

ROYAL OBSERVATORY, HONG KONG

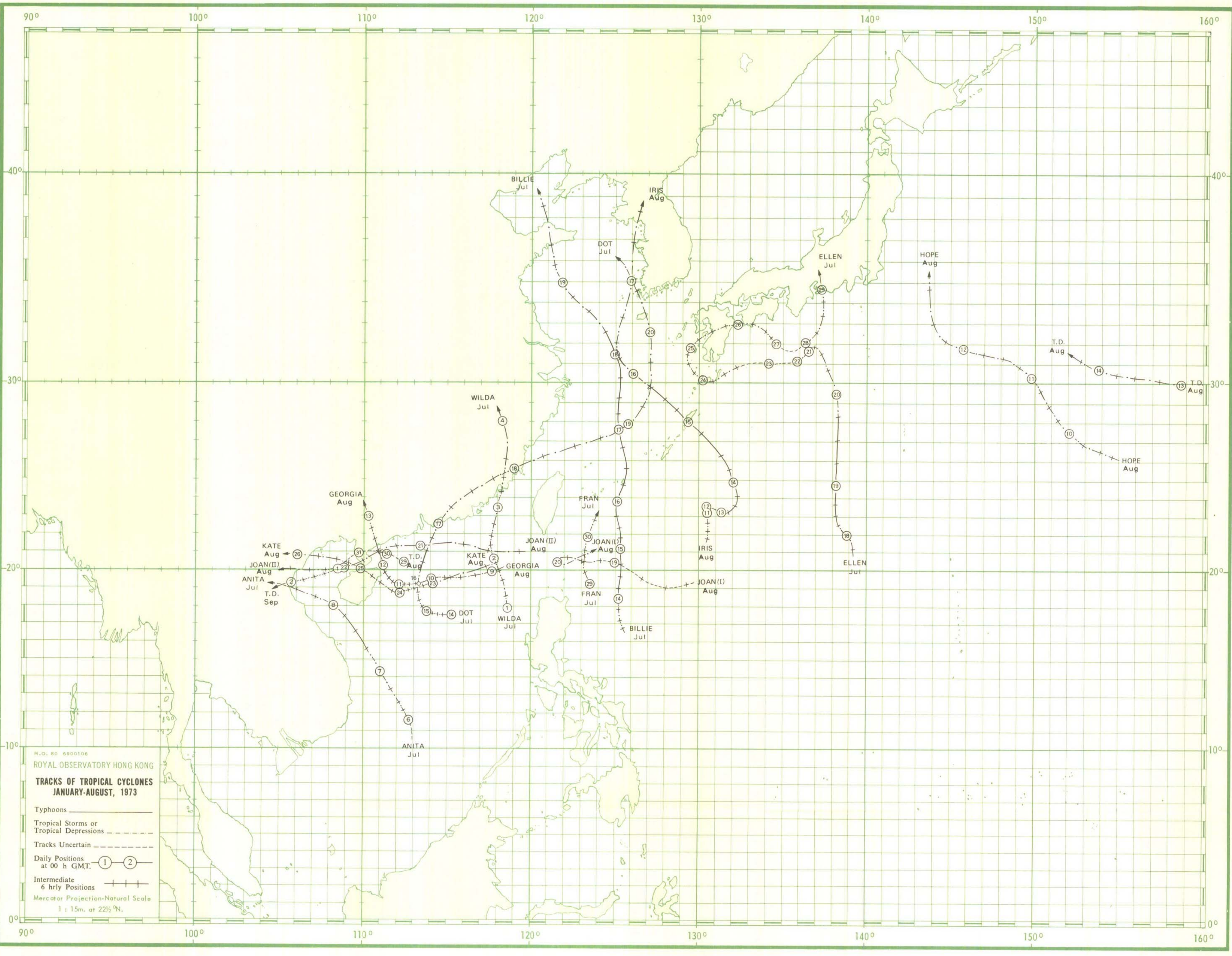
METEOROLOGICAL RESULTS
1973

PART III—TROPICAL CYCLONE SUMMARIES



PRINTED AND PUBLISHED BY J. R. LEE, GOVERNMENT PRINTER
AT THE GOVERNMENT PRESS
JAVA ROAD, HONG KONG

1974



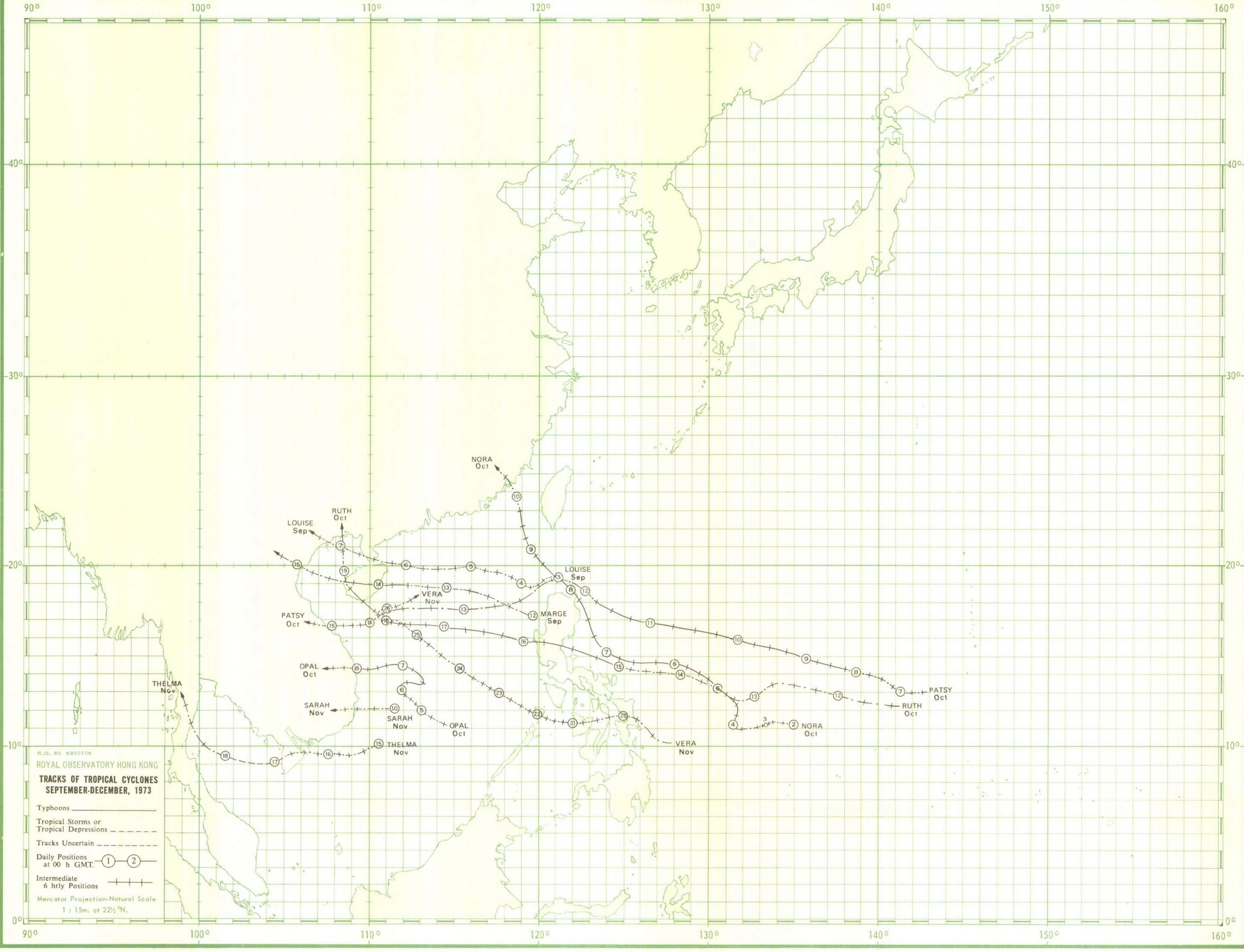
R.O. 80 6900106
 ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
JANUARY-AUGUST, 1973

Typhoons ———
 Tropical Storms or
 Tropical Depressions - - - -
 Tracks Uncertain - - - -

Daily Positions
 at 00 h GMT. ① ② ———

Intermediate
 6 hrly Positions ———+

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



R.O. 80 5900108
 ROYAL OBSERVATORY HONG KONG
**TRACKS OF TROPICAL CYCLONES
 SEPTEMBER-DECEMBER, 1973**

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

THELMA Nov
 SARAH Nov
 OPAL Oct
 PATSY Oct
 VERA Nov
 MARGE Sep
 LOUISE Sep
 RUTH Oct
 NORA Oct

METEOROLOGICAL RESULTS
1973

PART III—TROPICAL CYCLONE SUMMARIES

CROWN COPYRIGHT RESERVED

CONTENTS

	<i>Page</i>
FRONTISPIECE: Tracks of Tropical Cyclones in the western North Pacific and the South China Sea, 1973	
SECTION	
1. INTRODUCTION	1
2. DESCRIPTION OF TABLES	3
3. LIST OF FIGURES	4
4. TROPICAL CYCLONE SUMMARY FOR 1973	6
5. REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1973	
(a) Tropical Storm 'Wilda': July 1-4	7
(b) Typhoon 'Dot': July 14-19	10
(c) Typhoon 'Georgia': August 9-13	24
(d) Tropical Storm 'Joan': August 18-22	28
(e) Tropical Storm 'Kate': August 22-26	31
(f) Severe Tropical Storm 'Louise': September 3-7	34
(g) Typhoon 'Marge': September 12-15	36
(h) Typhoon 'Nora': October 2-10	39
(i) Typhoon 'Ruth': October 11-19	44
6. TABLES	
Table 1. List of Tropical Cyclones in the western North Pacific and the South China Sea in 1973	50
Table 2. Tropical Cyclone Warnings for Shipping Issued in 1973	51
Table 3. Tropical Cyclone Warning Signals Hoisted in Hong Kong and Number of Warning Bulletins Issued in 1973	51
Table 4. Frequency of Hoisting and Total Duration of Tropical Cyclone Warning Signals: 1946-1973	52
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: 1946-1973	52
Table 6. Duration of Display of Tropical Cyclone Warning Signals in Hong Kong: 1946-1973	53
Table 7. Casualties and Damage Caused by Tropical Cyclones in Hong Kong: 1937-1973	53
Table 8. Ships Sunk, Damaged, Grounded, etc., by Tropical Cyclones in Hong Kong: 1971-1973	54
Table 9. Tropical Cyclones Causing Persistent Gales at the Royal Observatory: 1884-1973	55
Table 10. A Summary of Meteorological Observations Recorded in Hong Kong During the Passages of Tropical Cyclones in 1973	59

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 which formed 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 I. 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 6 stations in the Colony. Each station is equipped with a Dines pressure-tube anemograph incorporating a twin-pen direction recorder, manufactured by R. W. Munro Limited. Quick-run mechanisms are also fitted to the anemometers at the Hong Kong 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.
	Latitude N	Longitude E	(m)	(m)	(m)
Royal Observatory	22° 18'	114° 10'	33	32	61
Hong Kong Airport	22° 20'	114° 11'	24	4	10
Waglan Island	22° 11'	114° 18'	56	55	74
Tate's Cairn	22° 22'	114° 13'	*	576†	589
Cheung Chau	22° 12'	114° 01'	79	72	92
Cape Collinson	22° 16'	114° 15'	48	46	59

* No barometer.

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

‡ 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.

In order to obtain more representative surface wind observations in the harbour area, a M.O. Mark IV Cup generator type anemograph, manufactured by R. W. Munro Limited, was installed on the roof of the east wing of the Star Ferry Pier, Kowloon. The speed unit was operational from August 5, 1972 onwards but the erection of the direction unit was not completed until December 20, 1972. From July 20, 1973 onwards, complete observations of wind speeds and directions were relayed on an operational basis to the Central Forecasting Office by means of telephone line.

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 the Colony;
- (d) the lowest barometric pressure recorded in the Colony;
- (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 the Colony.

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 1973 Hong Kong Summer Time was in force during the period between 3.30 (Hong Kong Standard Time) in the morning of April 22 and 3.30 (Hong Kong Summer Time) in the morning of October 21 and from 3.30 (Hong Kong Standard Time) in the morning of December 30 to the end of the year.

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^{-1} or about 0.514 m s^{-1} .

* As the present volume was completed much earlier this year, the data from reconnaissance aircraft reports were taken directly from the eye-fix messages received operationally at the Royal Observatory, Hong Kong. In previous volumes, the data were checked against the Annual Typhoon Reports published by the Fleet Weather Central/Joint Typhoon Warning Center at Guam. No attempt was made to convert the wind speed reports into equivalent '10-minutes mean winds' as normally reported by all surface stations.

DESCRIPTION OF TABLES

Table 1 is a list of tropical cyclones in 1973 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 1973, 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 1973 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 1946-1973. 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 1946-1973. 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 1946-1973.

Table 7 presents the casualties and damage figures associated with tropical cyclones in Hong Kong for the period 1937-1973. 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 1971-1973. The information is compiled from local newspapers and from the Marine Department's records.

Table 9 presents some features of tropical cyclones which gave gales or winds of greater force at the Observatory since 1884. In this context, the criterion used is the hourly mean wind speed centred on the hour recorded at the Royal Observatory. In each case, data are tabulated in chronological order according to the date and time of minimum pressure recorded at the Royal Observatory. The information presented includes lowest hourly reading of the barometer (reduced to M.S.L.), the maximum gust peak speed, duration of gale, direction of strongest winds and the sequence of wind direction in terms of veering and backing. Statements on storm surges and additional information, where applicable, are included as remarks. Information on gusts was not available before the installation of the Dines anemograph in 1911.

Table 10 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 1973. 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.

LIST OF FIGURES

- 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 1973.
- Figure 2. Track of Tropical Storm 'Wilda': July 1-4, 1973.
- Figure 3. ESSA-8 APT picture of Tropical Storm 'Wilda' taken at 11.20 a.m. on July 2, 1973.
- Figure 4. Radar picture of Tropical Storm 'Wilda' taken at the Royal Observatory at 5.00 p.m. on July 2, 1973.
- Figure 5. Track of Typhoon 'Dot': July 14-19, 1973.
- Figure 6. ESSA-8 APT picture of Typhoon 'Dot' taken at 11.08 a.m. on July 13, 1973.
- Figure 7. ESSA-8 APT picture of Typhoon 'Dot' taken at noon on July 14, 1973.
- Figure 8. NOAA-2 DRIR picture of Typhoon 'Dot' taken at 10.12 p.m. on July 14, 1973.
- Figure 9. ESSA-8 APT picture of Typhoon 'Dot' taken at 11.47 a.m. on July 16, 1973.
- Figure 10. Radar pictures of Typhoon 'Dot' taken at the Royal Observatory during the afternoon of July 16, 1973.
- Figure 11. Radar pictures of Typhoon 'Dot' taken at the Royal Observatory in the early morning of July 17, 1973.
- Figure 12. Records of barometric pressure at some selected meteorological stations in Hong Kong during the passage of Typhoon 'Dot' on July 16-17, 1973.
- Figure 13. Trajectory of the eye of Typhoon 'Dot' over the eastern part of Hong Kong on July 17, 1973.
- Figure 14. ESSA-8 APT picture of Typhoon 'Dot' taken at 12.32 p.m. on July 17, 1973.
- Figure 15. ESSA-8 APT picture of Typhoon 'Dot' taken at 11.28 a.m. on July 18, 1973.
- Figure 16. Records of wind speeds and directions at some selected meteorological stations in Hong Kong during the passage of Typhoon 'Dot' on July 16-17, 1973.
- Figure 17. Hourly rainfall distribution and pressure profile as recorded at the Royal Observatory during the passage of Typhoon 'Dot' on July 16-17, 1973.
- Figure 18. Photographs of damage and disruption caused by Typhoon 'Dot' in Hong Kong on July 16-17, 1973.
- Figure 19. Track of Typhoon 'Georgia': August 9-13, 1973.
- Figure 20. NOAA-2 DRIR picture of Typhoon 'Georgia' taken at 10.23 a.m. on August 9, 1973.
- Figure 21. ESSA-8 APT picture of Typhoon 'Georgia' taken at 12.04 p.m. on August 10, 1973.
- Figure 22. ESSA-8 APT picture of Typhoon 'Georgia' taken at 11.01 a.m. on August 11, 1973.
- Figure 23. ESSA-8 APT picture of Typhoon 'Georgia' taken at 11.52 a.m. on August 12, 1973.
- Figure 24. ESSA-8 APT picture of Typhoon 'Georgia' taken at 12.37 p.m. on August 13, 1973.
- Figure 25. Track of Tropical Storm 'Joan': August 18-22, 1973.
- Figure 26. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 10.10 a.m. on August 19, 1973.
- Figure 27. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 11.01 a.m. on August 20, 1973.
- Figure 28. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 11.52 a.m. on August 21, 1973.
- Figure 29. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 12.44 p.m. on August 22, 1973.
- Figure 30. Track of Tropical Storm 'Kate': August 22-26, 1973.
- Figure 31. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 11.40 a.m. on August 23, 1973.
- Figure 32. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 12.31 p.m. on August 24, 1973.
- Figure 33. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 11.27 a.m. on August 25, 1973.
- Figure 34. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 12.19 p.m. on August 26, 1973.
- Figure 35. Track of Severe Tropical Storm 'Louise': September 3-7, 1973.
- Figure 36. ESSA-8 APT picture of Severe Tropical Storm 'Louise' taken at 11.28 a.m. on September 3, 1973.

- Figure 37. Radar picture of Severe Tropical Storm 'Louise' taken at the Royal Observatory at 9.40 a.m. on September 5, 1973.
- Figure 38. ESSA-8 APT picture of Severe Tropical Storm 'Louise' taken at 11.16 a.m. on September 5, 1973.
- Figure 39. Track of Typhoon 'Marge': September 12-15, 1973.
- Figure 40. ESSA-8 APT picture of Typhoon 'Marge' taken at 11.30 a.m. on September 12, 1973.
- Figure 41. ESSA-8 APT picture of Typhoon 'Marge' taken at 12.21 p.m. on September 13, 1973.
- Figure 42. ESSA-8 APT picture of Typhoon 'Marge' taken at 11.17 a.m. on September 14, 1973.
- Figure 43. Track of Typhoon 'Nora': October 2-10, 1973.
- Figure 44. ESSA-8 APT picture of Typhoon 'Nora' taken at 10.16 a.m. on October 3, 1973.
- Figure 45. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.08 a.m. on October 4, 1973.
- Figure 46. ESSA-8 APT picture of Typhoon 'Nora' taken at 10.04 a.m. on October 5, 1973.
- Figure 47. NOAA-2 DRIR picture of Typhoon 'Nora' taken at 9.58 a.m. on October 6, 1973.
- Figure 48. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.45 a.m. on October 7, 1973.
- Figure 49. NOAA-2 DRIR picture of Typhoon 'Nora' taken at 9.53 a.m. on October 8, 1973.
- Figure 50. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.32 a.m. on October 9, 1973.
- Figure 51. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.23 p.m. on October 10, 1973.
- Figure 52. Track of Typhoon 'Ruth': October 11-19, 1973.
- Figure 53. ESSA-8 APT picture of Typhoon 'Ruth' taken at 10.16 a.m. on October 12, 1973.
- Figure 54. ESSA-8 APT picture of Typhoon 'Ruth' taken at 11.14 a.m. on October 13, 1973.
- Figure 55. NOAA-2 DRIR picture of Typhoon 'Ruth' taken at 9.39 a.m. on October 14, 1973.
- Figure 56. ESSA-8 APT picture of Typhoon 'Ruth' taken at 10.55 a.m. on October 15, 1973.
- Figure 57. NOAA-2 DRIR picture of Typhoon 'Ruth' taken at 9.34 a.m. on October 16, 1973.
- Figure 58. NOAA-2 DRIR picture of Typhoon 'Ruth' taken at 10.28 a.m. on October 17, 1973.
- Figure 59. ESSA-8 APT picture of Typhoon 'Ruth' taken at 11.34 a.m. on October 18, 1973.
- Figure 60. ESSA-8 APT picture of Typhoon 'Ruth' taken at 12.25 a.m. on October 19, 1973.

TROPICAL CYCLONE SUMMARIES FOR 1973

During the year 22 tropical cyclones were detected in the western North Pacific and the South China Sea, of which 11 attained typhoon intensity. Seven tropical cyclones crossed the coast of China and eight entered the east coast of Vietnam. However, only two tropical cyclones crossed the Philippines and one passed over Japan. One tropical cyclone affected Korea and another one dissipated over the northern part of the Malay Peninsula. The monthly distribution of these tropical cyclones is shown in Figure 1 and a brief summary of their tracks is contained in Table 1.

Five tropical cyclones entered Hong Kong's Area of Responsibility for Tropical Cyclone Warnings for Shipping while another 12 developed within this area. Altogether 370 Warnings for Shipping were issued on 17 tropical cyclones by the Royal Observatory, Hong Kong. Nine tropical cyclones necessitated the display of Tropical Cyclone Warning Signals in Hong Kong, only Typhoon 'Dot' came sufficiently close to cause gales and damage in the Colony.

In the first six months of the year there were no tropical cyclones reported in the western North Pacific and the South China Sea. This is the fourth occasion since 1884 when tropical cyclones were completely absent over the region; the other three occurred in 1889, 1897 and 1917.

Six tropical cyclones were observed in July but only two affected the Colony. The first tropical cyclone for the year was Tropical Storm 'Wilda' which passed about 200 miles east of Hong Kong on July 3. Typhoon 'Dot' formed in the South China Sea on July 14 and passed about 12 miles to the east of the Royal Observatory early on July 17. Gales and heavy showers were experienced in the Colony and some flooding was also reported in low-lying areas. Tropical Storm 'Fran' formed to the northeast of north Luzon and dissipated south of the Ryukyu Islands. Typhoon 'Anita' developed over the southern part of the South China Sea and degenerated into a low pressure area over North Vietnam. Typhoon 'Billie' originated to the east of the Philippines and entered the Gulf of Pohai after crossing the Ryukyu Islands. Typhoon 'Ellen' developed to the northwest of the Mariana Islands and moved north to hit Japan.

In August, seven tropical cyclones were reported in the area. Typhoon 'Georgia', Tropical Storms 'Joan' and 'Kate' all passed to the south of Hong Kong and caused periods of strong winds and heavy rain over the Colony. A weak tropical depression formed to the southwest of Hong Kong and moved westwards, dissipating over North Vietnam. Typhoon 'Iris' developed to the southeast of the Ryukyu Islands and recurved northwards to land in North Korea. Tropical Depression 'Hope' and another weak tropical depression formed in the western North Pacific near the Ogasawara Islands and dissipated to the east and southeast of Japan respectively.

Typhoon 'Marge' and Severe Tropical Storm 'Louise' were the only two tropical cyclones in the area during September. They formed in the vicinity of north Luzon and moved westwards across the South China Sea, dissipating over North Vietnam.

Four typhoons were observed in October; one formed near Nansha in the southern part of the South China Sea, while the other three originated near the Caroline Islands. Only Typhoons 'Nora' and 'Ruth' came within 350 miles to affect the Colony. The other two typhoons, 'Opal' and 'Patsy' entered the coast of South Vietnam near Danang.

Three tropical cyclones were reported in November. Both Tropical Storms 'Sarah' and 'Thelma' formed near the South Vietnam coast. The former dissipated over South Vietnam shortly after formation while the latter entered the Gulf of Siam and filled over the northern part of Malay Peninsula. Severe Tropical Storm 'Vera' originated near the southeast coast of the Philippines and degenerated into an area of low pressure near the Paracel Islands.

No tropical cyclones were reported in the western North Pacific and the South China Sea in December.

