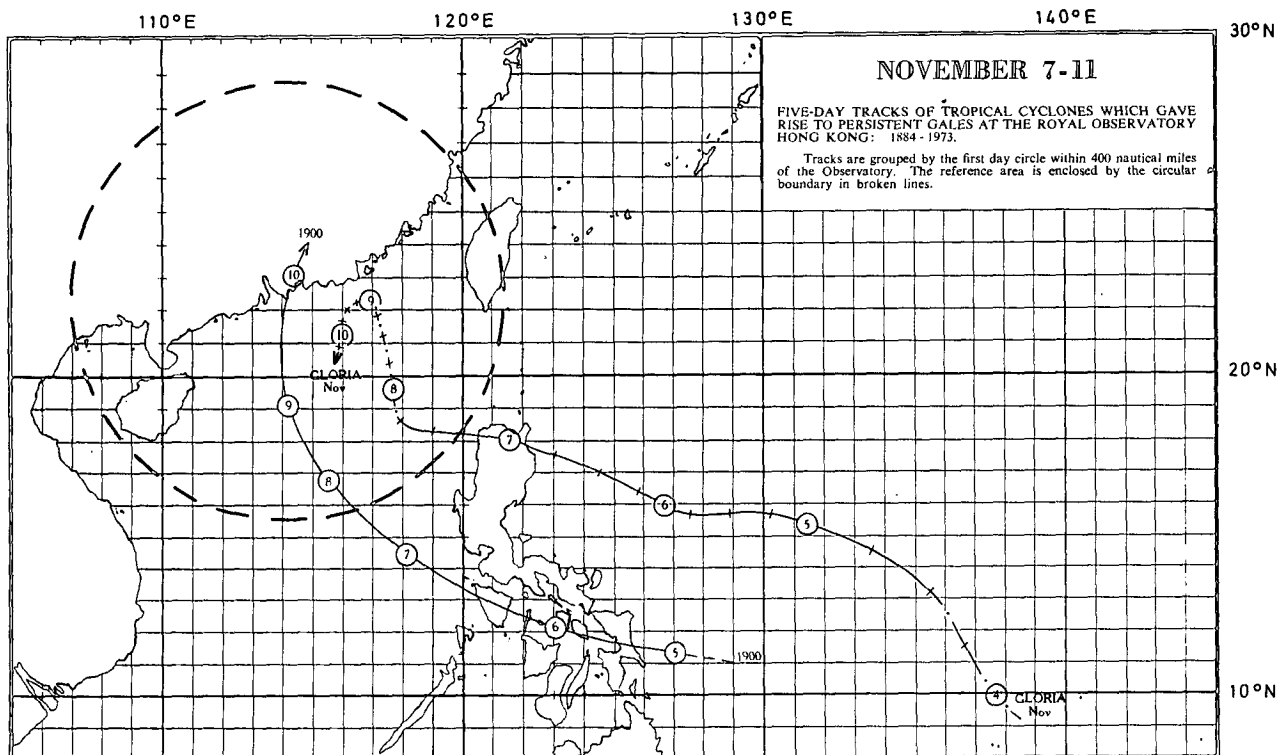


Figure 33. Track of Typhoon 'Gloria': November 3-10, 1974.