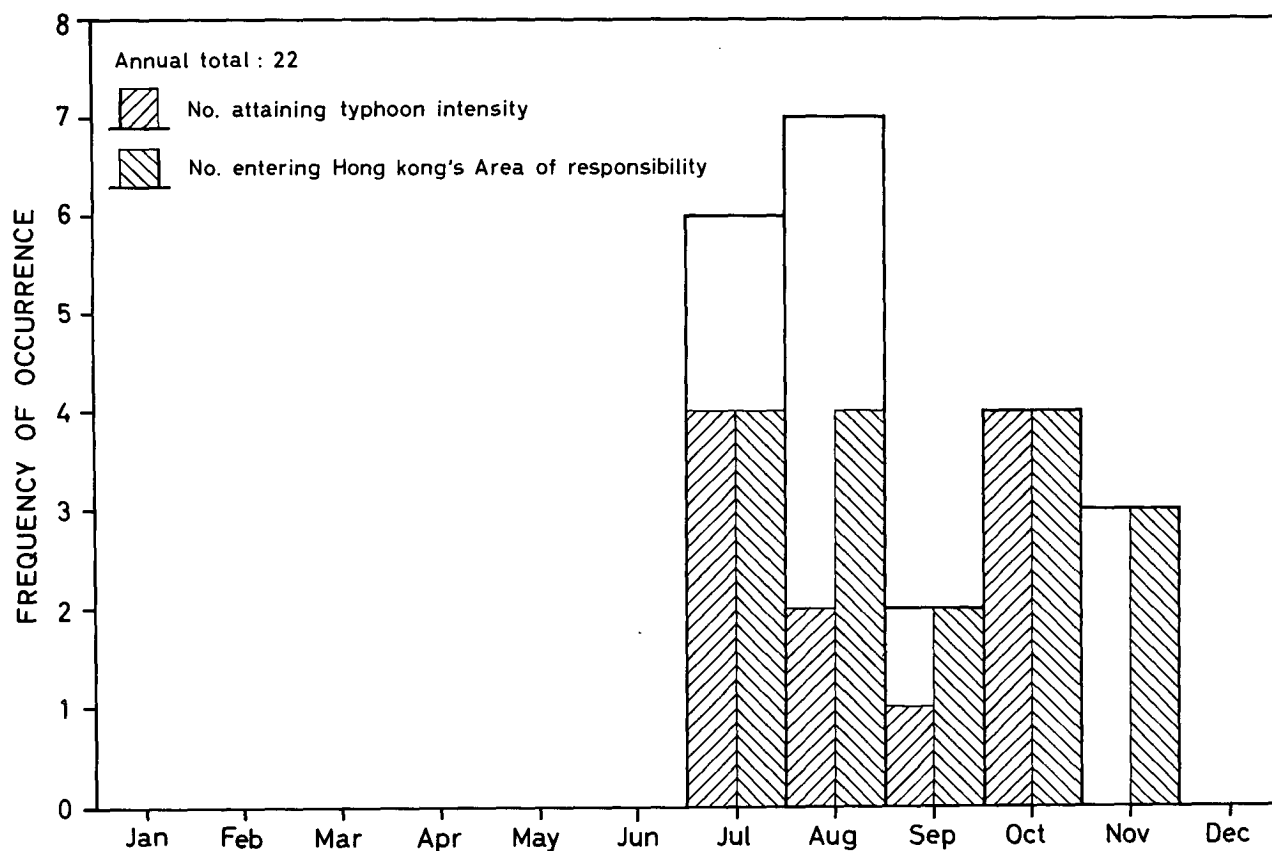


Figure 1. Monthly distribution of the frequency of occurrence of tropical cyclones in the western North Pacific and the South China Sea in 1973 (classified in accordance with the month of the first day circle of each track).

REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1973

TROPICAL STORM 'WILDA'

July 1-4, 1973

The track of this tropical storm is shown in Figure 2

On June 29, a low pressure area developed to the east of the Philippines and moved slowly northwestwards. It intensified into a tropical depression over the South China Sea during the morning of July 1 after crossing Luzon and at 10.30 a.m. the Stand By Signal, No. 1, was hoisted in Hong Kong when the depression was centred about 360 miles southeast of the Colony. 'Wilda' took on a north-northwesterly track and intensified into a tropical storm during the afternoon. At 6.00 p.m. there were two ships reporting gale force winds near its centre. Eight minutes later, a reconnaissance aircraft reported maximum surface winds of 40 knots and a minimum sea-level pressure of 991 millibars near its centre. At 9.00 p.m. on the same day, a ship about 80 miles northeast of 'Wilda' reported winds of 44 knots while Pratas Island which was about 100 miles northwest of the tropical storm, reported winds of 30 knots.

'Wilda' took on a more northerly course on July 2 and continued to move steadily towards Amoy. At 11.20 a.m. a satellite picture received at the Royal Observatory indicated that 'Wilda' was well-organized and its cloud mass covered an area about 240 miles in diameter (Figure 3). At 5.00 p.m. the eye of 'Wilda' became clearly visible on the Royal Observatory's radar and was about 50 miles in diameter when it was about 200 miles east of the Colony (Figure 4).

'Wilda' continued to move northwards, and the Stand By Signal was lowered at 6.15 a.m. on July 3, when the storm centre was about 220 miles east of the Colony. Around 3.00 p.m. on the same day, the tropical storm crossed the south China coast near Amoy where surface winds of 34 knots and a sea-level pressure of 980.1 millibars were reported. 'Wilda' degenerated into a low pressure area over Chekiang Province early on July 4.

The weather in Hong Kong was mainly fine on July 1-4 apart from some scattered heavy showers. Winds were generally light to moderate and there were no abnormal changes in tide heights during the period when the Stand By Signal, No. 1, was on display.

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

July 1	Nil
July 2	Trace
July 3	3.4 mm
July 4	23.3 mm

'Wilda' was the first tropical cyclone reported in the western North Pacific and the South China Sea in 1973. This is the fourth occasion since 1884 that no tropical cyclones were reported during the first six months of the year over the area; the other three occurred in 1889, 1897 and 1917.

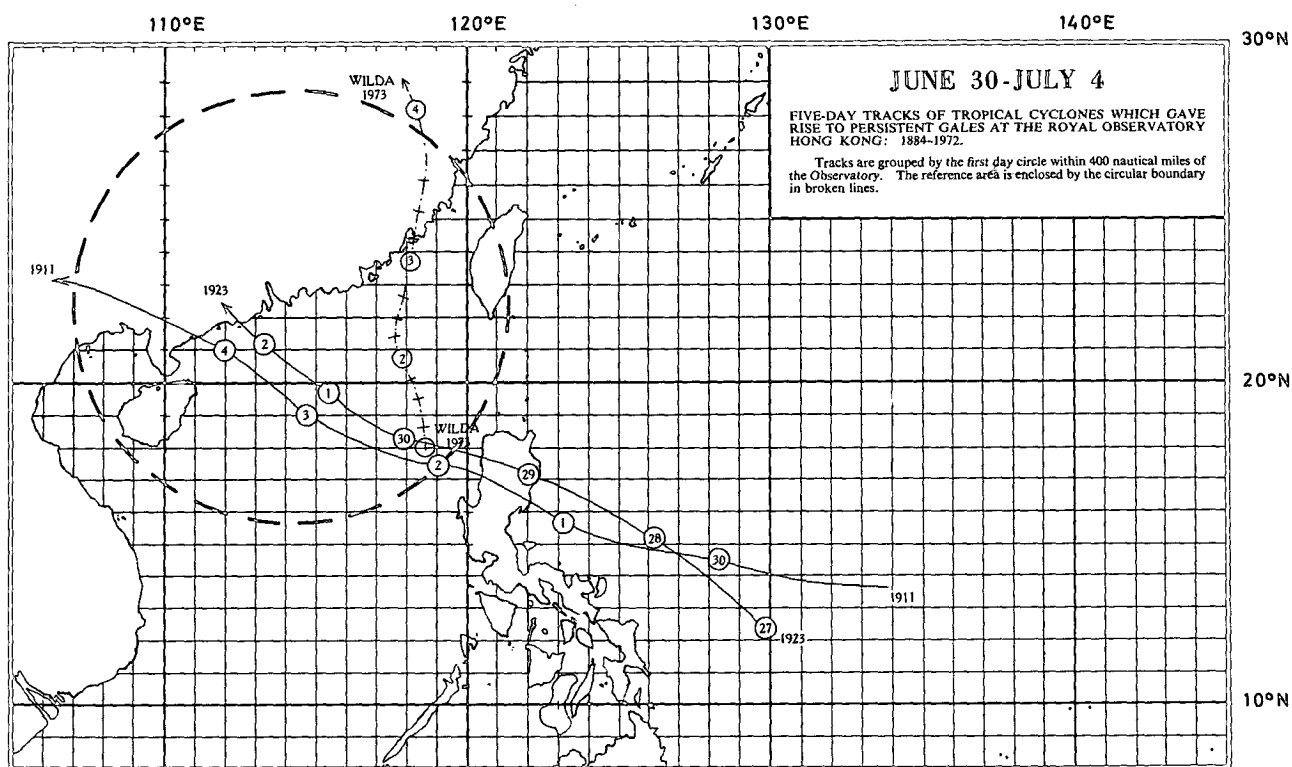


Figure 2. Track of Tropical Storm 'Wilda': July 1-4, 1973.

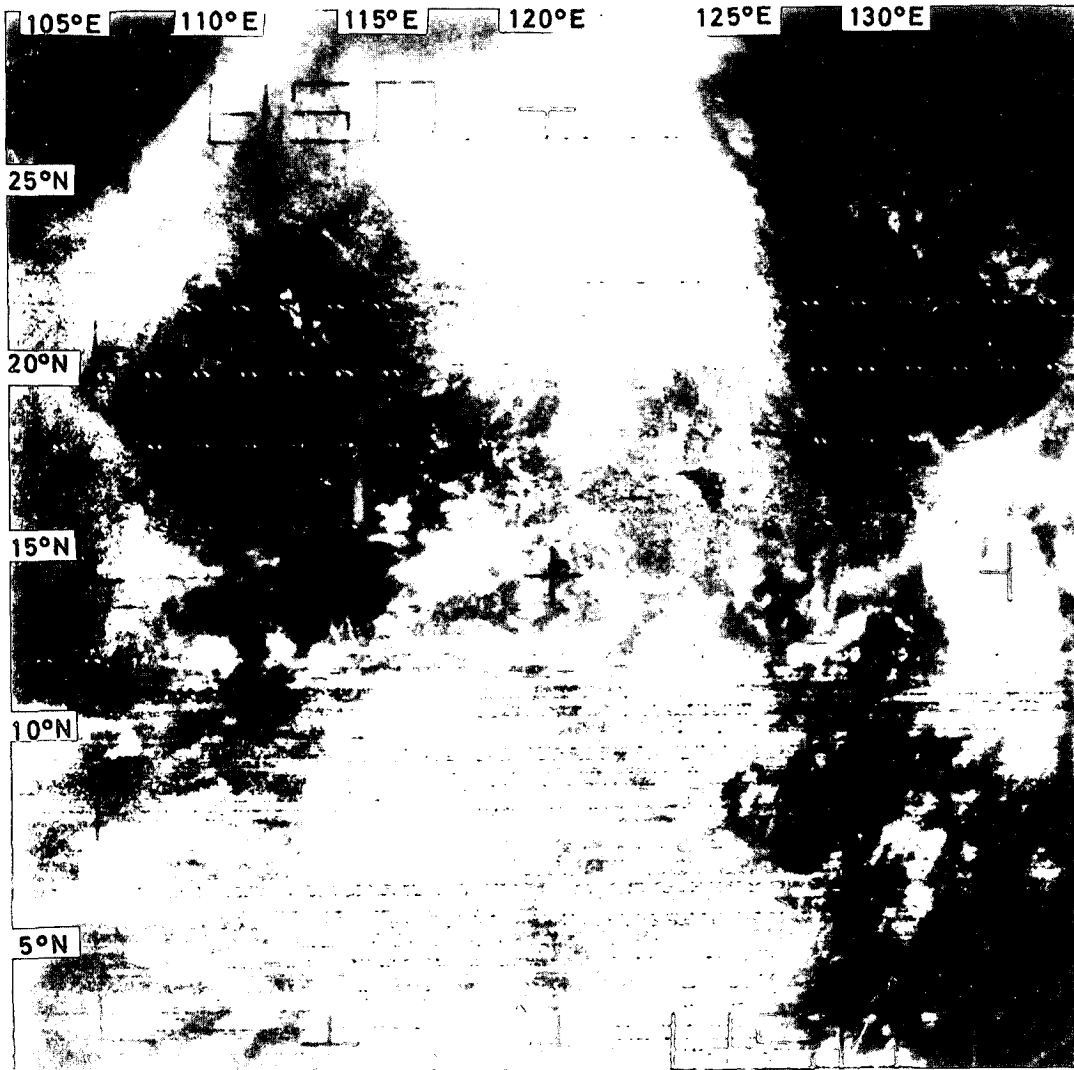


Figure 3. ESSA-8 APT picture of Tropical Storm 'Wilda' taken at 11.20 a.m. on July 2, 1973.

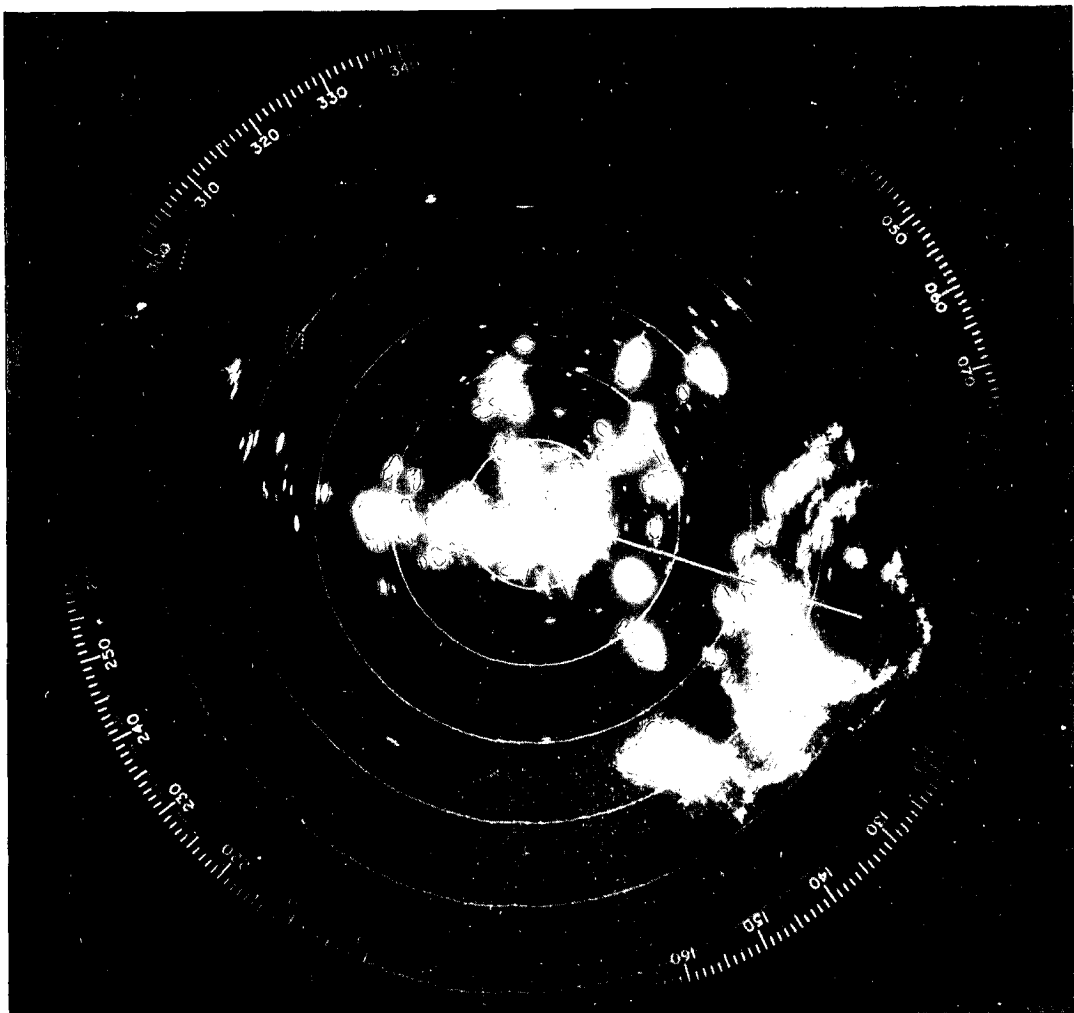


Figure 4. Radar picture of Tropical Storm 'Wilda' taken at the Royal Observatory at 5.00 p.m. on July 2, 1973 (Range markers at 40 n mile intervals).

TYPHOON 'DOT'

July 14-20, 1973

The track of this typhoon is shown in Figure 5

An area of low pressure formed over the South China Sea on July 13 (Figures 6 and 7) and developed into a tropical depression early next morning. During the afternoon of July 14, the circulation of the depression became well-organized and a satellite picture received at 10.12 p.m. indicated intense spiral cloud bands around the centre of the depression with a strong outflow aloft (Figure 8).

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 7.50 p.m. on July 14 when the depression was centred about 300 miles south of the Colony. It began to drift slowly towards the northwest. The depression intensified to a tropical storm named 'Dot' during the night and winds of 38 knots were reported at Paracel Islands about 120 miles southwest of its centre. The Strong Wind Signal, No. 3, was hoisted at 6.15 a.m. on July 15 when 'Dot' was centred about 290 miles south of the Colony and was taking a more northerly course towards the south China coast. An Islander aircraft of the Royal Hong Kong Auxiliary Air Force made a special flight into the storm during the morning and reported that there were gales associated with the storm about 100 miles south of Hong Kong. 'Dot' further intensified into a severe tropical storm during the afternoon and at 3.00 p.m. a ship about 60 miles from the centre experienced winds of 55 knots and a sea-level pressure of 989.3 millibars. At 7.50 p.m., a reconnaissance aircraft reported maximum surface winds of 65 knots near the centre.

'Dot' moved steadily northwards during the night of July 15 but accelerated to a speed of 8 knots. Satellite pictures received at the Royal Observatory during the morning of July 16 revealed that the cloud mass of the storm covered an area about 300 miles in diameter (Figure 9). 'Dot' became a typhoon in the afternoon and the North-easterly Gale or Storm Signal, No. 8 NE, was hoisted at 3.00 p.m. when the centre was about 120 miles south-southwest of the Colony and the eye of the typhoon began to appear on the Royal Observatory's radar. This signal was replaced by the Increasing Gale or Storm Signal, No. 9, at 10.40 p.m. when 'Dot' turned to a north-northeast track and headed almost directly towards the Colony. The size of the eye changed from time to time and became ill-defined during the evening but the average diameter during the afternoon of July 16 was about 20 nautical miles (Figure 10).

At 3.00 a.m. on July 17, the Colony came within the western edge of the eye and winds decreased rapidly. At the same time 'Dot' weakened into a severe tropical storm. The Northwesterly Gale or Storm Signal, No. 8 NW, was raised at 5.10 a.m. when the centre of the storm was about 16 miles southeast of the Royal Observatory. 'Dot' was closest to Hong Kong shortly after 6.00 a.m. when its centre was about 12 miles to the east of the Royal Observatory (Figure 11). At this time, the mean sea-level pressures recorded at the Royal Observatory and Cape Collinson were respectively 978.3 and 976.9 millibars (Figure 12). The storm crossed the coast on the northeastern side of Mirs Bay a few hours later (Figure 13) and the Southwesterly Gale or Storm Signal, No. 8 SW, was hoisted at 11.10 a.m. to warn the change in gale direction. 'Dot' continued to weaken overland and the No. 8 SW Signal was replaced by the Strong Wind Signal, No. 3, at 1.45 p.m. All signals were lowered by 4.15 p.m. on the same day.

'Dot' weakened to a low pressure area over eastern Kwangtung during the evening of July 17 but it retained its circulation and entered the East China Sea as a tropical depression near Foochow during the morning of July 18 (Figures 14 and 15). The storm moved northwards and finally dissipated over the Yellow Sea near Korea two days later.

In Hong Kong, the weather was mainly cloudy with isolated showers and fresh winds on July 15. Winds became generally strong overnight and reached gale force by the evening of July 16 (Figures 16 and 17) when heavy showers associated with the tropical cyclone spread in from the south. Winds were strongest during the early morning of July 17 when storm force winds were experienced in exposed places. The maximum winds and maximum gust peak speeds recorded at various locations were as follows:

<i>Location</i>	<i>Maximum sustained wind (kn)</i>	<i>Maximum gust peak speed (kn)</i>
Royal Observatory	34	77
Star Ferry	44	78
Hong Kong Airport	36	81
Cape Collinson	51	74
Cheung Chau	44	75
Waglan Island	57	86
Tate's Cairn	57	97

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

July 15	8.3 mm
July 16	42.2 mm
July 17	172.1 mm
July 18	Nil

The times and heights of the highest tides and maximum storm surges recorded at the various locations in the Colony during Typhoon 'Dot' were as follows:

Location	Highest Tide Above Chart Datum			Maximum Storm Surge Above Predicted Level		
	Height	Date	Time	Height	Date	Time
North Point	2.6 m	July 16	9.18 a.m.	0.7 m	July 17	1.45 a.m.
Tai Po Kau	2.7 m	July 17	10.15 a.m.	1.3 m	July 17	3.15 a.m.
Chi Ma Wan (Lantau)	3.0 m	July 16	10.50 a.m.	1.2 m	July 17	12.50 a.m.

During the passage of Typhoon 'Dot', many low-lying areas in the New Territories were flooded (Figure 18). The flooding was most serious in Tin Shui Wai, north of Yuen Long, where flood water rose about four feet above the ground level. Heavy losses to garden crops, fruit trees, livestock, farm houses and fish-ponds were reported. A woman was killed in a landslide in Tsuen Wan and 38 persons were injured. Two freighters were aground and seven others adrift.

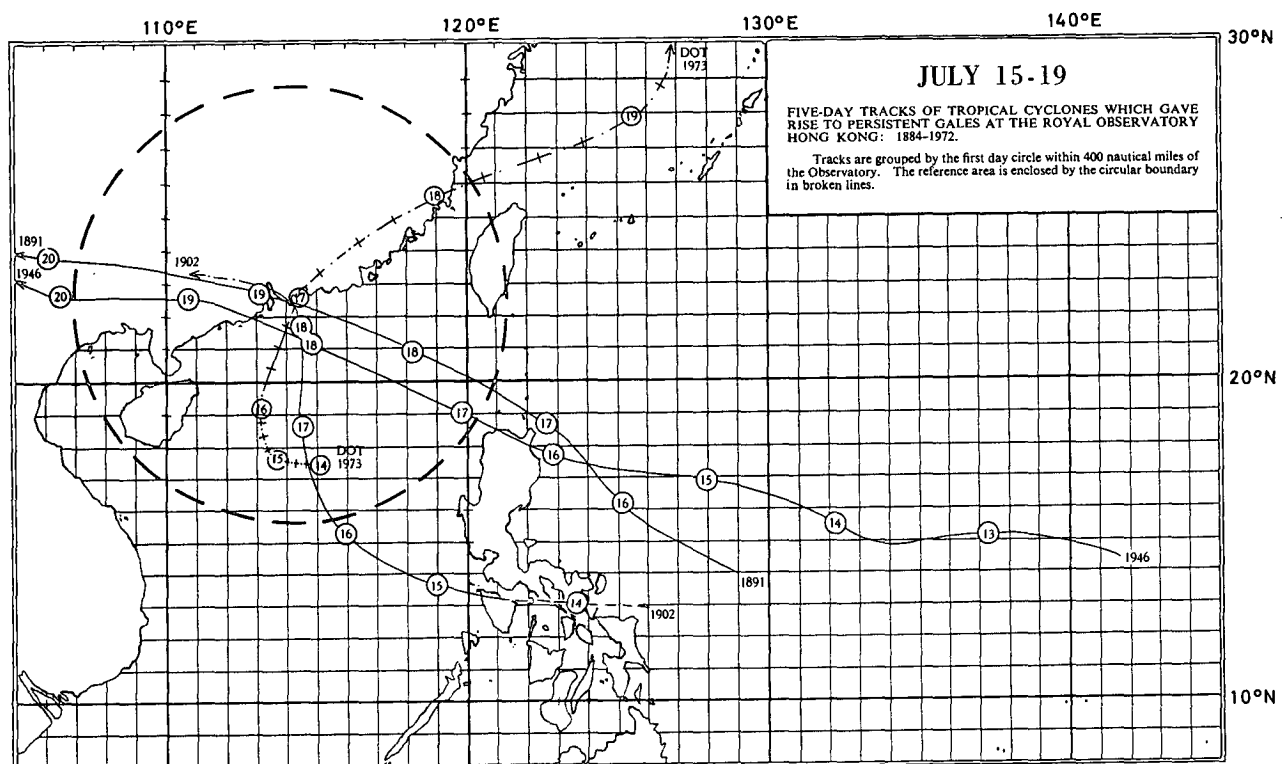


Figure 5. Track of Typhoon 'Dot': July 14-19, 1973.

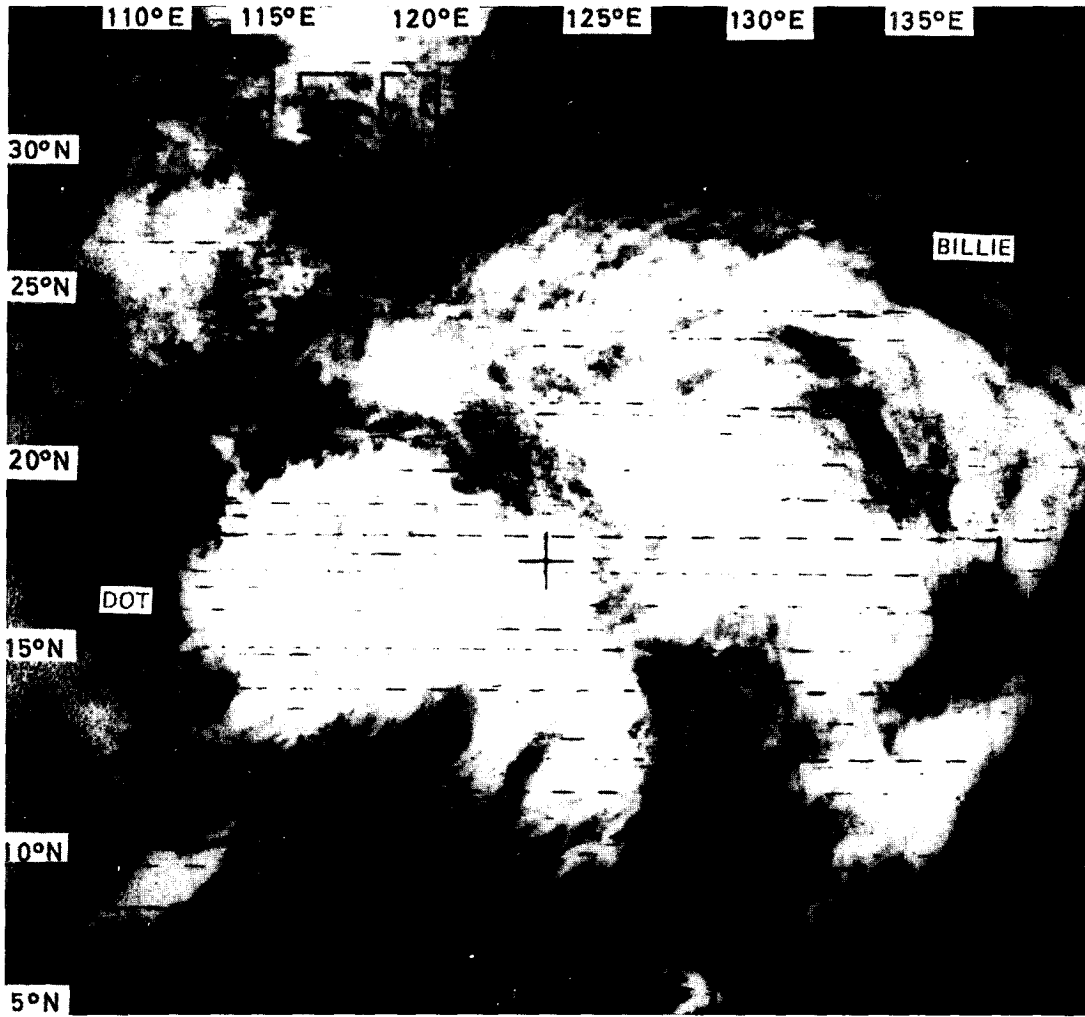


Figure 6. ESSA-8 APT picture of Typhoon 'Dot' taken at 11.08 a.m. on July 13, 1973.

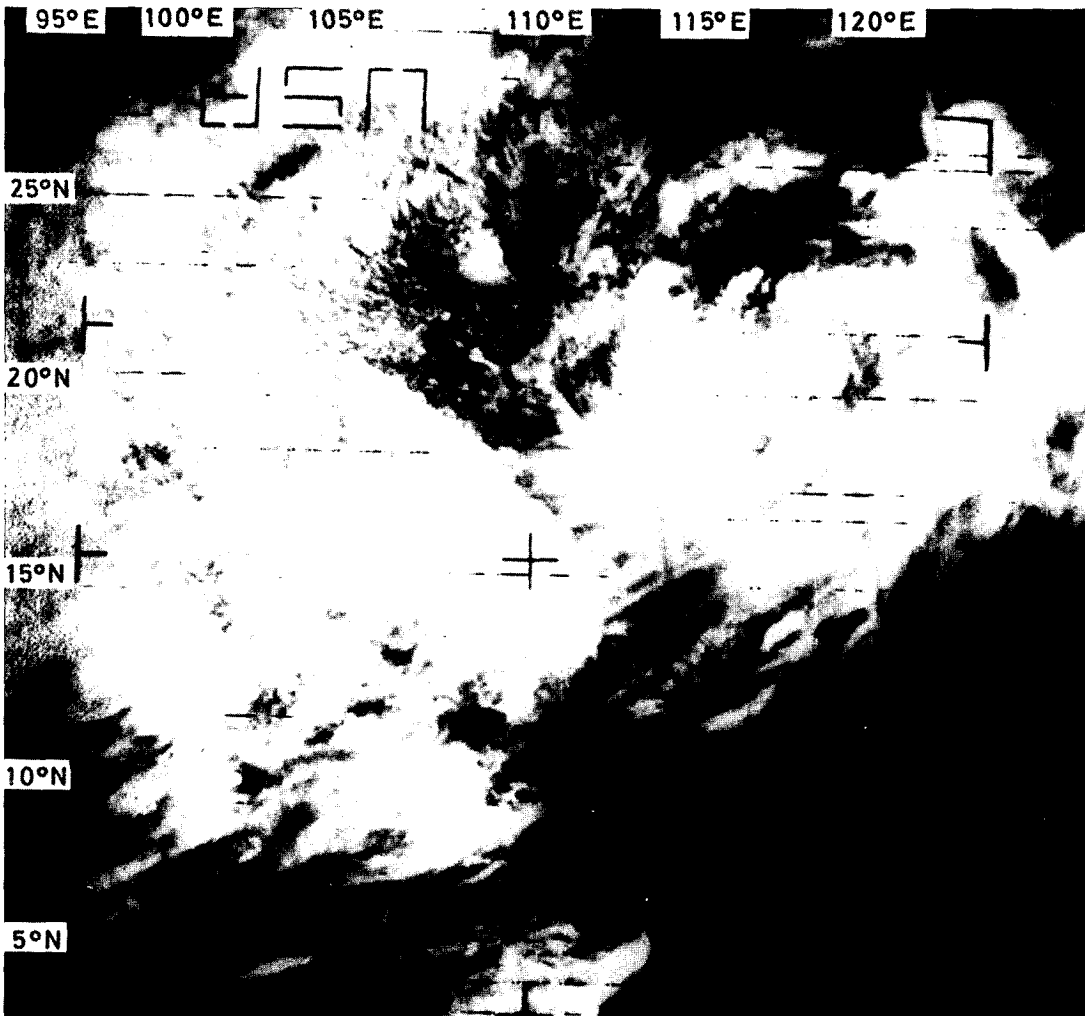


Figure 7. ESSA-8 APT picture of Typhoon 'Dot' taken at noon on July 14, 1973.

版權照片刊登於印刷本內，該刊物可在香港天文台資源中心查閱。

天文台資源中心網址：

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
(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 8. NOAA-2 DRIR picture of Typhoon 'Dot' taken at 10.12 p.m. on July 14, 1973.

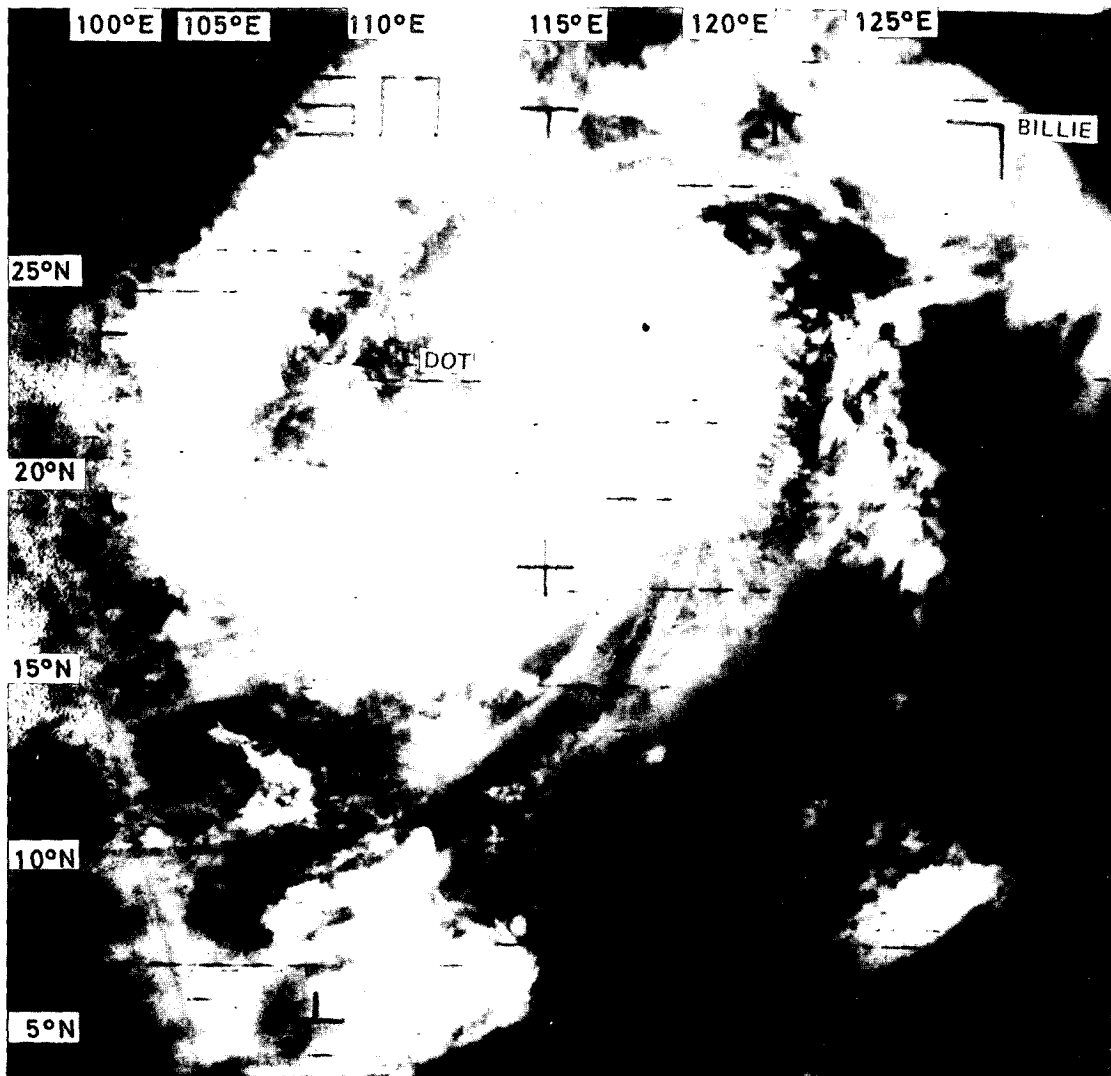
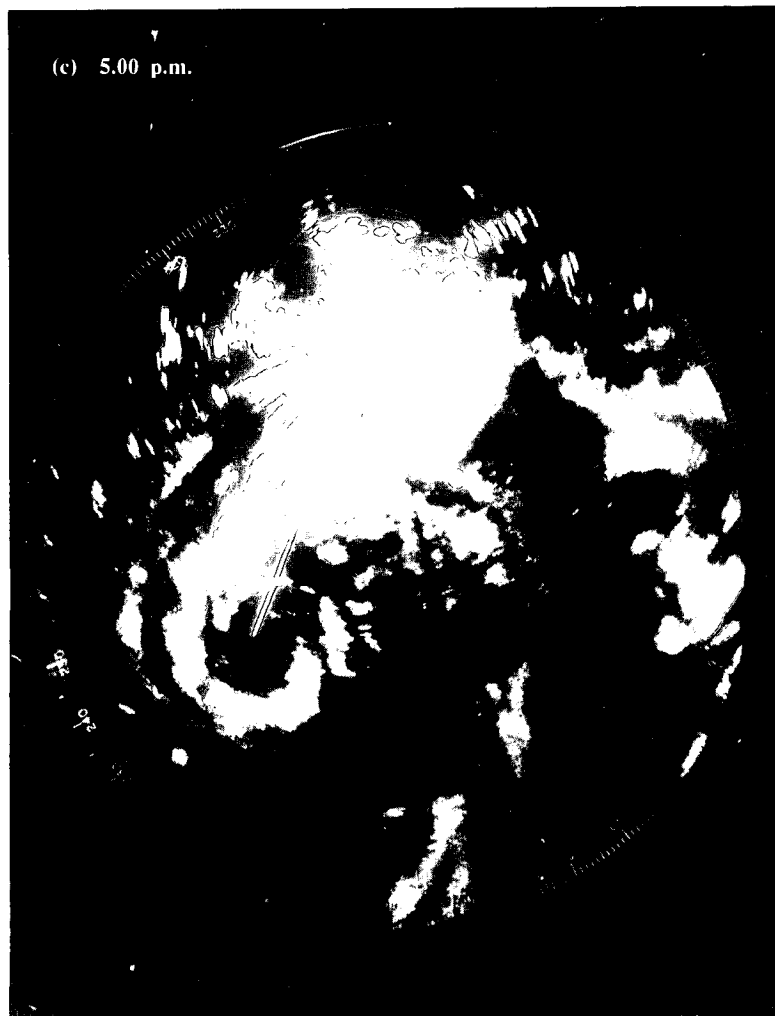
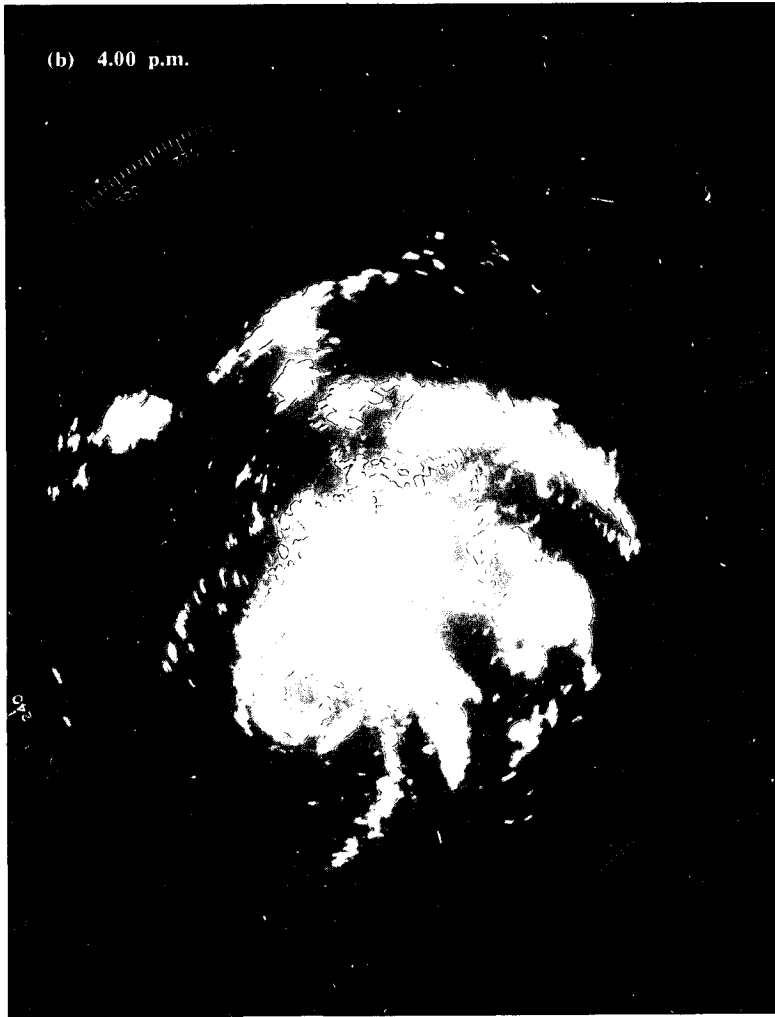


Figure 9. ESSA-8 APT picture of Typhoon 'Dot' taken at 11.47 a.m. on July 16, 1973.



Figure 10. Radar pictures of Typhoon 'Dot' taken at the Royal Observatory during the afternoon of July 16, 1973 (Range markers at 40 n mile intervals).