106° E

111° E

116° E

121° E

126° E

131° E

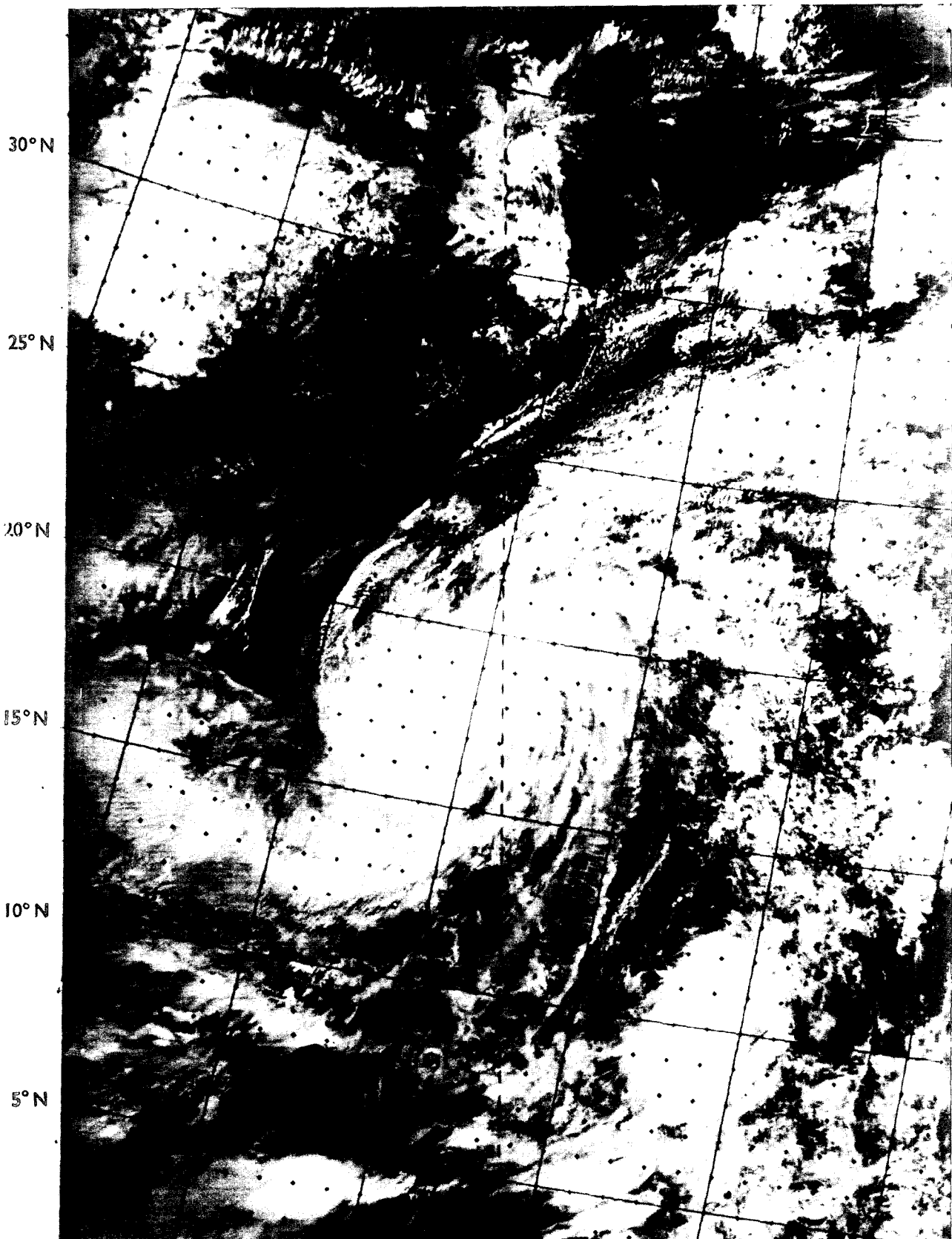


Figure 34. Imagery of Typhoon 'Gloria' taken at 8.17 a.m. on November 7, 1974. (U.S. DMSP imagery)