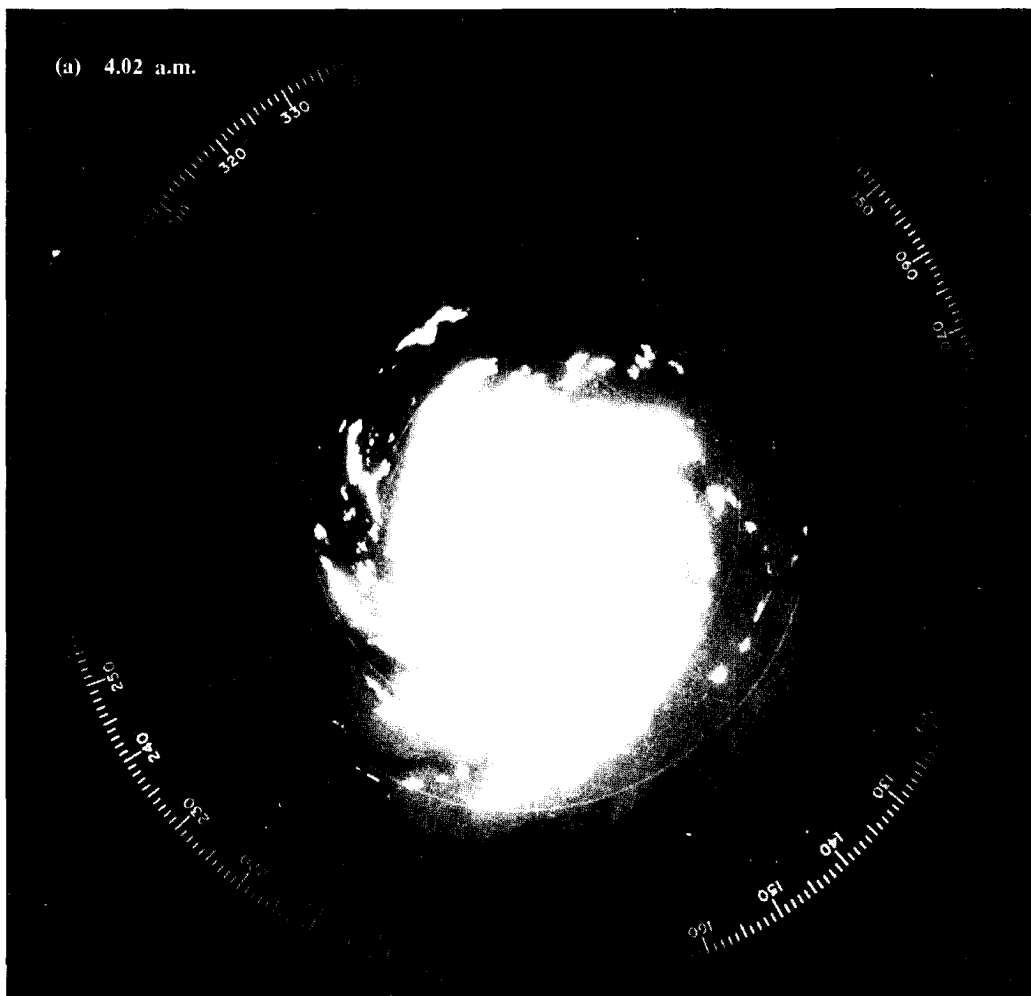
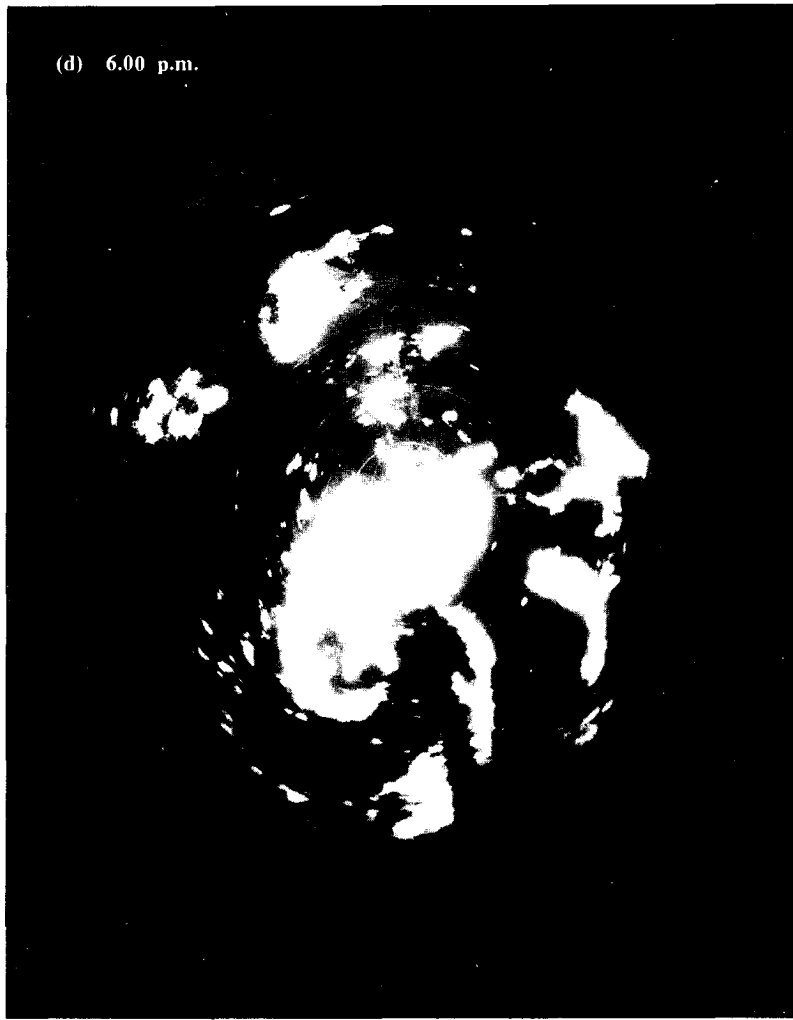
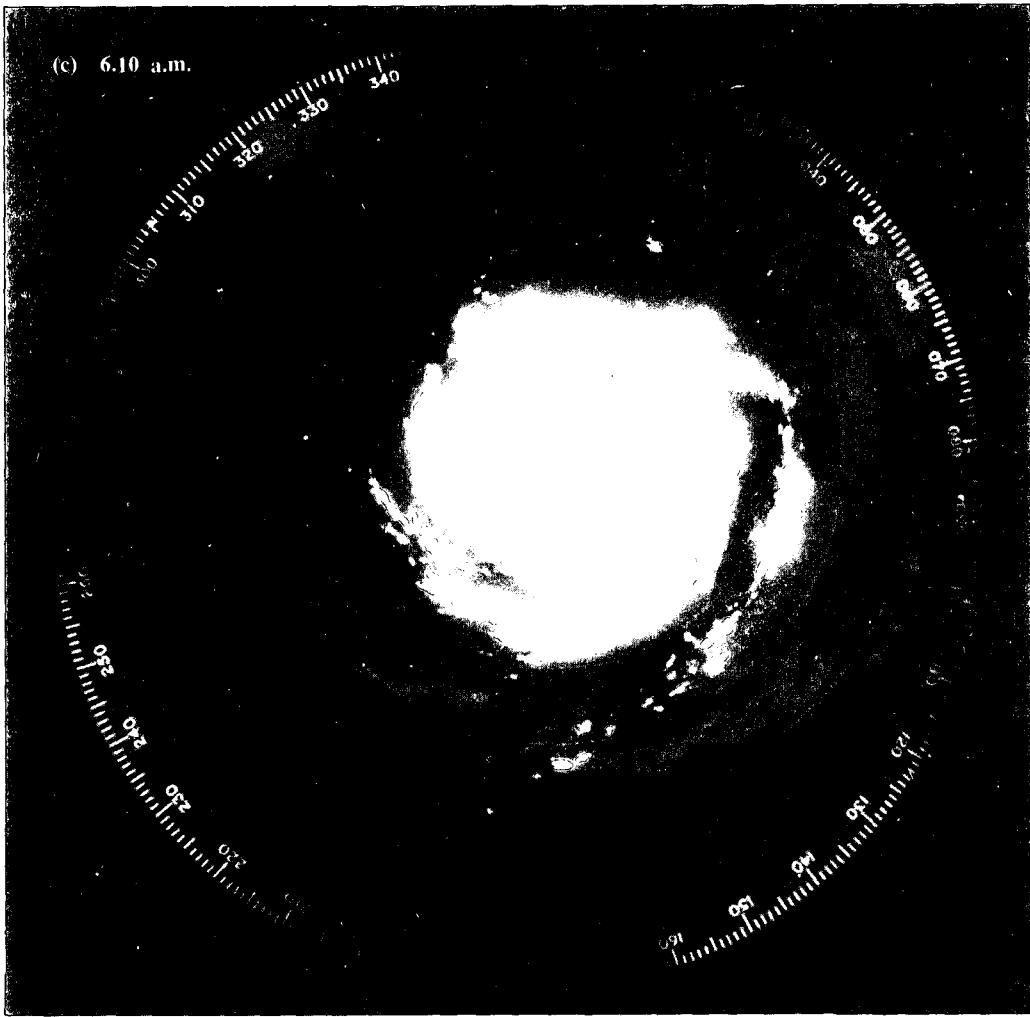
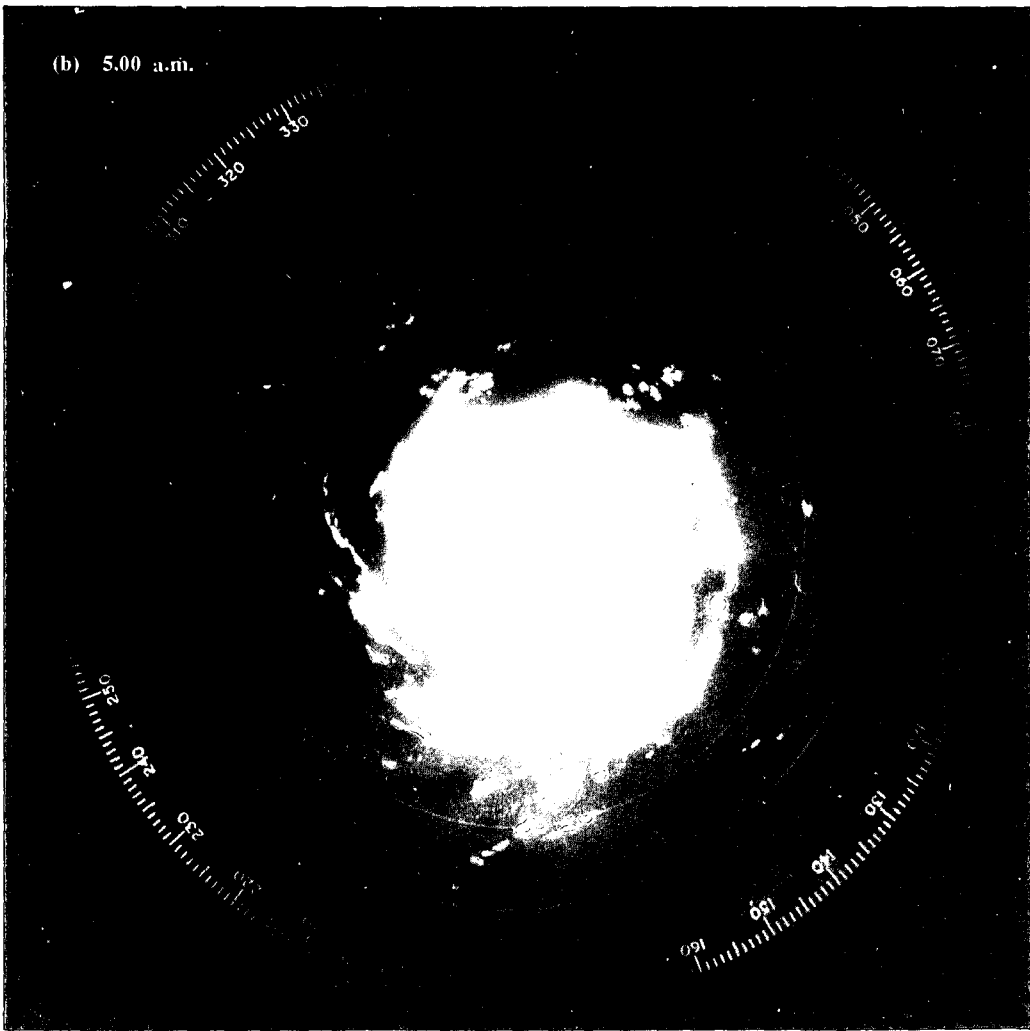


Figure 11. Radar pictures of Typhoon 'Dot' taken at the Royal Observatory in the early morning of July 17, 1973 (Range markers at 40 n mile intervals).



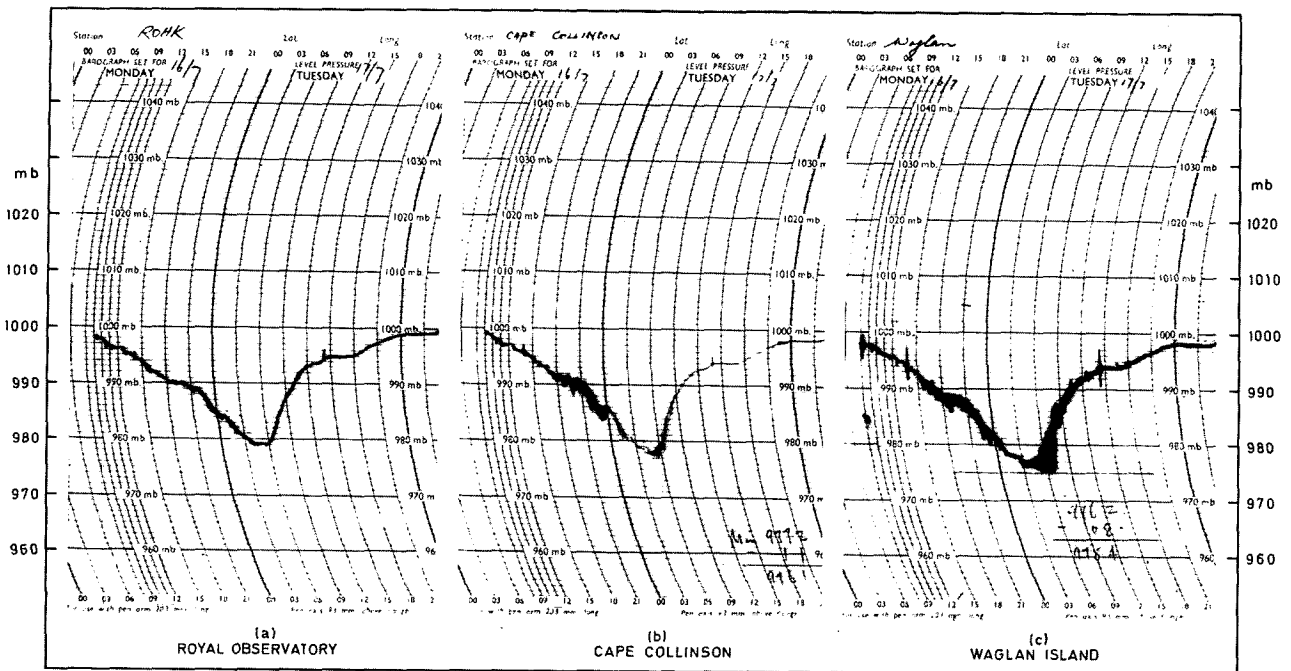
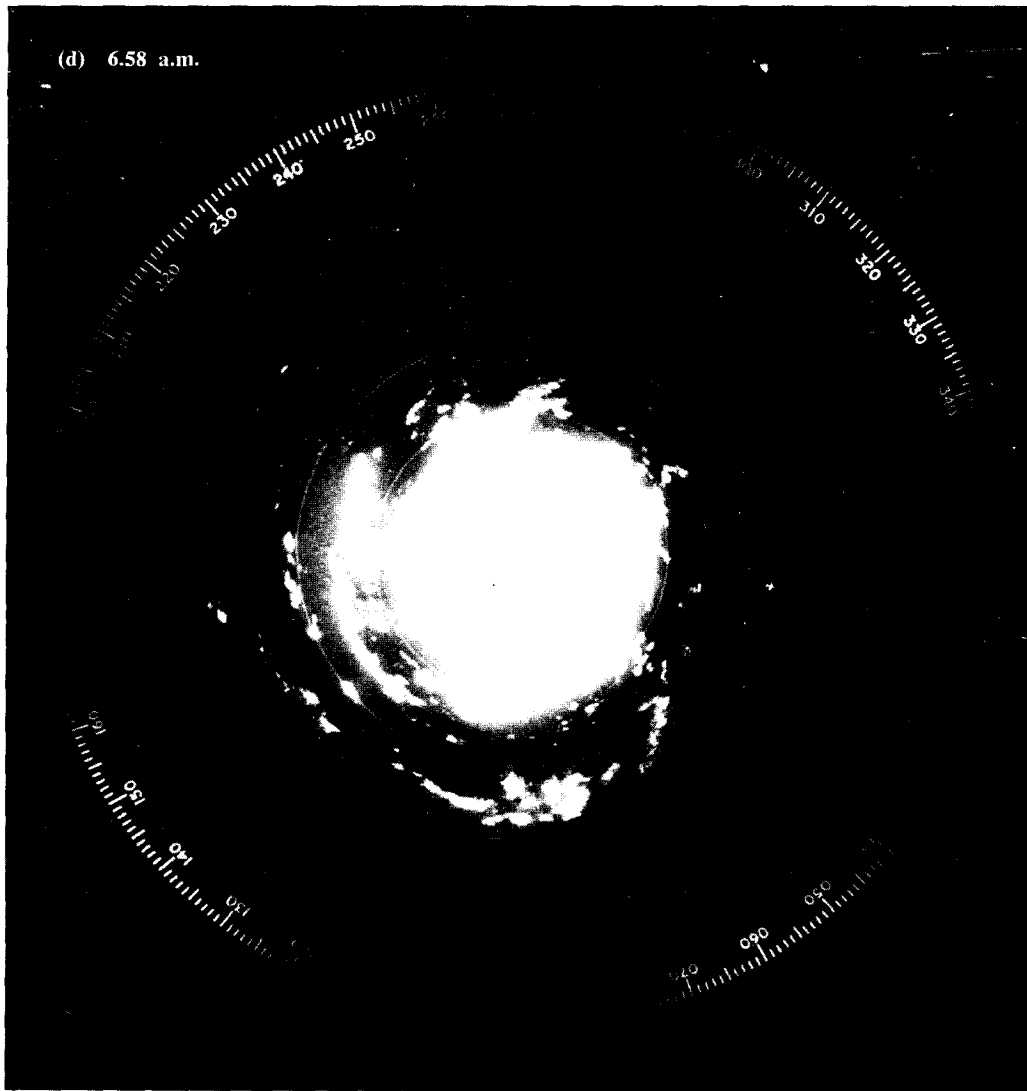


Figure 12. Records of barometric pressure at some selected meteorological stations in Hong Kong during the passage of Typhoon 'Dot' on July 16-17, 1973.

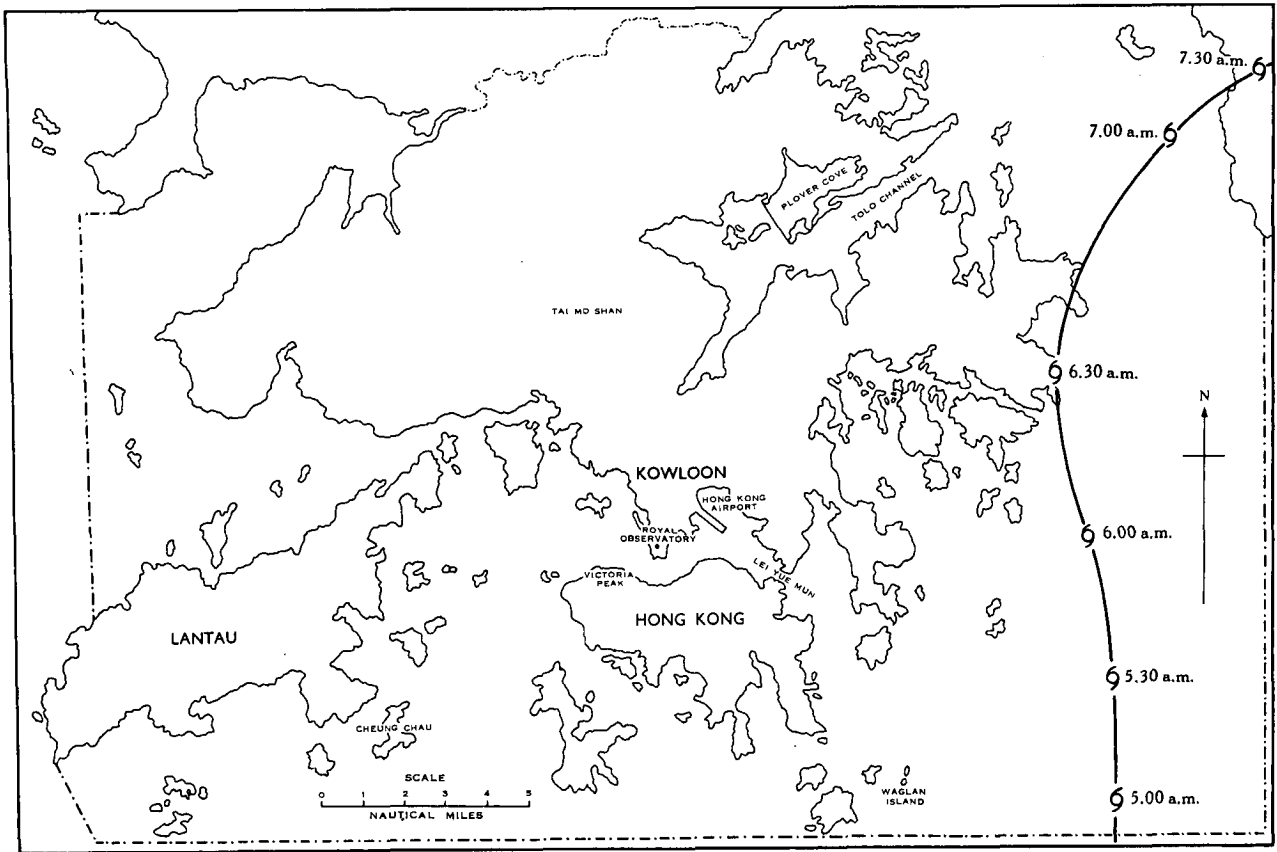


Figure 13. Trajectory of the eye of Typhoon 'Dot' over the eastern part of Hong Kong on July 17, 1973.

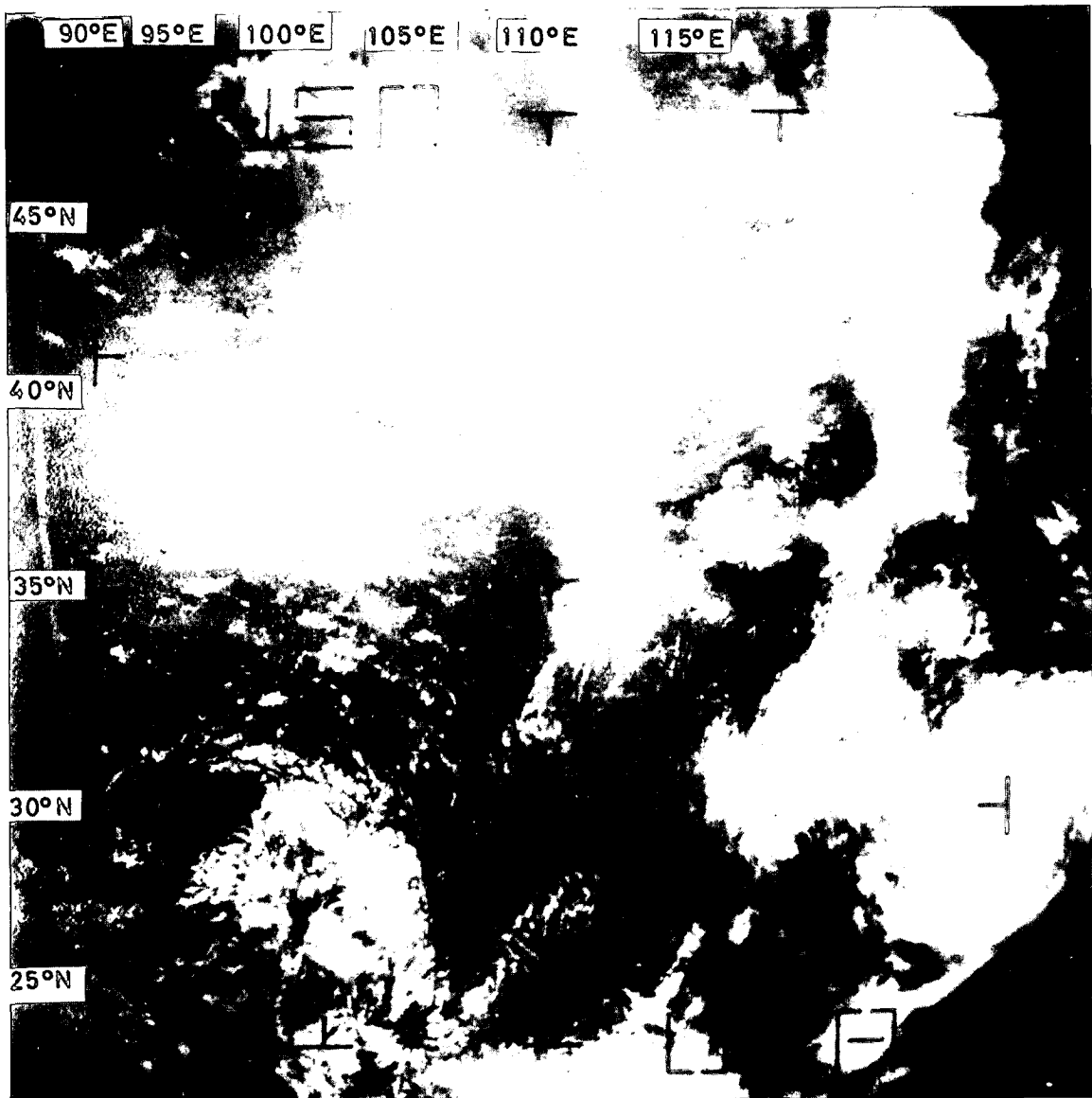


Figure 14. ESSA-8 APT picture of Typhoon 'Dot' taken at 12.32 p.m. on July 17, 1973.

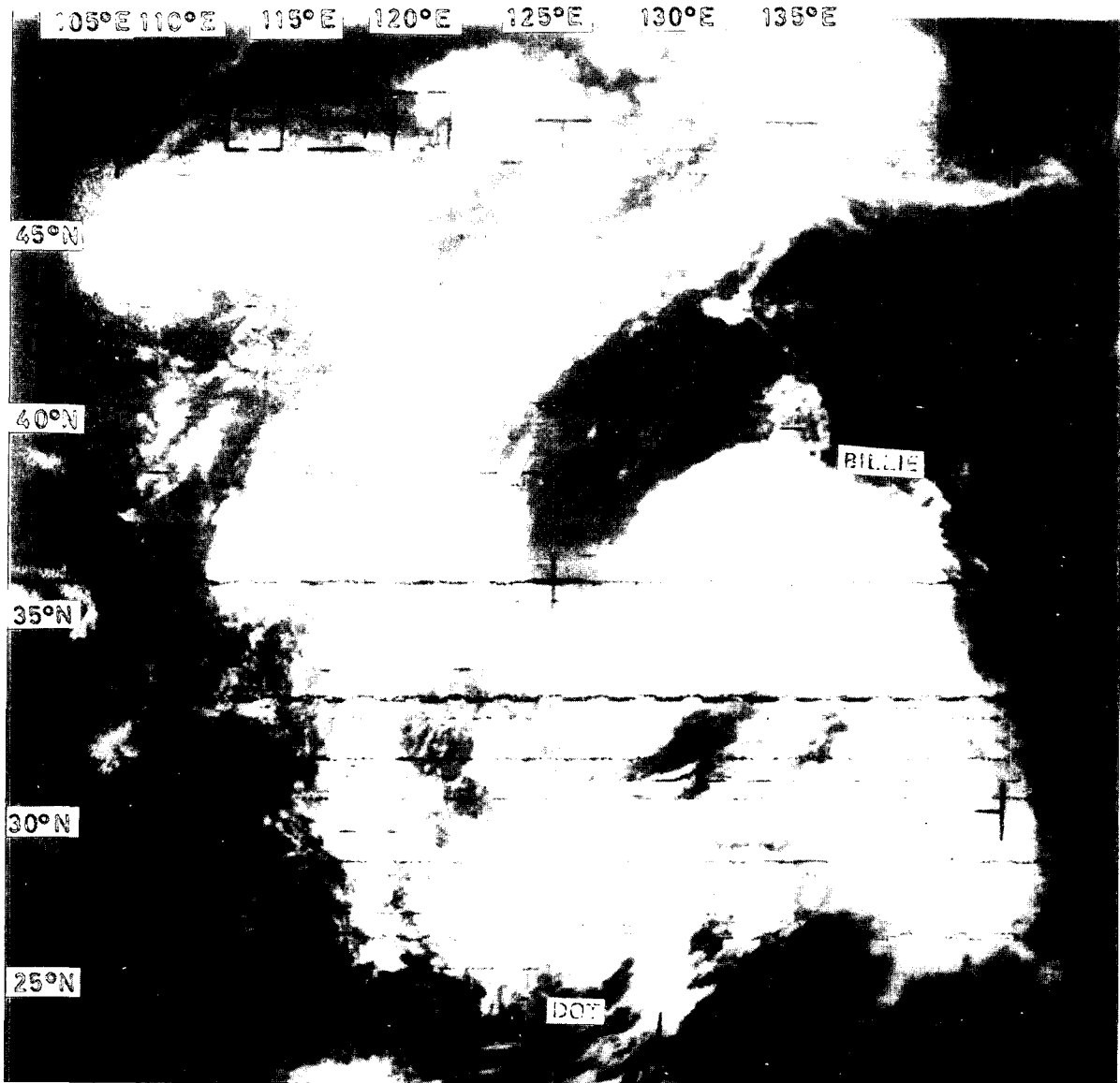


Figure 15. ESSA-8 APT picture of Typhoon 'Dot' taken at 11.28 a.m. on July 18, 1973.