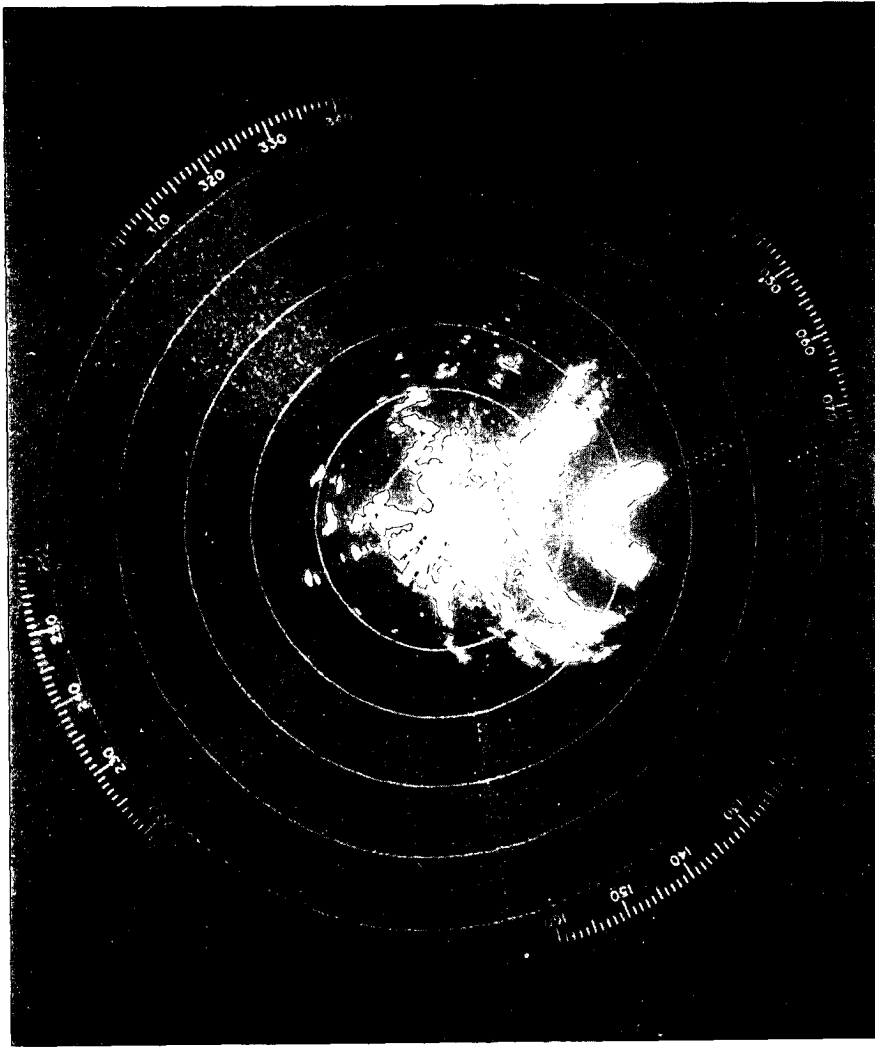


Figure 35. Radar picture of Typhoon 'Gloria' taken at the Royal Observatory at 11.00 a.m. on November 9, 1974 (Range markers at 40 n mile intervals).

TYPHOON 'IRMA'

November 21–December 2, 1974

The track of this typhoon is shown in Figure 36

In the history of the Royal Observatory, Typhoon 'Irma' was the first tropical cyclone which necessitated the hoisting of Tropical Cyclone Warning Signals in the month of December. The typhoon passed about 30 miles to the north of Hong Kong causing strong winds and heavy rain. On December 2, the Royal Observatory recorded 177.3 mm of rainfall which was the highest daily amount ever recorded in December.

'Irma' developed from an area of low pressure near the Caroline Islands on November 21. It moved slowly northwestwards at first and intensified into a typhoon during the morning of November 24 when a reconnaissance aircraft reported a minimum sea-level pressure of 975 millibars and maximum winds of 70 knots near its centre. Thereafter, the typhoon gradually changed to a westerly course and moved towards Luzon at a speed of about 10 knots. Reconnaissance aircraft reports in the morning of November 26 indicated that the typhoon had intensified further with maximum winds of 90 knots and minimum sea-level pressure of 940 millibars near its centre. 'Irma' crossed Luzon about 40 miles north of Manila around noon on November 28 and weakened into a severe tropical storm over the South China Sea. Satellite pictures received at the Royal Observatory on November 29 and 30 indicated that the maximum winds near its centre were about 50 to 60 knots.

On November 30, 'Irma' gradually turned onto a northerly course and at 2.00 a.m. on December 1, it was centred about 55 miles north-northwest of Paracel Islands where winds of 46 knots and a mean sea-level pressure of 996.6 millibars were reported. In Hong Kong, the Stand By Signal, No. 1, was hoisted at 12.45 p.m. on the same day when 'Irma' was centred about 240 miles to the southwest. Early in the evening of December 1, there were indications that 'Irma' would follow a more northeasterly track and come closer to Hong Kong and the Strong Wind Signal, No. 3, was therefore hoisted at 11.00 p.m. At this time the severe tropical storm was centred about 180 miles southwest of Hong Kong.

'Irma' crossed the south China coast near St. John's Island in the morning of December 2 and weakened into a tropical depression later in the afternoon when it was centred about 15 miles north of Macau where winds of only 18 knots were reported. Radar observations at the Royal Observatory during the morning of December 2 indicated that the circulation of 'Irma' was poorly organized but there was an extensive area of rain associated with it (Figure 37). In Hong Kong, the Strong Wind Signal was lowered at 4.00 p.m. on December 2 when the

tropical depression was moving northeastwards across the Pearl River estuary. 'Irma' continued to weaken and finally dissipated over south Kwangtung about 30 miles from Hong Kong on the same evening.

In Hong Kong, rain set in on November 30 and became frequent and heavy on December 2. Winds freshened from the east in the afternoon of December 1 and became strong later in the day. The maximum winds recorded were 34 knots at Cheung Chau and Tate's Cairn, and 26 knots at the Hong Kong International Airport. However, the weather improved on December 2 when winds moderated rapidly and turned to southwesterly.

The following daily amounts of rainfall were recorded at the Royal Observatory:

November 30	3.7 mm
December 1	19.3 mm
December 2	177.3 mm
December 3	Nil

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the display of Tropical Cyclone Warning Signals were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.5	Dec. 1	9.00 p.m.	0.3	Dec. 1	6.45 a.m.
Tai Po Kau	2.5	Dec. 1	11.00 p.m.	0.7	Nov. 30	Midnight
Chi Ma Wan (Lantau Island)	2.7	Dec. 1	8.45 p.m.	0.4	Dec. 1	7.45 a.m.