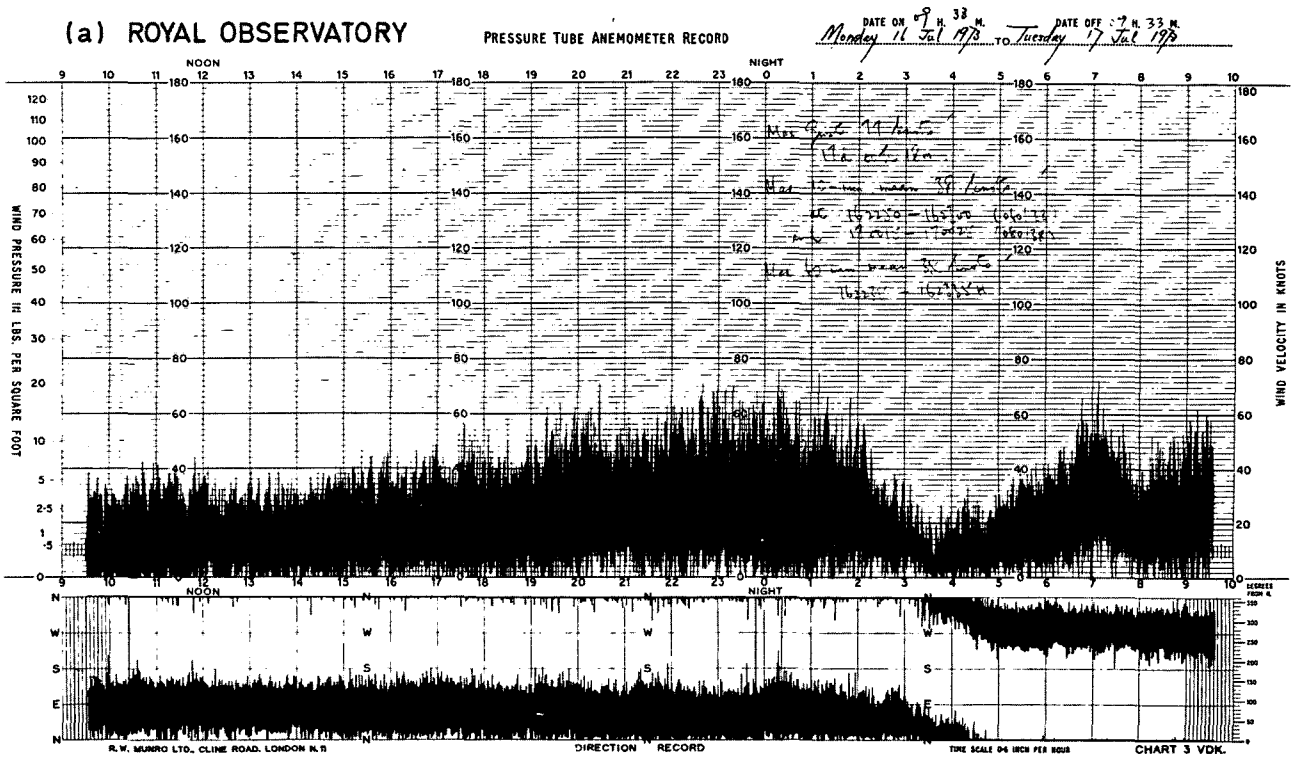
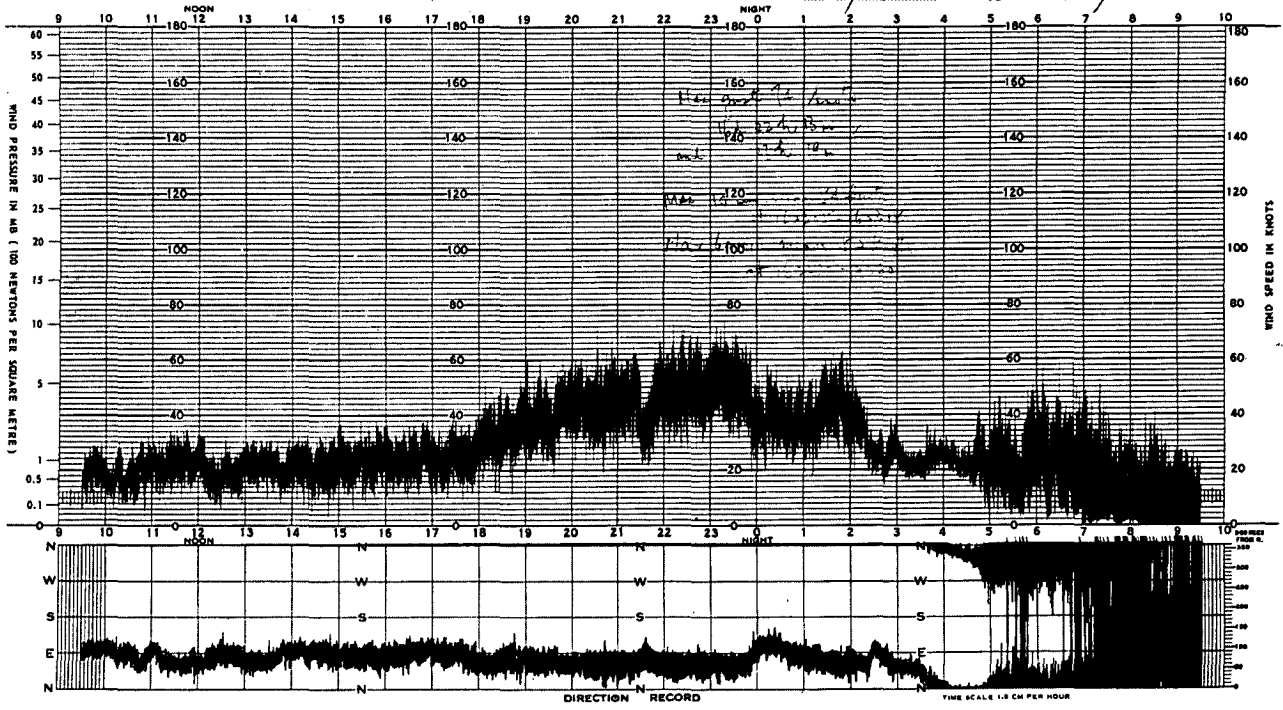


Figure 16. Records of wind speeds and directions at some selected meteorological stations in Hong Kong during the passage of Typhoon 'Dot' on July 16-17, 1973.

(b) CAPE COLLINSON

PRESSURE TUBE ANEMOMETER RECORD

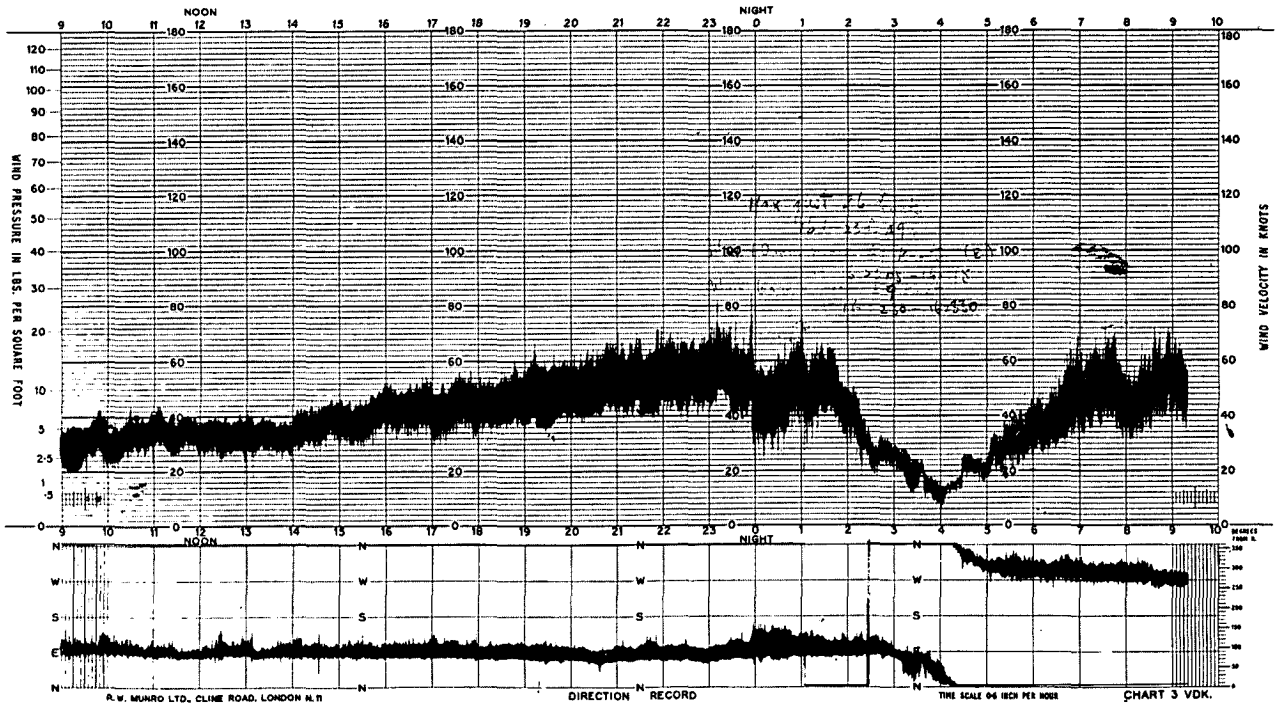
DATE ON 09³¹ M. DATE OFF 11⁰⁰ M.
 Monday 16 Feb 1973 TO Thursday 17 Feb 1973



(c) WAGLAN ISLAND

PRESSURE TUBE ANEMOMETER RECORD

DATE ON 09⁰⁰ M. DATE OFF 01⁰⁰ M.
 Monday 16-7-73 TO Tuesday 17-7-73



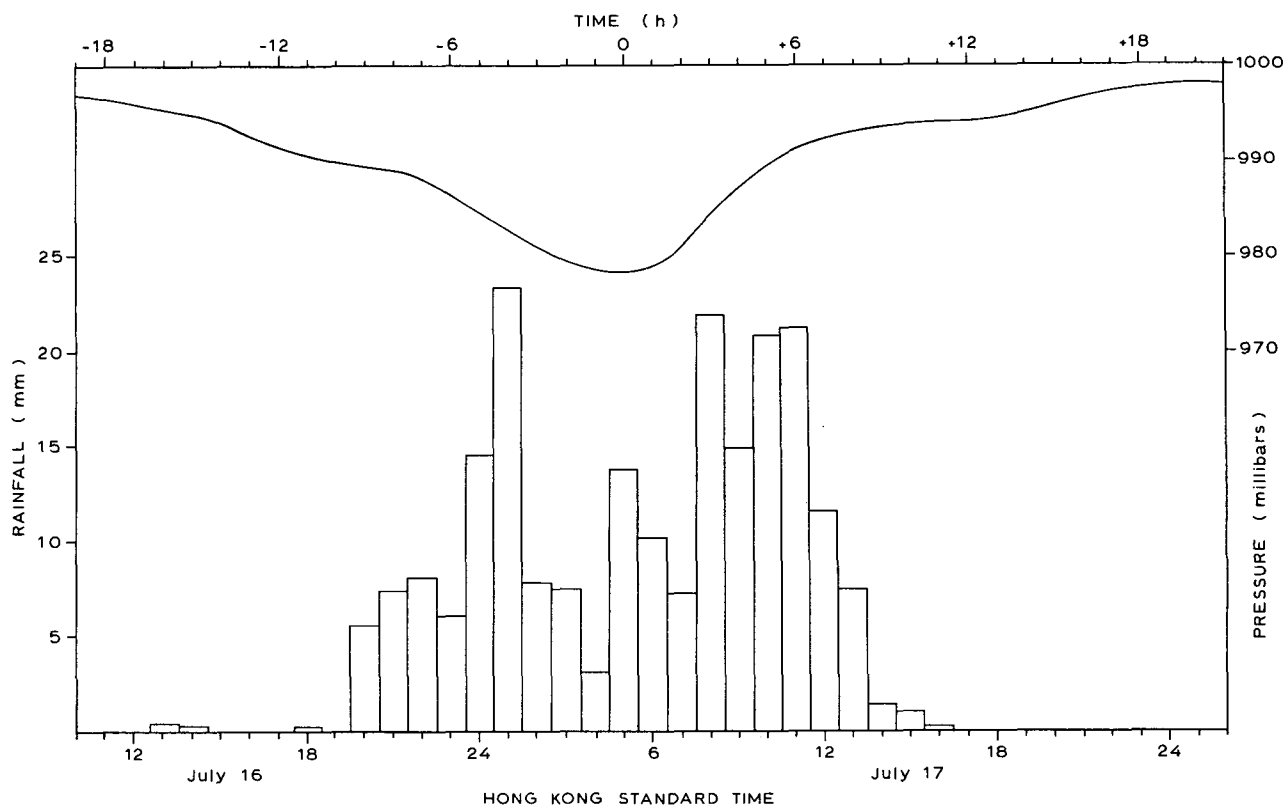


Figure 17. Hourly rainfall distribution and pressure profile as recorded at the Royal Observatory during the passage of Typhoon 'Dot' on July 16-17, 1973 (The time scale is measured from the hour of lowest barometric pressure).

版權照片刊登於印刷本內，該刊物可在香港天文台資源中心查閱。

天文台資源中心網址：

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
(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 18. Photographs of damage and disruption caused by Typhoon 'Dot' in Hong Kong on July 16-17, 1973.

(a) The paddy fields of Yuen Long (New Territories) with knee-deep water.

(By courtesy of South China Morning Post)

版權照片刊登於印刷本內，該刊物可在香港天文台資源中心查閱。

天文台資源中心網址：

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
(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)

(b) Flooding over Tsuen Wan area.

(By courtesy of South China Morning Post)

版權照片刊登於印刷本內，該刊物可在香港天文台資源中心查閱。

天文台資源中心網址：

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
(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)

(c) A land slide in Taipo Road near the Chinese University.

(By courtesy of Hongkong Standard)

版權照片刊登於印刷本內，該刊物可在香港天文台資源中心查閱。

天文台資源中心網址：

http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
(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)

(d) A huge wave breaks onto the praya of Kennedy Town at the height of Typhoon 'Dot'.

(By courtesy of South China Morning Post)

TYPHOON 'GEORGIA'

August 9–13, 1973

The track of this typhoon is shown in Figure 19

On August 8, a low pressure area developed to the southeast of Pratas Island and intensified into a tropical depression named 'Georgia' the next day. It moved westwards across the South China Sea at about 8 knots and at 4.00 p.m. on August 9, the Stand By Signal, No. 1, was hoisted in Hong Kong when the depression was centred about 210 miles southeast of the Colony. At 10.47 p.m. on the same day, a reconnaissance aircraft reported maximum surface winds of 50 knots and a minimum sea-level pressure of 989 millibars near its centre.

'Georgia' intensified into a tropical storm during the evening and moved closer to the Colony. The Strong Wind Signal, No. 3, was hoisted at 11.10 p.m. on August 9 when 'Georgia' was centred about 180 miles south-southeast of the Colony. 'Georgia' continued to move westwards towards Hainan but slowed down to about 3 knots during the afternoon of August 10. At 12.50 p.m. on the same day, a reconnaissance aircraft reported maximum surface winds of 65 knots and a minimum sea-level pressure of 978 millibars near its centre. During the next morning, 'Georgia' intensified into a typhoon and started to turn towards the northwest when it was about 220 miles southwest of Hong Kong and finally dissipated over Kwangsi on August 13. A sequence of satellite pictures received at the Royal Observatory during the period August 9–13 is presented in Figures 20–24. The Strong Wind Signal was lowered at 9.10 a.m. on August 11.

In Hong Kong, the weather was mainly cloudy with occasional heavy showers from August 9–13 and winds over the Colony freshened during the evening of August 9 and became generally strong on August 10. The maximum winds recorded at Tate's Cairn and Waglan Island were 36 and 41 knots respectively. The maximum gust peak speeds recorded at the above two stations were 73 and 55 knots respectively.

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

August 9	18.5 mm
August 10	75.3 mm
August 11	90.8 mm
August 12	57.0 mm
August 13	6.2 mm

There were no abnormal changes in tide heights during the period when the Tropical Cyclone Warning Signals were on display and no serious damage or flooding was reported.

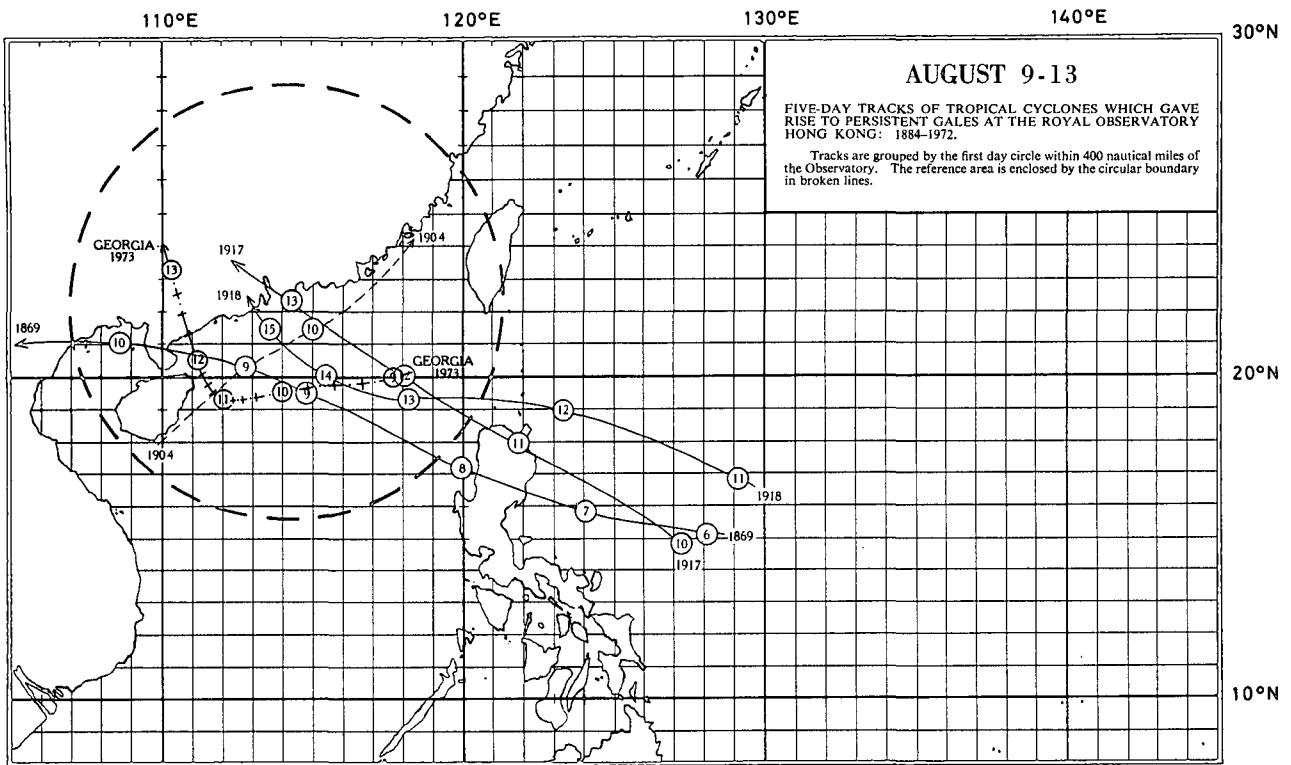


Figure 19. Track of Typhoon 'Georgia': August 9-13, 1973.

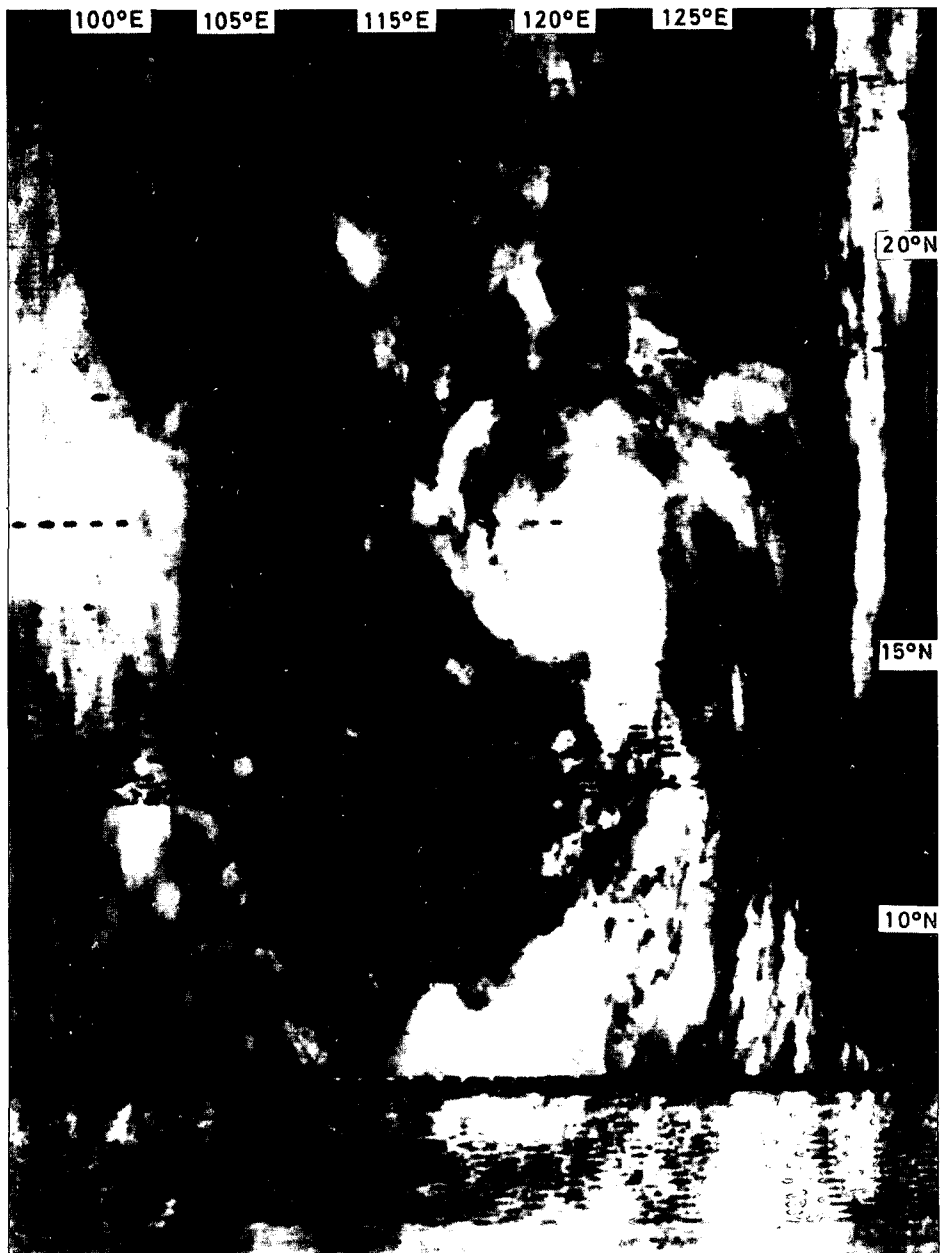


Figure 20. NOAA-2 DRIR picture of Typhoon 'Georgia' taken at 10.23 a.m. on August 9, 1973.

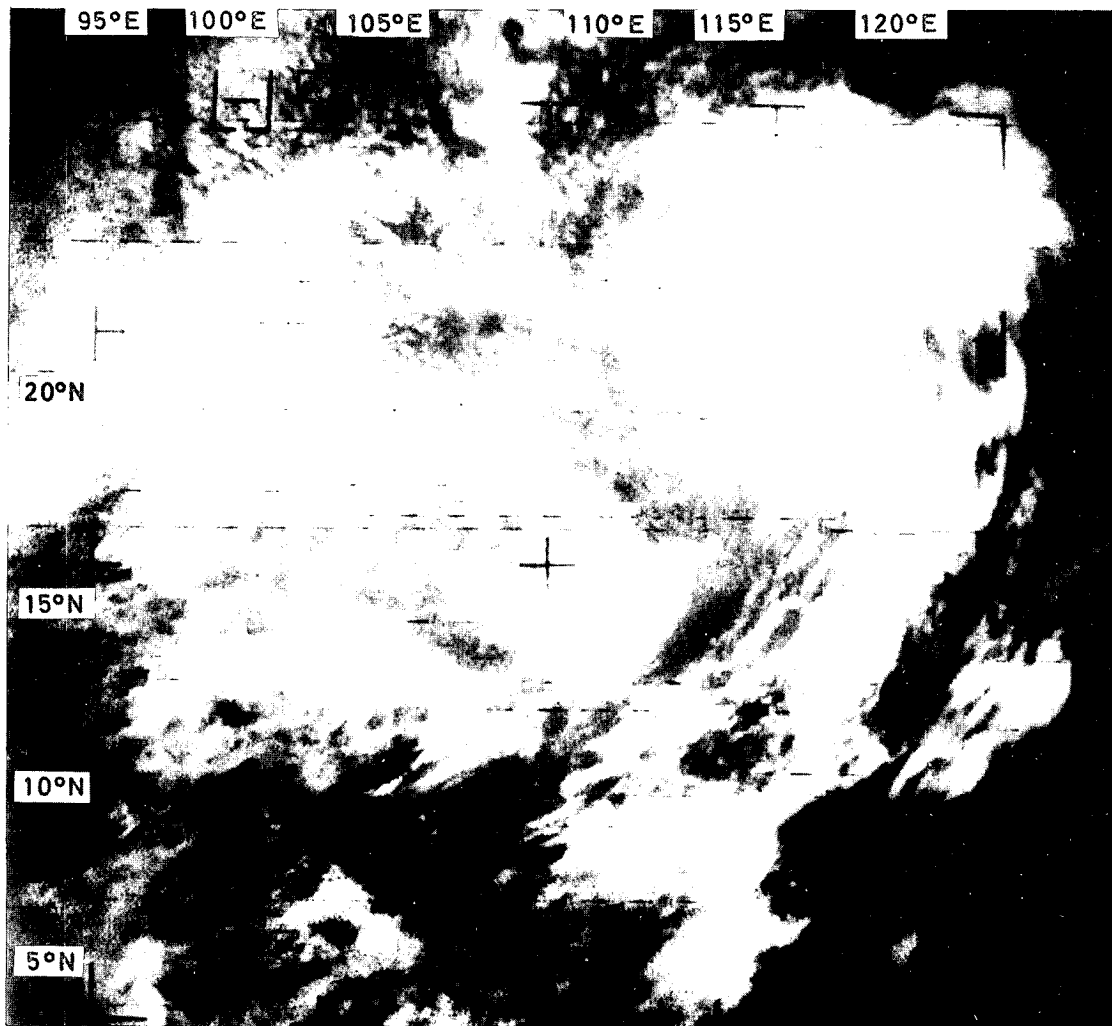


Figure 21. ESSA-8 APT picture of Typhoon 'Georgia' taken at 12.04 p.m. on August 10, 1973.

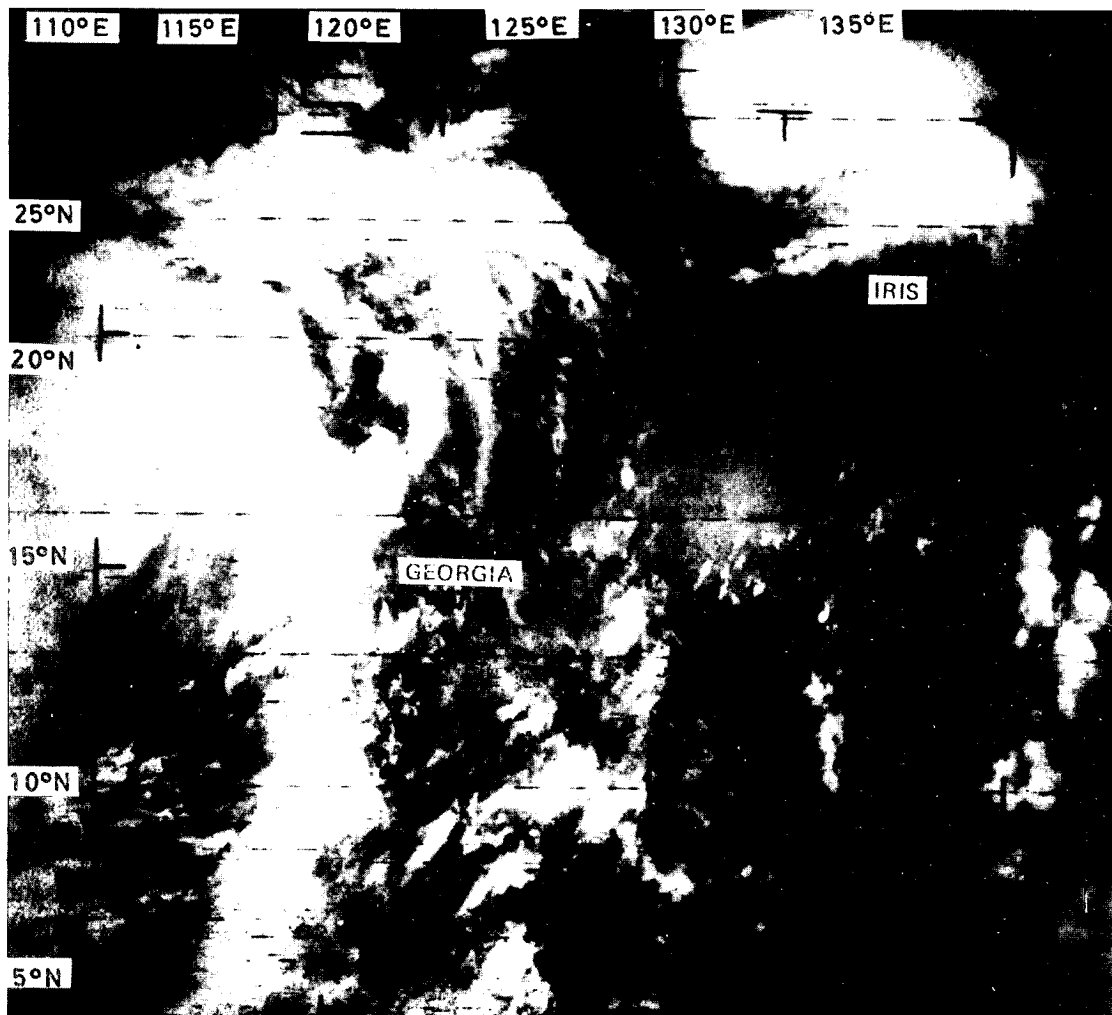


Figure 22. ESSA-8 APT picture of Typhoon 'Georgia' taken at 11.01 a.m. on August 11, 1973.

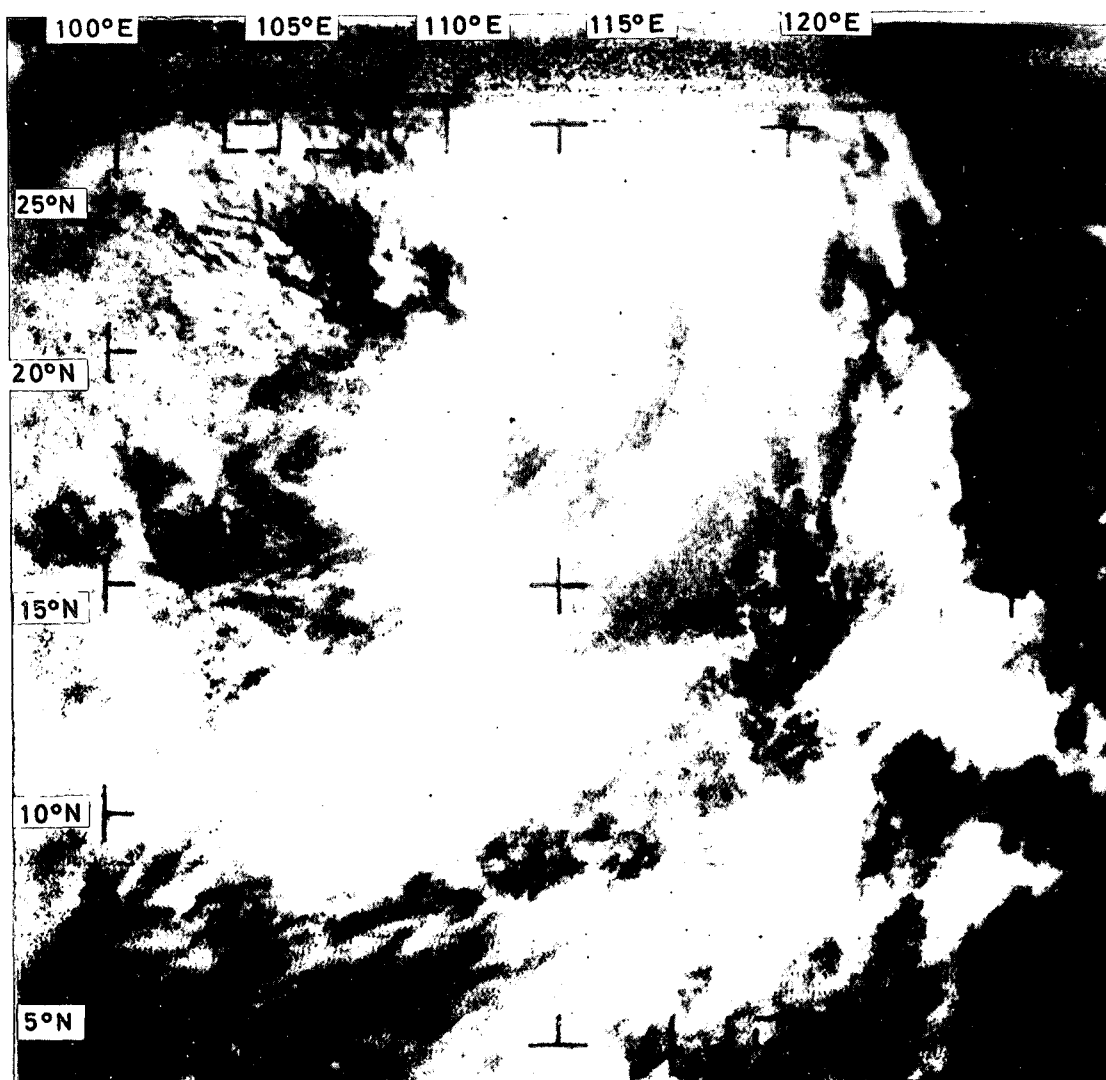


Figure 23. ESSA-8 APT picture of Typhoon 'Georgia' taken at 11.52 a.m. on August 12, 1973.

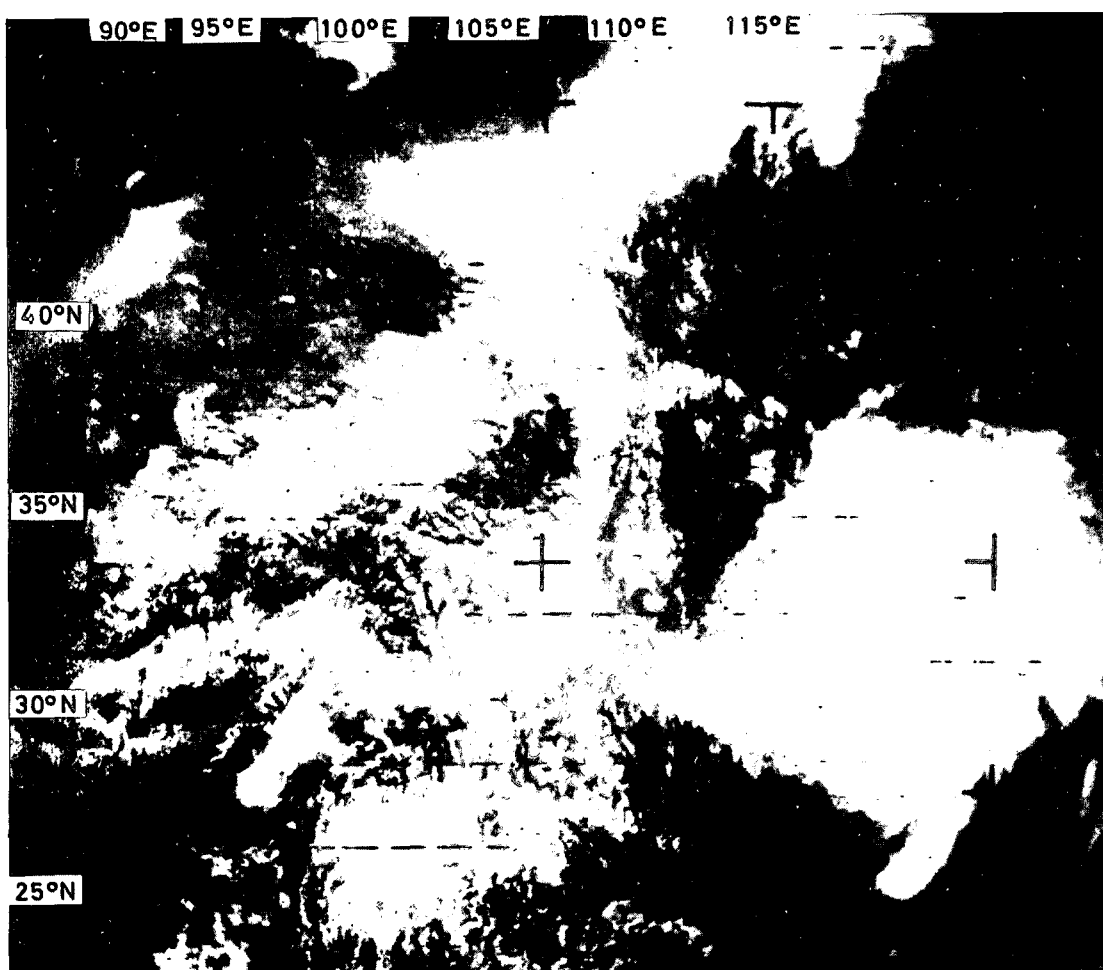


Figure 24. ESSA-8 APT picture of Typhoon 'Georgia' taken at 12.37 p.m. on August 13, 1973.

TROPICAL STORM 'JOAN'

August 18-22, 1973

The track of this tropical storm is shown in Figure 25

On August 18, a tropical depression developed about 450 miles east of the northern tip of Luzon and moved west-northwest towards the Bashi Channel. During the afternoon of August 19, it intensified into a tropical storm named 'Joan' and a ship about 100 miles north of its centre reported winds of 30 knots.

At 6.12 a.m. on August 20, a reconnaissance aircraft reported that the centre of 'Joan' was ill-defined and the minimum sea-level pressure recorded there was 990 millibars. During the afternoon on the same day, another centre developed in the circulation of 'Joan' over the northeastern part of the South China Sea while the centre to the east of the Bashi Channel slowly degenerated into an area of low pressure. On August 20 the new centre of 'Joan' took on a westerly course and in Hong Kong, the Stand By Signal, No. 1, was hoisted at 7.50 p.m. when it was centred about 230 miles east-southeast of the Colony. 'Joan' passed about 60 miles south of the Colony in the early morning of August 21 and dissipated over North Vietnam during the night of August 22. All signals were lowered at 7.10 p.m. on August 21. A sequence of satellite pictures received at the Royal Observatory during the period August 19-22 is presented in Figures 26-29.

Thunderstorms and heavy showers associated with 'Joan' affected the Colony in the early evening of August 20 and exceptionally heavy falls with violent squalls were experienced during the next morning. From 5.00 a.m. to 10.00 a.m. 212.0 mm of rainfall were recorded at the Royal Observatory and the rain was heaviest between 9.00 a.m. and 10.00 a.m. when 76.1 mm of rainfall were recorded. Winds over the Colony freshened from the northeast during the night of August 20 and were strong at times in exposed places the next day. However, the weather improved rapidly early on August 22 after 'Joan' moved into the Gulf of Tonkin and rain stopped completely in Hong Kong after mid-day.

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

August 20	10.8 mm
August 21	251.5 mm
August 22	8.2 mm

There were no abnormal changes in tide heights during the period when the Stand By Signal was on display.

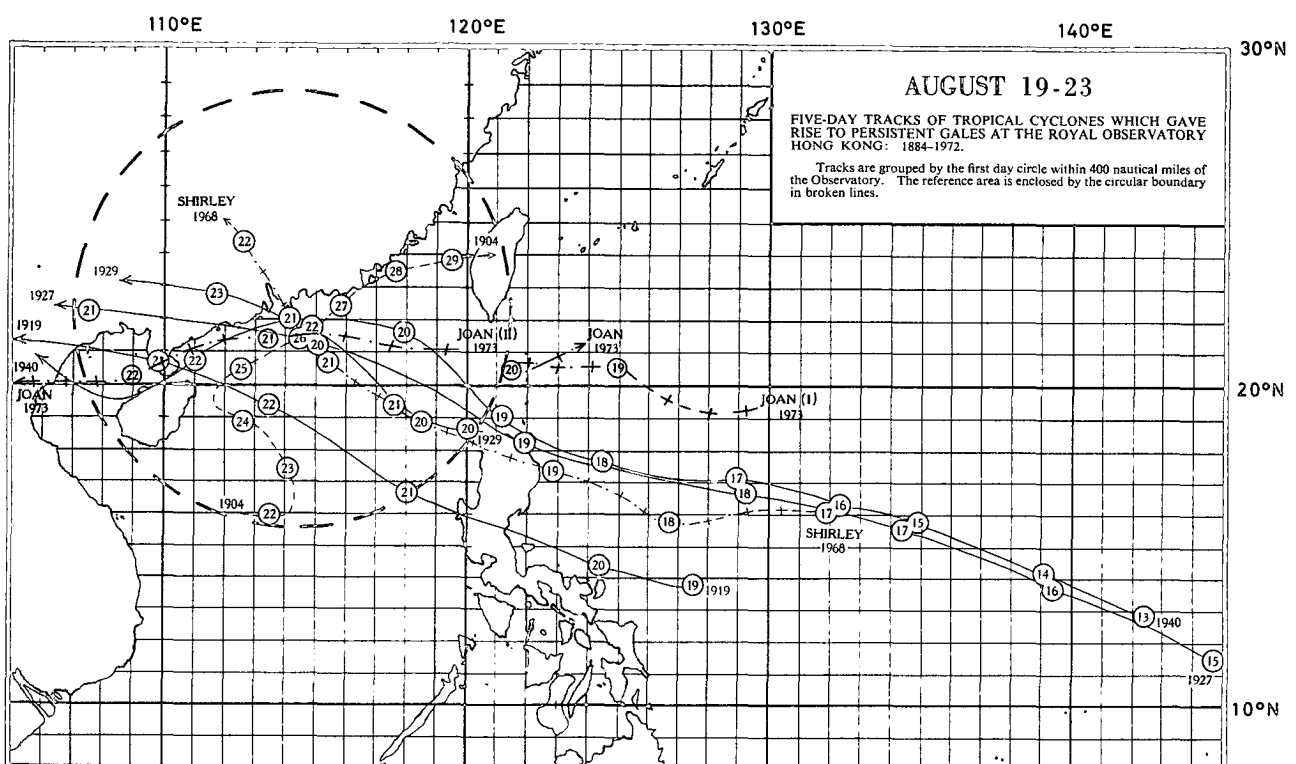


Figure 25. Track of Tropical Storm 'Joan': August 18-22, 1973.

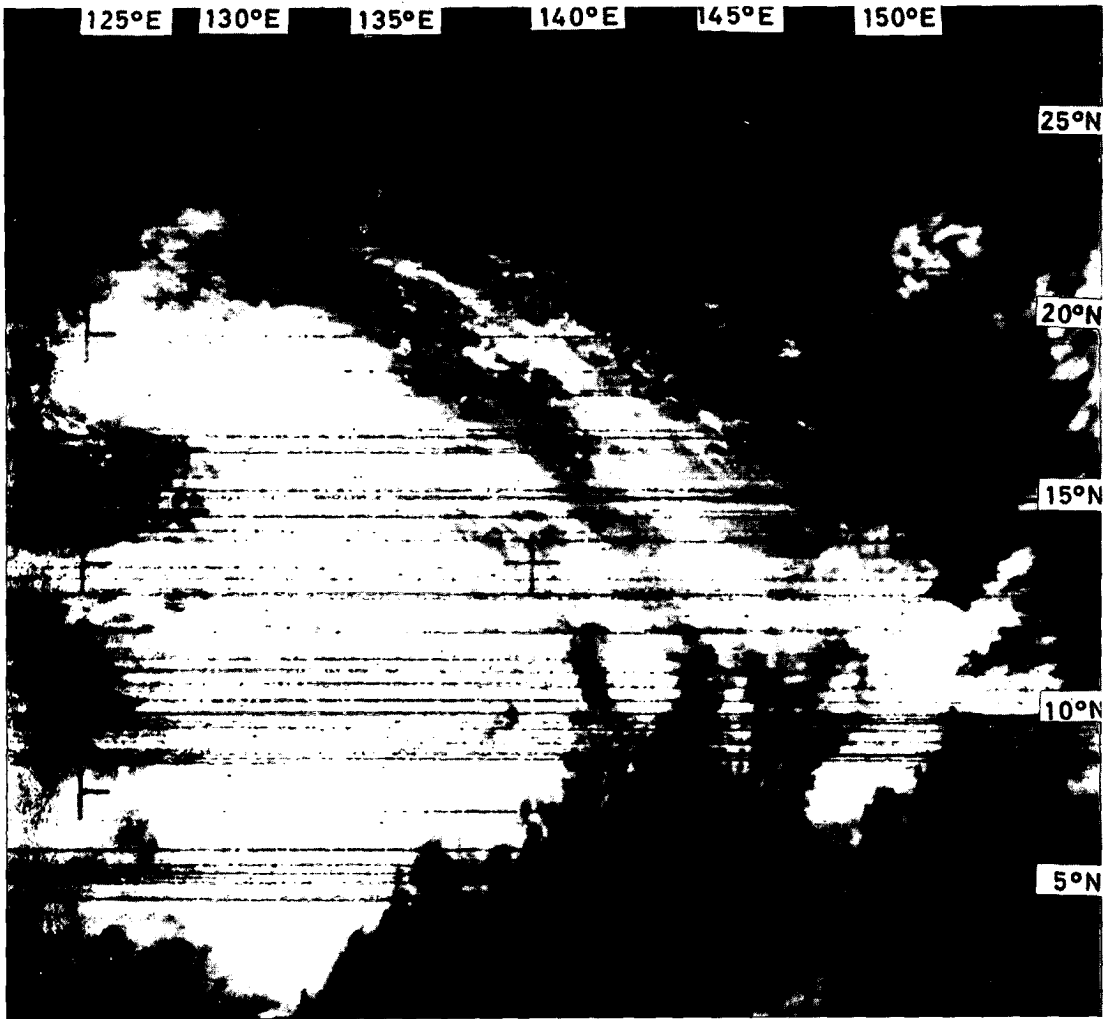


Figure 26. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 10.10 a.m. on August 19, 1973.