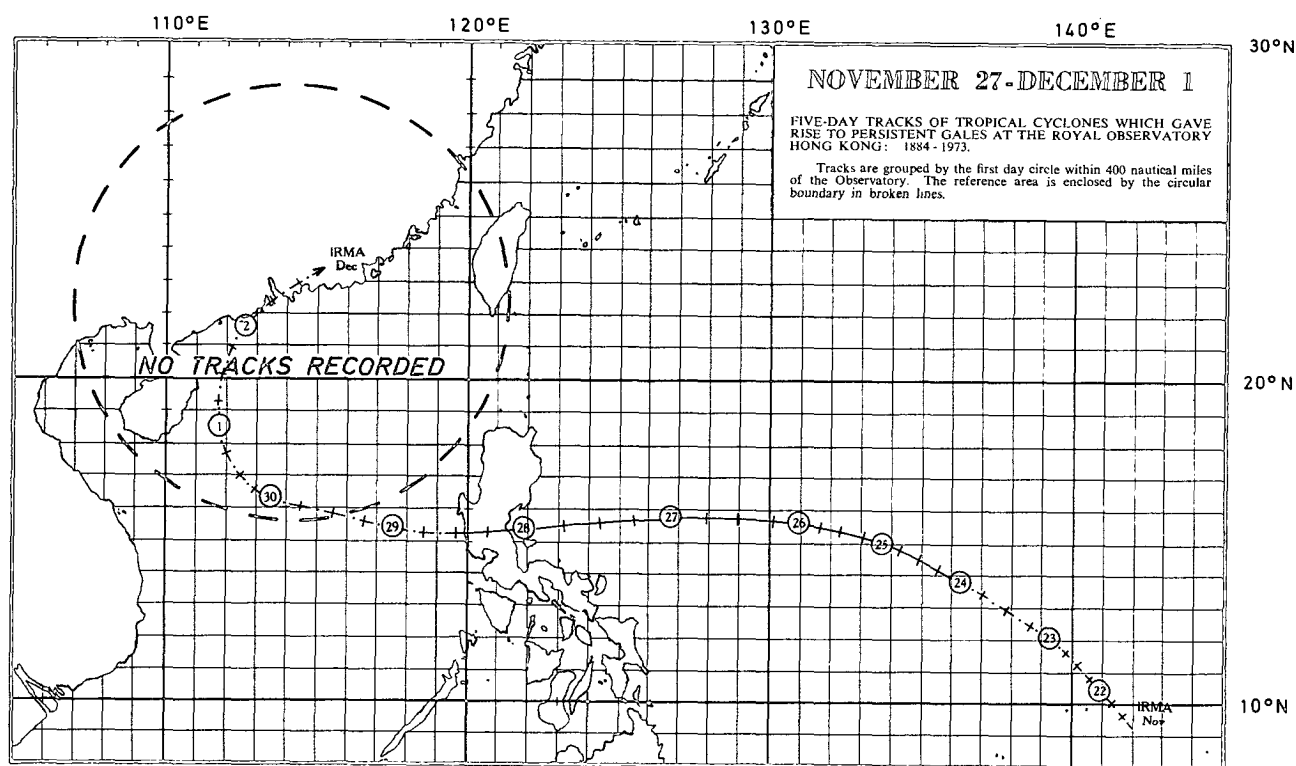


Figure 36. Track of Typhoon 'Irma': November 21—December 2, 1974.



Figure 37. Radar picture of Typhoon 'Irma' taken at the Royal Observatory at 8.00 a.m. on December 2, 1974 (Range markers at 40 n mile intervals).

TABLE 1

LIST OF TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND THE SOUTH CHINA SEA IN 1974