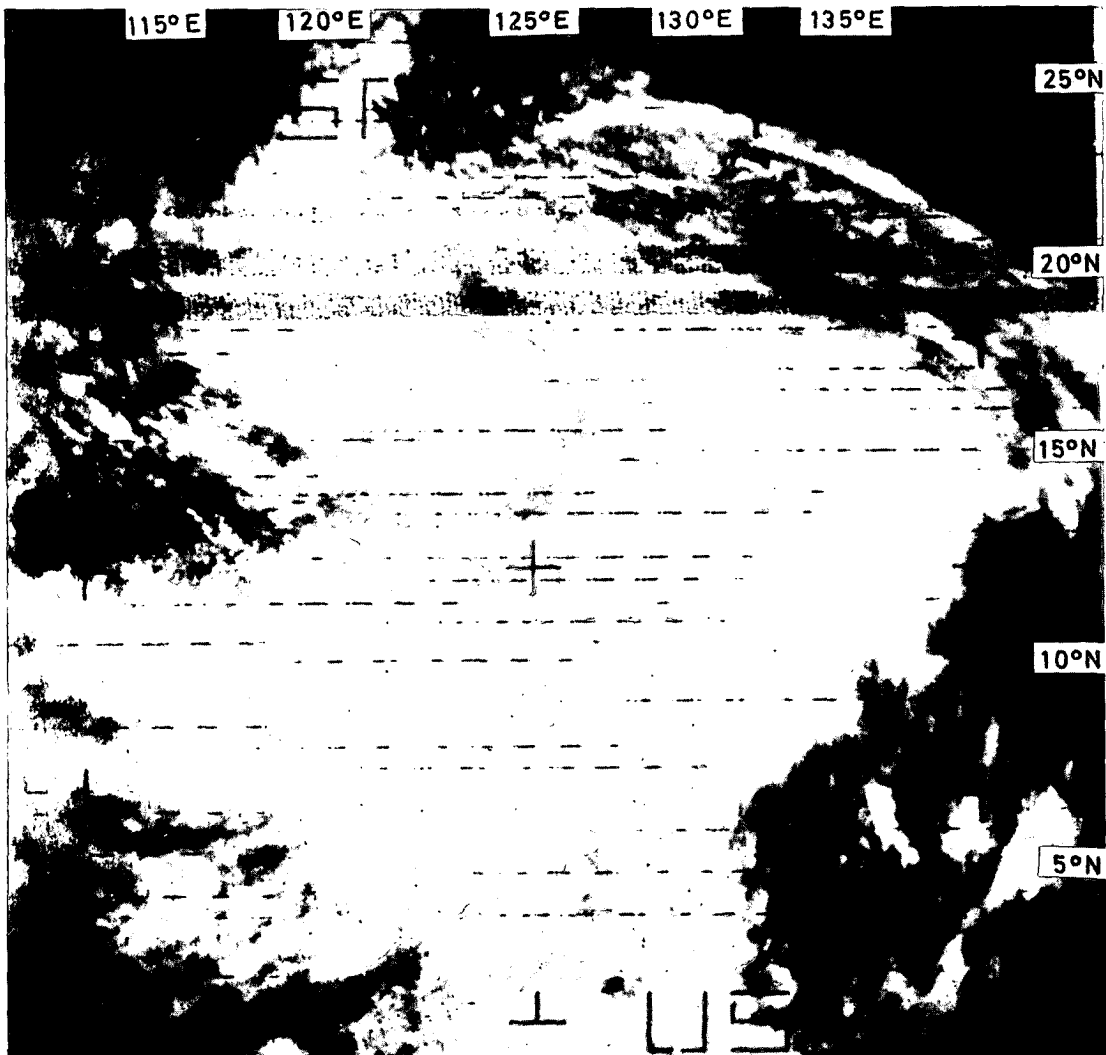


Figure 27. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 11.01 a.m. on August 20, 1973.

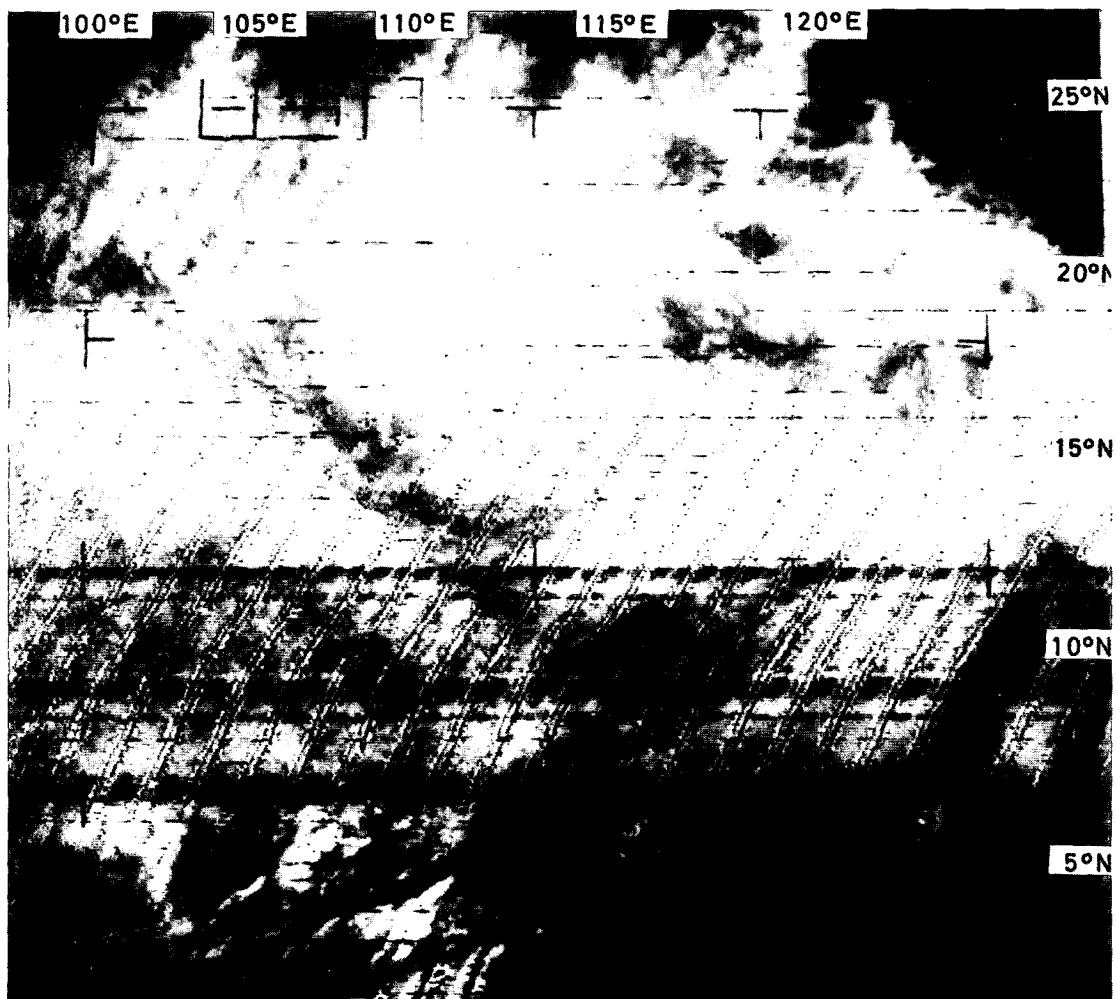


Figure 28. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 11.52 a.m. on August 21, 1973.

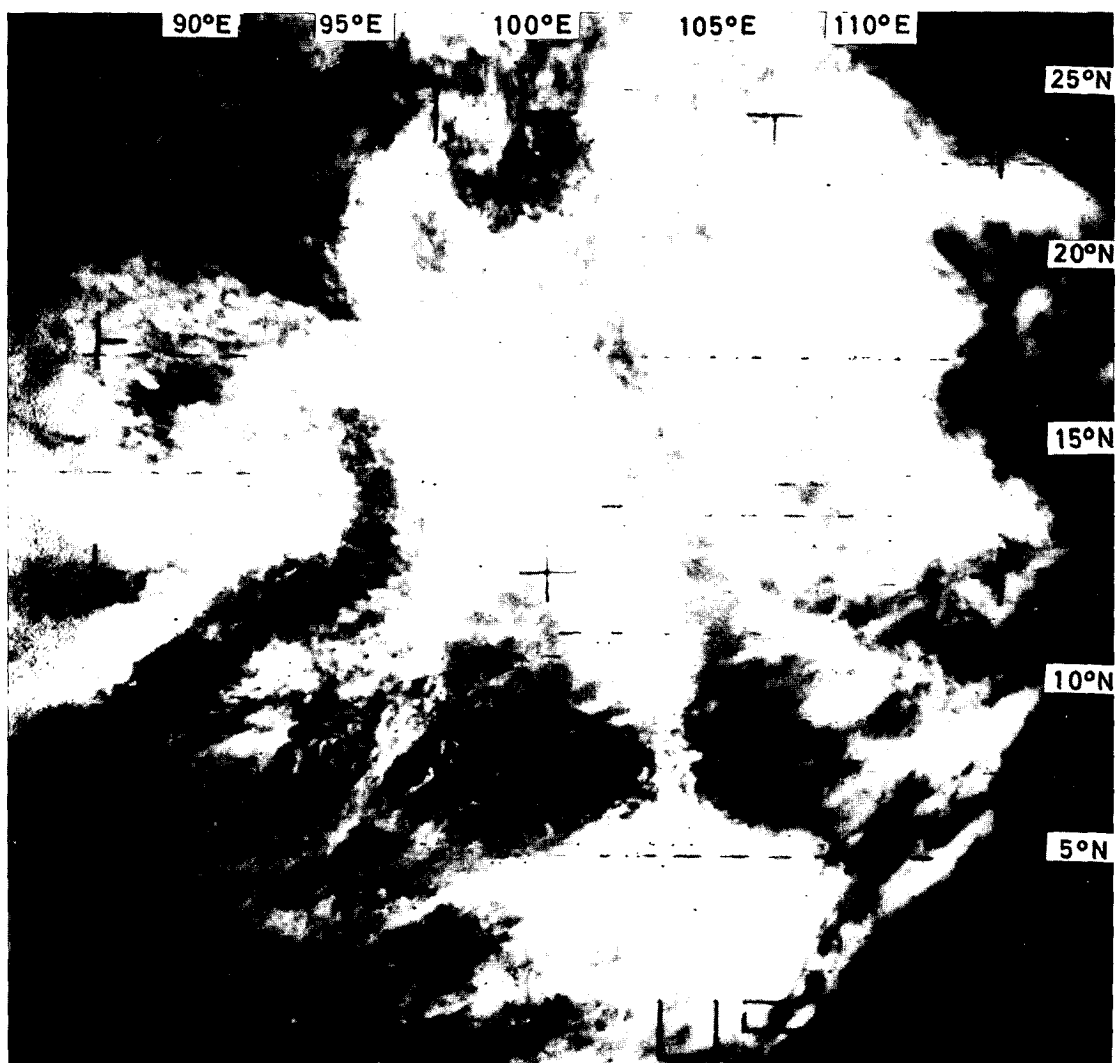


Figure 29. ESSA-8 APT picture of Tropical Storm 'Joan' taken at 12.44 p.m. on August 22, 1973.

TROPICAL STORM 'KATE'

August 22-26, 1973

The track of this tropical storm is shown in Figure 30

A tropical depression developed over the northeastern part of the South China Sea on August 22 (Figure 31) and at 9.00 p.m. it was centred about 50 miles southeast of Pratas Island where winds of 25 knots were reported. It moved rapidly west-southwestwards at about 20 knots and in Hong Kong, the Stand By Signal, No. 1, was hoisted at 10.20 p.m. on the same day when it was about 210 miles southeast of the Colony.

On August 23, the tropical depression slowed down to about 5 knots and in the next morning, it intensified into a tropical storm with winds of 34 knots reported 110 miles south of its centre. At 12.31 p.m. on the same day, a satellite picture received at the Royal Observatory indicated that the tropical storm was well-organized and winds near the centre of the tropical storm were estimated to be about 45 knots (Figure 32).

During the morning of August 24, the tropical storm took on a west-northwesterly course and at 6.00 a.m. the next day it passed very close to the northern tip of Hainan Island where winds of 38 knots and a mean sea-level pressure of 976.6 millibars were reported (Figure 33). At this time the name 'Kate' was given to the storm and as it continued to move away from the Colony, all signals were lowered at 6.55 a.m. on August 25. 'Kate' crossed the coast of North Vietnam near Haiphong early on August 26 and dissipated rapidly overland (Figure 34).

In Hong Kong winds freshened from the northeast during the night of August 22 and became strong at times in exposed places the following two days. The weather was mainly cloudy with showers between August 24 and 26.

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

August 23	Trace
August 24	28.6 mm
August 25	36.7 mm
August 26	18.5 mm

There were no abnormal changes in tide heights during the period when the Stand By Signal was on display.

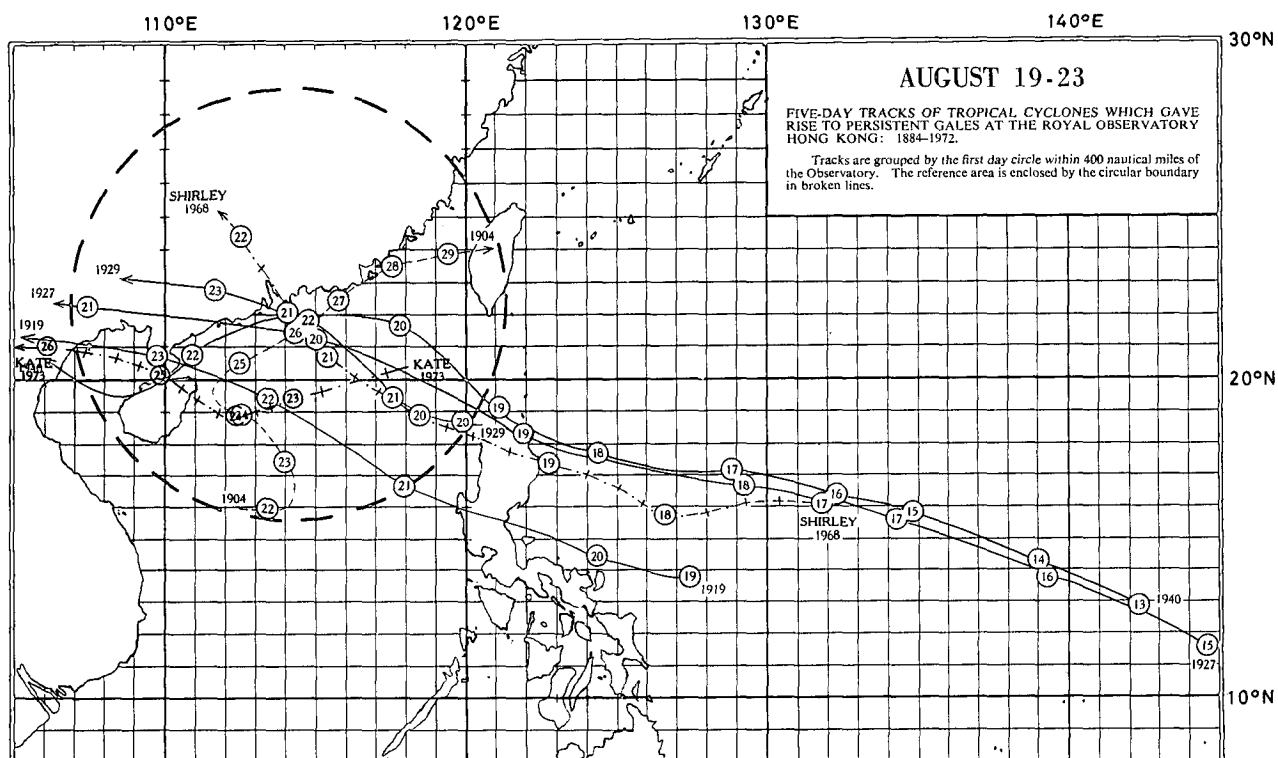


Figure 30. Track of Tropical Storm 'Kate' : August 22-26, 1973.

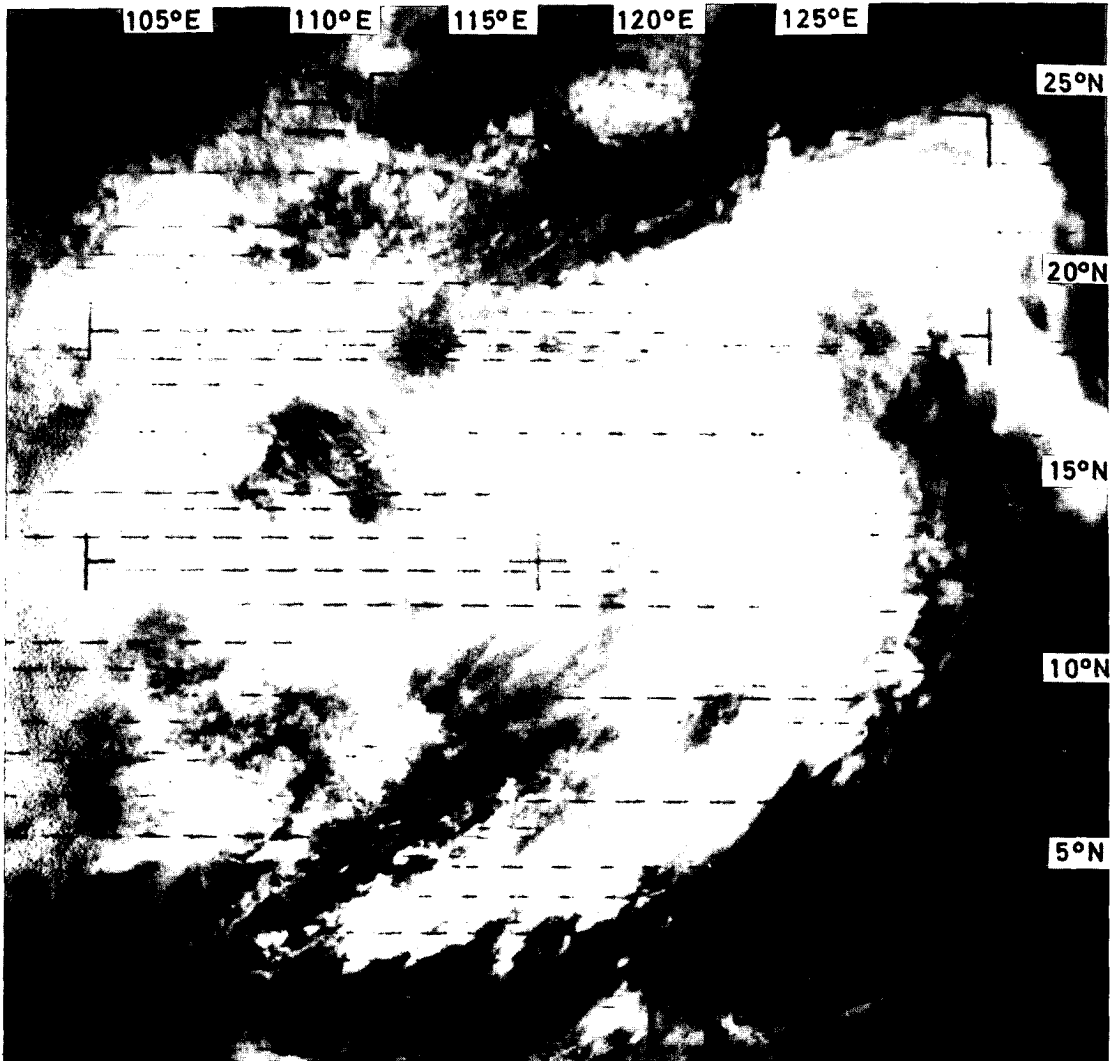


Figure 31. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 11.40 a.m. on August 23, 1973.

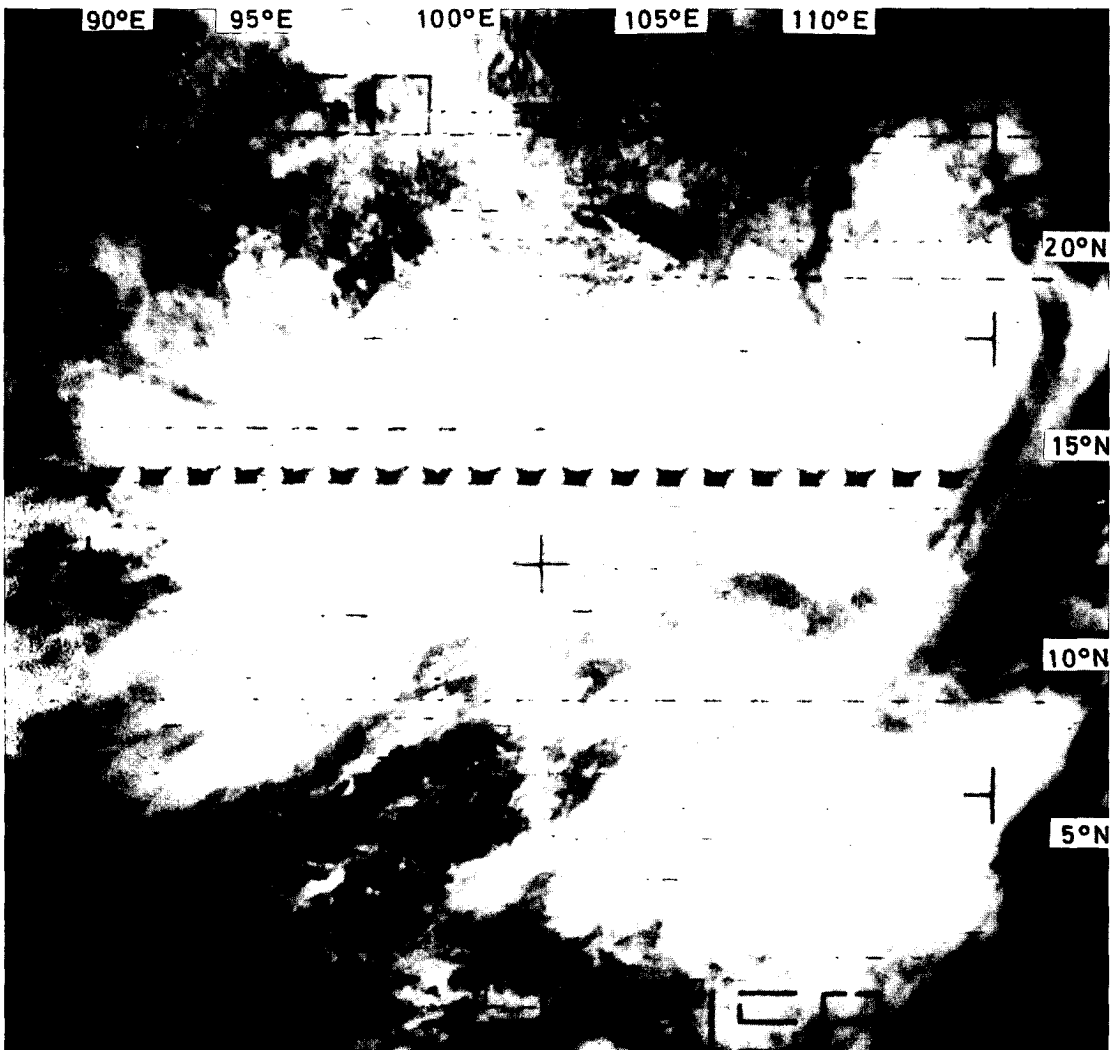


Figure 32. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 12.31 p.m. on August 24, 1973.