Name of Tropical Cyclone	Beginning of Track					First day circle	Last day circle	Ending of Track					
	Date	Time	Position		Date			Time	Position				
			G.M.T.	^o N					^o E	G.M.T.	^o N	^o E	
1	Severe Tropical Storm Wanda	January	10	0000	10.0	131.0	10	13	January	13	1800	15.0	147.5
2	Tropical Storm Amy	March	14	0000	8.1	144.0	14	19	March	19	1200	24.8	153.0
3	Severe Tropical Storm Babe	April	26	0000	9.3	147.5	26	2	May	2	1200	34.0	158.8
4	Typhoon Carla	May	2	0000	12.1	149.7	2	7	May	7	1200	31.6	159.0
5	Tropical Depression	June	6	0600	18.2	113.4	7	8	June	8	0000	21.7	112.0
6	Typhoon Dinah	June	6	0600	10.3	139.0	7	14	June	14	0600	21.3	105.9
7	Severe Tropical Storm Emma	June	13	0600	11.4	135.0	14	18	June	18	1200	29.1	131.8
8	Tropical Storm Freda	June	21	0000	26.0	151.7	21	22	June	22	0000	25.2	158.7
9	Typhoon Gilda	July	1	0000	19.6	134.4	1	7	July	7	0000	36.4	130.2
10	Tropical Storm Harriet	July	15	0000	16.9	140.0	15	18	July	18	0000	29.2	135.2
11	Typhoon Ivy	July	17	0600	11.8	139.5	18	22	July	22	1200	21.8	111.5
12	Severe Tropical Storm Jean	July	17	0000	19.8	127.1	17	20	July	20	0000	30.3	121.4
13	Tropical Storm Lucy	August	9	0000	18.5	119.3	9	11	August	11	0000	25.9	120.6
14	Severe Tropical Storm Mary	August	11	0600	15.3	151.4	12	26	August	26	0000	34.7	138.0
15	Tropical Depression	August	13	1200	17.7	113.5	14	15	August	15	0000	17.6	108.0
16	Tropical Storm Nadine	August	15	0000	16.7	127.7	15	18	August	18	1200	32.6	138.6
17	Typhoon Polly	August	25	0600	16.8	150.2	26	2	September	2	0000	37.2	132.6
18	Tropical Depression	August	27	0000	24.6	131.4	27	28	August	28	0000	26.8	129.2
19	Tropical Storm Rose	August	27	0000	20.2	117.0	27	31	August	31	0600	25.9	133.6
20	Typhoon Shirley	September	4	0000	24.4	130.7	4	9	September	9	0000	33.4	134.0
21	Tropical Storm Trix	September	5	0000	20.7	115.8	5	6	September	6	1200	22.0	111.1
22	Typhoon Virginia	September	12	1200	30.5	150.5	13	16	September	16	0600	41.4	154.2
23	Severe Tropical Storm Wendy	September	24	0600	17.8	124.0	25	30	September	30	0000	26.3	121.1
24	Typhoon Agnes	September	24	0600	22.3	155.1	25	30	September	30	1200	32.3	159.4
25	Typhoon Bess	October	8	0600	11.7	134.9	9	14	October	14	1200	19.3	106.2
26	Typhoon Carmen	October	14	1200	12.2	129.7	15	19	October	19	1200	21.3	112.4
27	Typhoon Della	October	21	0000	12.8	128.9	21	27	October	27	0000	19.8	106.3
28	Typhoon Elaine	October	24	0600	17.8	140.5	25	31	October	31	0600	20.8	112.5
29	Severe Tropical Storm Faye	November	1	0600	13.0	124.0	2	4	November	4	0600	14.5	108.5
30	Typhoon Gloria	November	3	0000	7.5	141.5	3	10	November	10	0600	21.0	115.8
31	Tropical Storm Hester	November	14	0600	13.6	116.1	15	15	November	15	1200	12.7	108.1
32	Typhoon Irma	November	21	1200	9.7	141.5	22	2	December	2	1200	23.0	114.2
33	Tropical Storm Judy	December	18	0000	13.4	114.0	18	19	December	19	0000	12.4	110.3
34	Tropical Storm Kit	December	19	0600	11.1	132.1	20	24	December	24	0600	9.1	107.2

N.B. (i) Tropical Storm Kim is east of 160 °E.

(ii) No tropical cyclone known as 'Olive' in 1974.

TABLE 2

TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1974

Tropical Cyclone	No. of Warnings Issued	Date and Time of Issue of						Duration of Warnings (hours)
		First Warning			Last Warning			
Tropical Depression*	14	June	6	0900	June	8	0000	39
Typhoon Dinah*	31	June	9	0600	June	14	0600	120
Severe Tropical Storm Emma	9	June	15	1200	June	17	1200	48
Severe Tropical Storm Jean	7	July	18	0600	July	19	1800	36
Typhoon Ivy*	20	July	19	1200	July	22	1500	75
Tropical Storm Lucy	7	August	9	1200	August	11	0000	36
Tropical Depression	8	August	13	1200	August	15	0600	42
Severe Tropical Storm Mary	3	August	19	0000	August	19	0900	9
Tropical Storm Rose	6	August	27	0000	August	28	0600	30
Tropical Storm Trix*	12	September	5	0000	September	6	0900	33
Severe Tropical Storm Wendy*	22	September	24	1200	September	29	1800	126
Typhoon Bess*	27	October	10	0600	October	14	0900	99
Typhoon Carmen*	28	October	15	1800	October	19	1500	93
Typhoon Della*	27	October	22	0600	October	27	0300	117
Typhoon Elaine*	31	October	27	1200	October	31	1800	102
Severe Tropical Storm Faye	13	November	1	0600	November	4	0600	72
Typhoon Gloria*	28	November	6	1200	November	10	1200	96
Tropical Storm Hester	5	November	14	0600	November	15	0600	24
Typhoon Irma*	27	November	27	0900	December	2	1200	123
Tropical Storm Judy	6	December	18	0000	December	19	0600	30
Tropical Storm Kit	5	December	20	1200	December	21	0900	21
Total	336							1,371

* Tropical cyclones for which Tropical Cyclone Warning Signals were hoisted in Hong Kong.

N.B. Times are given in hours G.M.T.

TABLE 3

TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG AND NUMBER OF WARNING BULLETINS ISSUED IN 1974

SUMMARY

Signal	No. of Occasions	Total Duration	
1	12	218 h	45 min
3	10	268	45
8 NORTHWEST	-	-	-
8 SOUTHWEST	-	-	-
8 NORTHEAST	2	28	20
8 SOUTHEAST	1	4	00
9	1	6	30
10	-	-	-

DETAILS

Tropical Cyclone	No. of Warning Bulletins Issued	Signal	Hoisted			Lowered		
			Date	Time		Date	Time	
Tropical Depression	17	1	June	6	1700	June	7	1830
		3	June	7	1830	June	8	0715
Typhoon Dinah	28	1	June	11	0600	June	11	1745
		3	June	11	1745	June	13	1715
Typhoon Ivy	24	1	July	21	0610	July	21	1215
		3	July	21	1215	July	23	0445
Tropical Storm Trix	10	1	September	5	1015	September	5	2130
		3	September	5	2130	September	6	0915
Severe Tropical Storm Wendy	16	1	September	25	1815	September	27	0915
Typhoon Bess	27	1	October	11	2120	October	11	2320
		3	October	11	2320	October	14	0805
Typhoon Carmen	50	1	October	17	0955	October	17	1530
		3	October	17	1530	October	18	0910
		8 NE	October	18	0910	October	19	0330
		9	October	19	0330	October	19	1000
		8 SE	October	19	1000	October	19	1400
		3	October	19	1400	October	20	1000
Typhoon Della	16	1	October	24	1830	October	26	0915
Typhoon Elaine	39	1	October	28	1700	October	28	2305
		3	October	28	2305	October	30	1010
		8 NE	October	30	1010	October	30	2010
		3	October	30	2010	October	31	0455
		1	October	31	0455	October	31	1530
Typhoon Gloria	25	1	November	7	1515	November	9	1910
Typhoon Irma	14	1	December	1	1245	December	1	2300
		3	December	1	2300	December	2	1600

TABLE 4
 FREQUENCY OF HOISTING AND TOTAL DURATION OF DISPLAY OF
 TROPICAL CYCLONE WARNING SIGNALS :
 1946-1974

Year	Signal	1	3*	8 NW †	8 SW †	8 NE †	8 SE †	9	10	Total	Total Duration (hours)
1946		7	-	1	0	1	2	1	1	13	154
1947		6	-	1	0	1	0	0	0	18	124
1948		5	-	1	1	3	2	0	0	12	112
1949		4	-	0	0	1	1	1	0	7	67
1950		2	-	0	0	1	1	1	0	5	102
1951		4	-	0	0	2	3	1	0	10	133
1952		2	-	0	0	1	1	0	0	4	74
1953		2	-	1	1	2	1	1	0	8	116
1954		5	-	0	0	3	2	2	0	12	133
1955		0	-	0	0	0	0	0	0	0	0
1946 to 1955	Total	37	-	4	2	15	13	7	1	79	1015
	Mean	3.7	-	0.4	0.2	1.5	1.3	0.7	0.1	7.9	101.5
1956*		5	4	0	0	0	0	0	0	9	191
1957		4	9	1	1	2	2	0	1	20	296
1958		4	5	0	0	1	0	0	0	10	214
1959		1	1	0	0	0	0	0	0	2	37
1960		11	7	0	2	2	2	1	1	26	433
1961		6	7	1	2	1	0	1	1	19	193
1962		4	3	0	1	1	0	1	1	11	158
1963		4	5	0	0	1	0	0	0	10	176
1964		11	14	1	3	5	3	3	2	42	570
1965		7	6	0	0	1	1	0	0	15	240
1966		6	5	0	0	2	2	0	0	15	285
1967		8	6	0	0	2	1	0	0	17	339
1968		7	7	0	1	1	0	1	1	18	290
1969		4	2	0	0	0	0	0	0	6	110
1970		6	8	2	1	2	0	0	0	19	287
1971		9	10	1	3	2	2	1	1	29	323
1972		8	6	0	0	1	1	0	0	16	268
1973		8	6	1	1	1	0	1	0	18	417
1974		12	10	0	0	2	1	1	0	26	526
1956 to 1974	Total	125	121	7	15	27	15	10	8	328	5373
	Mean	6.6	6.4	0.4	0.8	1.4	0.8	0.5	0.4	17.3	282.8

* The Strong Wind Signal, No. 3, was introduced in 1956.

† Gale or Storm Signals, 5, 6, 7 and 8 were renumbered as 8 NW, 8 SW, 8 NE and 8 SE respectively with effect from January 1, 1973.

TABLE 5

NUMBER OF TROPICAL CYCLONES IN HONG KONG'S AREA OF RESPONSIBILITY AND THAT NECESSITATED THE DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1946-1974

Year	Number in Hong Kong's Area of Responsibility	Number Necessitating the Display of Signals in Hong Kong
1946	9	6
1947	21	6
1948	15	4
1949	16	4
1950	13	5
1951	12	7
1952	22	9
1953	19	6
1954	17	7
1955	14	3
1956	23	5
1957	12	6
1958	14	5
1959	19	2
1960	20	9
1961	22	6
1962	16	4
1963	13	4
1964	25	10
1965	16	6
1966	16	6
1967	16	8
1968	12	6
1969	11	4
1970	21	6
1971	17	9
1972	14	5
1973	17	9
1974	21	11
Total	483	178
Mean	16.7	6.1

TABLE 6

DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1946-1974

Signal	Duration for each occasion						Duration per year					
	Mean		Maximum		Minimum		Mean		Maximum		Minimum	
1	17h	45min	102h	10min	1h	20min	99h	11min	273h	15min	0h	0min
3*	20	52	71	45	1	00	132	50	268	45	8	45
8 NW †	7	31	13	00	1	30	2	51	13	00	0	
8 SW †	5	30	11	10	2	30	3	14	16	10	0	
8 NE †	11	33	35	35	2	15	16	44	61	45	0	
8 SE †	7	12	17	20	0	20	6	57	28	52	0	
8	8	49	35	35	0	20	29	46	82	25	0	
9	3	51	6	30	1	10	2	16	11	00	0	
10	6	26	9	10	2	30	2	00	12	10	0	

* 1956-1974.

† Gale or Storm Signals 5, 6, 7 and 8 were renumbered as 8NW, 8SW, 8NE and 8SE respectively with effect from January 1, 1973.

TABLE 7

CASUALTIES AND DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG: 1937-1974

Tropical Cyclone	Ocean-going Vessels in Trouble	Junks Sunk or Wrecked	Junks Damaged	Persons Dead	Persons Missing	Persons Injured
1937 Typhoon	28	545	1,255	11,000	*	*
1957 T. Gloria	5	2	Several	8	*	111
1960 T. Mary	6	352	462	11	11	127
1961 T. Alice	*	*	*	4	0	20
1962 T. Wanda	36	1 297	756	130	53	*
1964 T. Viola	5	18	18	0	0	41
T. Ida	3	7	60	5	4	56
T. Ruby	20	32	282	38	6	300
T. Sally	0	0	0	9	0	24
T. Dot	2	31	59	26	10	85
1966 S.T.S. Lola	0	*	6	1	0	6
1968 T. Shirley	1	*	3	0	0	4
1970 Tropical Depression (Aug. 1-3)	0	0	0	2 †	0	0
T. Georgia	2	0	*	0	0	0
1971 T. Freda	8	0	0	2	0	30
T. Lucy	10	0	0	0	0	38
T. Rose	33**	303	*	110	15	286
1972 T. Pamela	3	0	0	1	0	8
1973 T. Dot	14	*	*	1	0	38
1974 T. Dinah	1	*	*	0	0	0
T. Ivy	2	*	*	0	0	0
T. Carmen	4	*	*	1	0	0
T. Della	1	*	*	0	0	0

N.B. Information compiled from Hong Kong newspapers and from the Marine Department's records.

* Data unavailable.

† Struck by lightning.

**Note: Number of Ocean-going vessels in trouble is revised on 30 Jul 2021.

TABLE 8

SHIPS SUNK, DAMAGED, GROUNDED, ETC., BY TROPICAL CYCLONES IN HONG KONG
IN 1972 - 1974

Year	Name of Tropical Cyclone	Name of Ship	Location of Grounding, etc.	Nature of Incident	Remarks
1972	Typhoon Pamela	S.S. Man On S.S. Van Mint S.S. Tai To Ku	Kowloon Bay S. Coast Lei Yue Mun S.E. of Stonecutters	Aground Aground Adrift	2 other ocean-going ships were in trouble.
1973	Typhoon Dot	S.S. Wa Hing S.S. Safina E. Hujjuj S.S. Portsun I S.S. Margaret Lykes S.S. Tennessee S.S. White Ocean S.S. Hysan S.S. Tiksi S.S. Sol Laila S.S. Straat Mozambique S.S. United Glory S.S. Kara Sea S.S. Mariner Alpha S.S. Cheung Chau	Near Stonecutters Near Kowloon Dock On Stonecutters S. of Stonecutters Kowloon Bay Near Stonecutters Victoria Harbour Victoria Harbour Near Green Island Victoria Harbour Western Anchorage Kowloon Bay Yaumati Anchorage Western Anchorage	Adrift Aground Aground Adrift Anchor chain broken Adrift Adrift Adrift Adrift Anchor Chain Broken Dragging Anchor Anchor Chain Broken Dragging Anchor Adrift	
1974	Typhoon Dinah Typhoon Ivy Typhoon Carmen Typhoon Della	S.S. Silver Shelton S.S. Asmari S.S. Hwalung S.S. Terryusan Maru S.S. Uniparagon S.S. Oriental Hero S.S. Pearl Star S.S. Lela	Victoria Harbour E. of Tsing Yi Kellett Bank Off Po Toi Island S. of Stonecutters Island S.W. of Stonecutters Island Western Anchorage S. of Stonecutters Island	Adrift Adrift Dragging Anchor Dragging Anchor Adrift Adrift and in collision with S.S. Bright Sea Dragging Anchor Collision with S.S. Taolin	Slight damage to both vessels Minor damage to both vessels

N.B. Information compiled from Hong Kong newspapers and from the Marine Department's records.

TABLE 9

A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG
DURING THE PASSAGES OF TROPICAL CYCLONES IN 1974

Name of Tropical Cyclone	Date and Time of Occurrence of Minimum Pressure Date Time		Maximum Storm Surge			Max. 60-min mean wind in points and knots		Max. 10-min mean wind in points and knots		Max. gust peak speed in points and knots		Min. Hourly H.S.L. Pressure at Royal Observatory	Rainfall at Royal Observatory				
			North Point	Tai Po Kau	Chi Ma Wan	Royal Observatory	Waglan Island	Royal Observatory	Waglan Island	Royal Observatory	Waglan Island		(i) 300 n mile	(ii) 24 hours	(iii) 48 hours	(iv) 72 hours	(i) + (iv)
			m	m	m								millibars	mm	mm	mm	mm
T.D.	June 7	1700	0.4	0.6	0.7	ENE 16	E 35	ENE 19	E 36	ENE 43	E 44	1003.3	22.3	-	-	-	22.3
T. Dinah	June 12	1700	0.7	1.1	0.9	E 22	E 38	E 25	E 40	E 64	ESE 62	996.2	32.7	8.5	9.1	9.1	41.8
T. Ivy	July 22	0600	0.5	0.7	1.0	E 23	ESE 34	E 26	SE 40	SE 61	SE 56	1002.7	42.4	-	-	-	42.4
T.S. Trix	September 5	1700	0.4	0.4	0.6	E 16	ENE 35	E 18	ENE 37	E 46	ENE 49	1001.3	15.3	-	-	-	15.3
S.T.S. Wendy	September 29	1500	-	-	-	W 6	E 14	W 6	E 19	-	ENE 32	1005.2	-	-	-	-	-
T. Bess	October 12	1800	1.4	1.5	1.5	E 18	E 45	E 20	E 47	E 50	E 58	1001.8	Trace	Trace	0.1	0.1	0.1
T. Carmen	October 19	0400	0.9	1.1	1.0	E 25	E 49	E 29	E 53	E 70	E 71	994.1	469.3	-	-	-	469.3
T. Della	October 25	1700	0.4	0.6	0.7	ENE 12	E 35	E 15	E 36	ENE 40	E 43	1010.1	0.5	Trace	Trace	3.6	4.1
T. Elaine	October 30	0500	0.7	1.0	0.9	ENE 17	ENE 44	ENE 20	ENE 46	ENE 52	ENE 55	1000.0	225.2	-	-	-	225.2
T. Gloria	November 8	1500	0.3	0.6	0.5	WSW 8	N 26	WSW 10	N 27	WNW 27	N 39	1001.7	3.6	-	-	-	3.6
T. Irma	December 2	1600	0.3	0.7	0.4	E 18	S 28	E 18	S 30	SSE 38	SE 39	1004.8	200.3	-	-	-	200.3

- Notes: (i) during the period when the tropical cyclone was centred within 300 nautical miles of Hong Kong
(ii) during the 24-hour period after the tropical cyclone has moved outside the 300-n mile radius of Hong Kong
(iii) during the 48-hour period after the tropical cyclone has moved outside the 300-n mile radius of Hong Kong
(iv) during the 72-hour period after the tropical cyclone has moved outside the 300-n mile radius of Hong Kong
All data, other than the rainfall, refer to the period when Tropical Cyclone Warning Signals were hoisted.