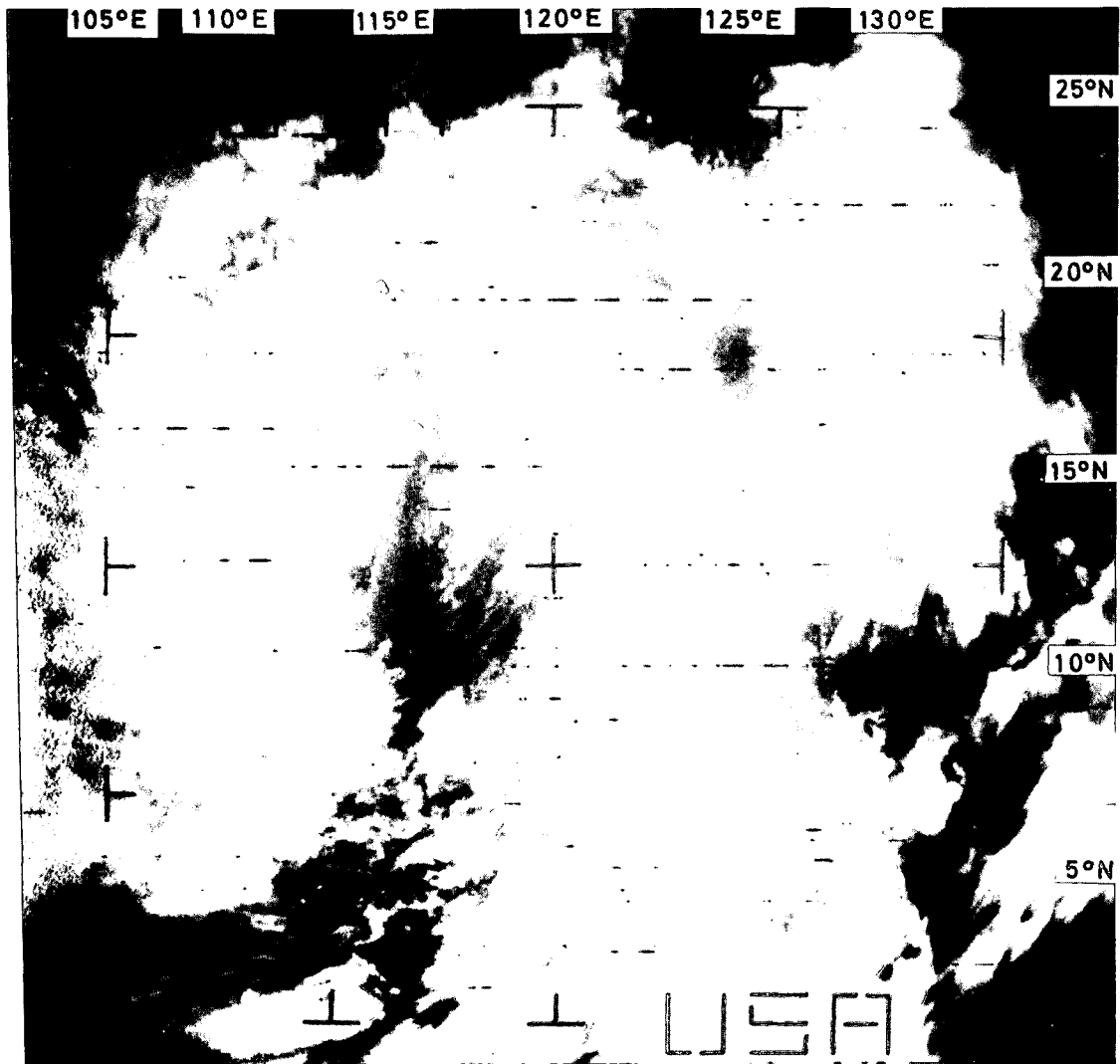


Figure 33. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 11.27 a.m. on August 25, 1973.

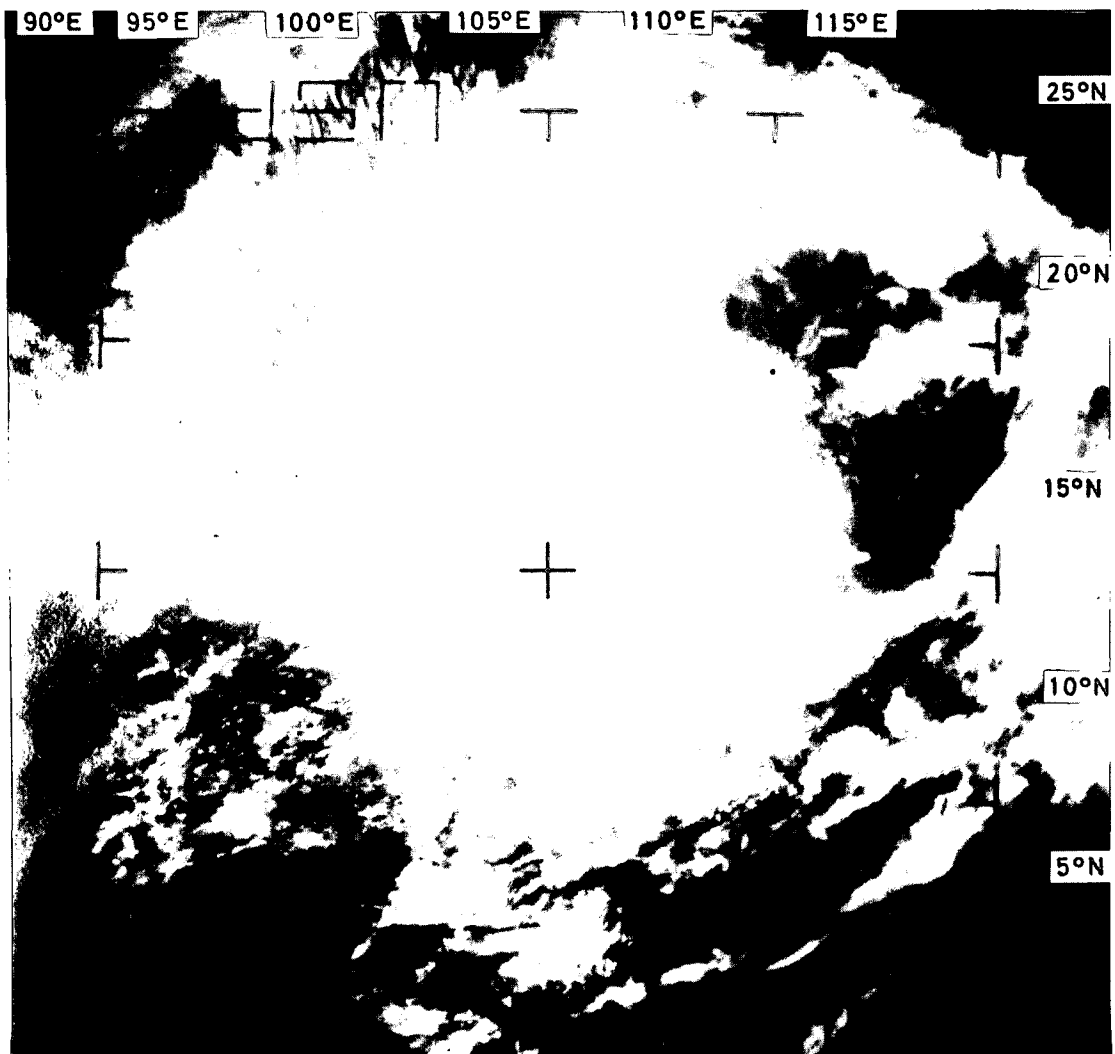


Figure 34. ESSA-8 APT picture of Tropical Storm 'Kate' taken at 12.19 p.m. on August 26, 1973.

SEVERE TROPICAL STORM 'LOUISE'

September 3-7, 1973

The track of this severe tropical storm is shown in Figure 35

On September 1, a low pressure area developed to the east of the Philippines. It moved northwestwards into the Balintang Channel and intensified rapidly into a severe tropical storm named 'Louise'. At 9.00 a.m. on September 3, when 'Louise' was about 430 miles east-southeast of Hong Kong, a ship reported winds of 60 knots near its centre. Reconnaissance reports received during the same morning showed that the maximum surface winds near the centre of the storm were about 70 knots with a minimum sea-level pressure of 998 millibars. The cloud cover associated with 'Louise' as shown in satellite pictures received at the Royal Observatory at 11.28 a.m. was about 300 miles in diameter (Figure 36).

'Louise' took on a west-southwesterly course at first and moved slowly at about 5 knots into the South China Sea. In Hong Kong, the Stand By Signal, No. 1, was hoisted at 4.00 p.m. on September 3 when the storm was centred about 380 miles east-southeast of the Colony. 'Louise' changed its course to west-northwest during the night of September 3 and then west during the evening of September 4. In the next morning, the eye of 'Louise' first appeared on the Royal Observatory's radar. It was circular and well-defined with a diameter of about 25 nautical miles.

The Strong Wind Signal, No. 3, was hoisted at 10.15 a.m. on September 5 when Severe Tropical Storm 'Louise' was centred about 180 miles south-southeast of Hong Kong. At 11.16 a.m. a satellite picture received at the Royal Observatory indicated that 'Louise' remained relatively small and intense with its cloud mass covering an area about 250 miles in diameter (Figure 38). 'Louise' passed about 150 miles south of Hong Kong around 9.00 p.m. on September 5 and all signals were lowered at 12.50 p.m. the next day. 'Louise' crossed the Luichow Peninsula during the night of September 6 and dissipated over North Vietnam during the afternoon of September 7.

In Hong Kong winds freshened from the east to northeast during the afternoon of September 5 and became strong in exposed places during the evening. The maximum winds recorded at Waglan Island and Tate's Cairn were 31 and 28 knots respectively, while the maximum gust peak speeds recorded there were 43 and 49 knots. Cloudy skies and scattered showers were experienced during the evening of September 5 and early September 6. However, rapid improvement took place later in the afternoon and the weather was sunny with moderate southeast winds.

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

September 4	Nil
September 5	0.8 mm
September 6	9.7 mm
September 7	Trace

There were no abnormal changes in tide heights during the period when the Tropical Cyclone Warning Signals were on display.

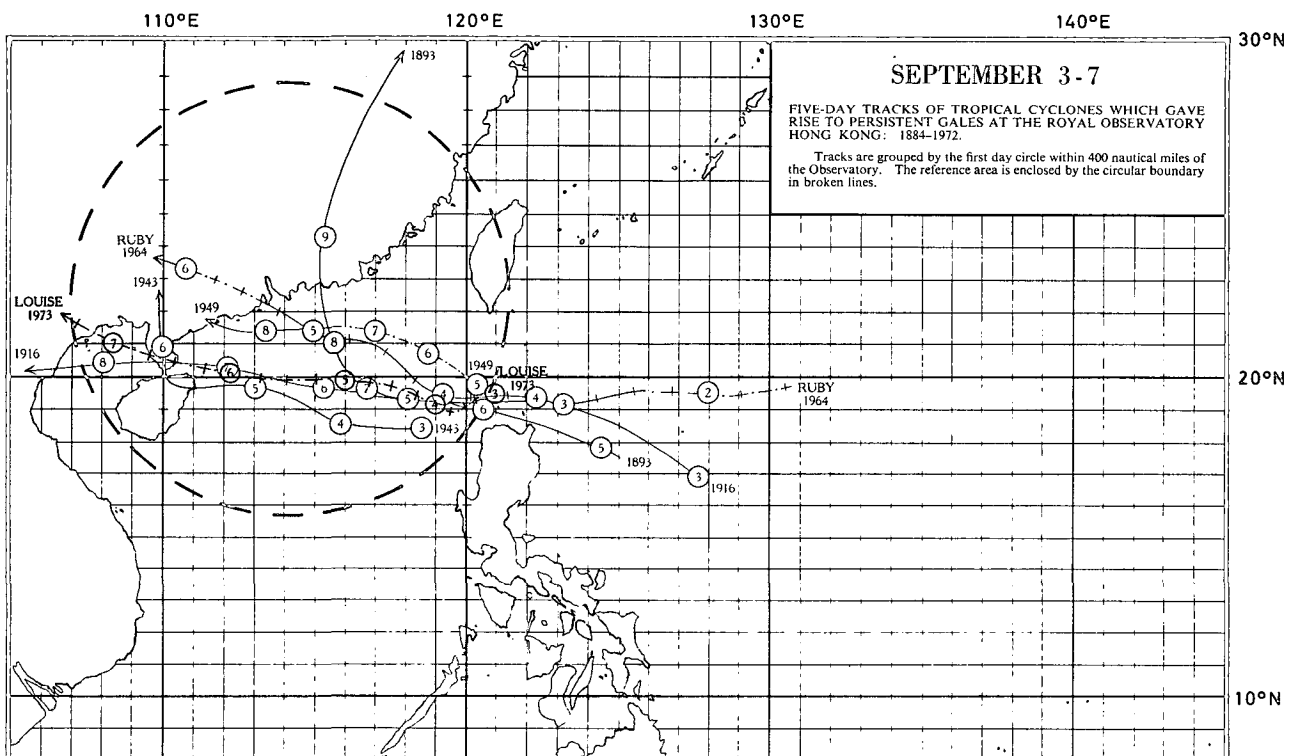


Figure 35. Track of Severe Tropical Storm 'Louise' : September 3-7, 1973.

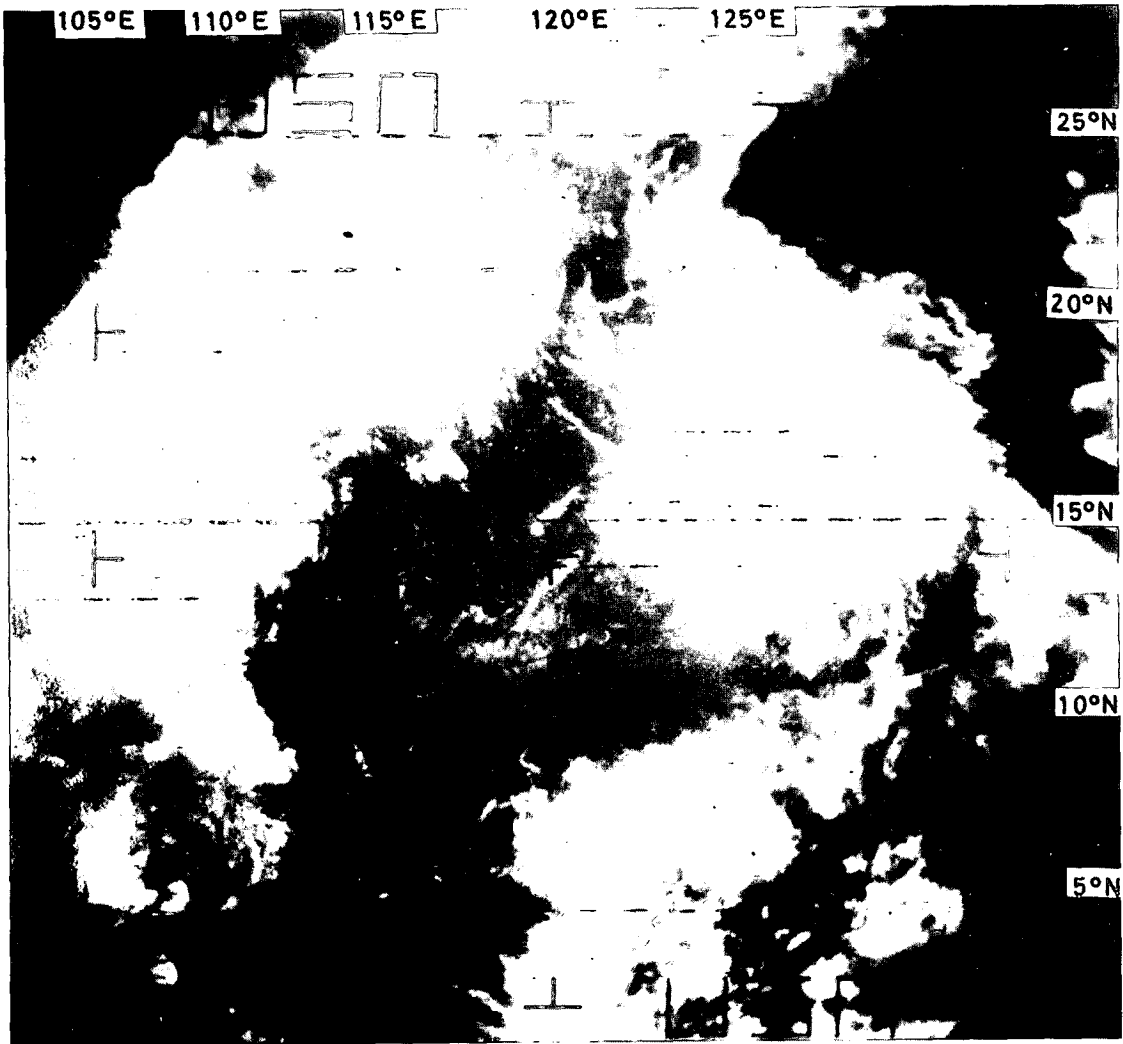


Figure 36. ESSA-8 APT picture of Severe Tropical Storm 'Louise' taken at 11.28 a.m. on September 3, 1973.

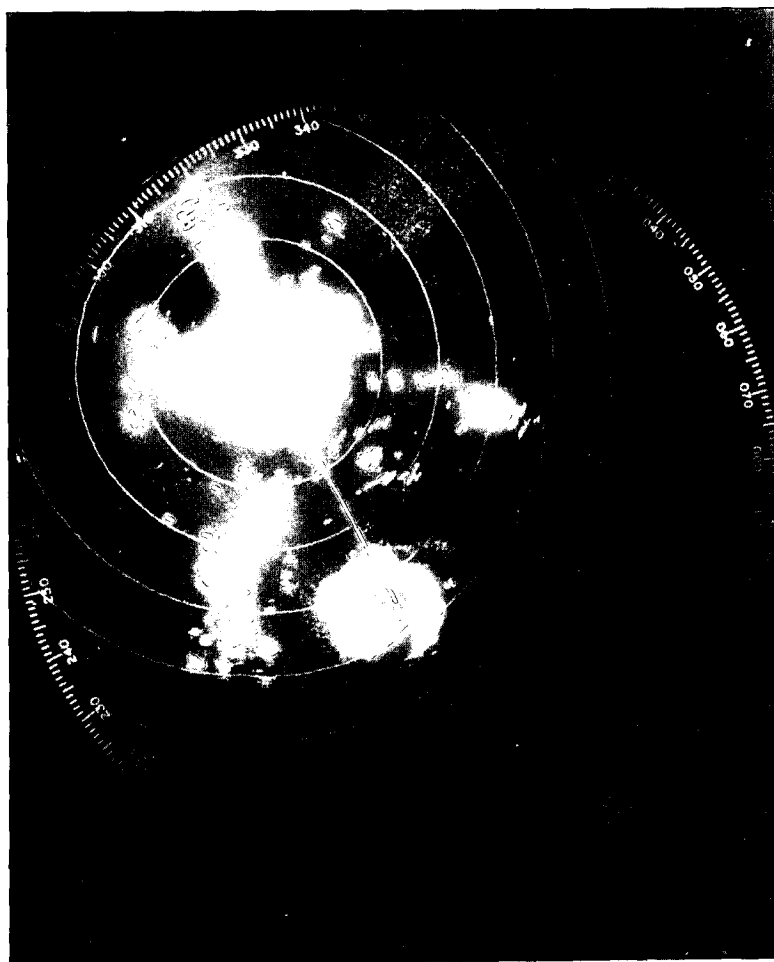


Figure 37. Radar picture of Severe Tropical Storm 'Louise' taken at the Royal Observatory at 9.40 a.m. on September 5, 1973 (Range markers at 40 n mile intervals).

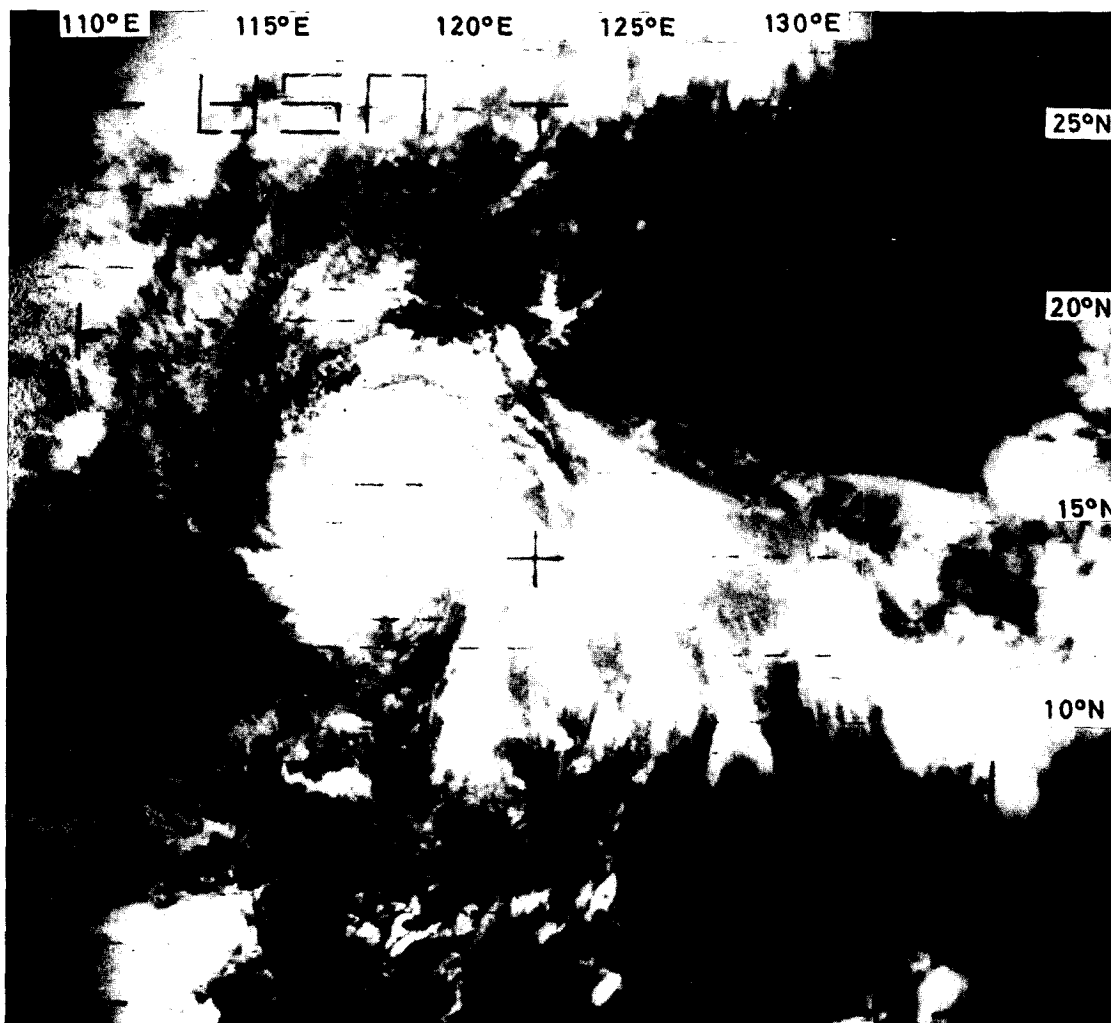


Figure 38. ESSA-8 APT picture of Severe Tropical Storm 'Louise' taken at 11.16 a.m. on September 5, 1973.

TYPHOON 'MARGE'

September 12-15, 1973

The track of this typhoon is shown in Figure 39

On September 10, a low pressure area developed over the western North Pacific about 500 miles east of Manila. It moved west-northwest towards north Luzon and intensified into a tropical depression named 'Marge' during the morning of September 12, when it was just off the west coast of Luzon. Satellite pictures received at the Royal Observatory at 11.30 a.m. on the same day indicated that the cloud cover associated with 'Marge' was about 180 miles in diameter (Figure 40). About one hour later, a reconnaissance aircraft reported maximum surface winds of 35 knots and a minimum sea-level pressure of 1003 millibars near its centre.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 5.30 p.m. on September 12 when 'Marge' was about 350 miles southeast of the Colony. 'Marge' intensified into a tropical storm in the evening and became a severe tropical storm early on September 13. The storm then took a more westerly course and passed about 210 miles south of Hong Kong around mid-day.

Although 'Marge' became more intense on September 13, its circulation remained small and satellite pictures received at 12.21 p.m. showed that the cloud mass associated with the storm was still only about 180 miles in diameter (Figure 41). Ship reports also indicated that strong winds extended to less than 100 miles from the centre of the storm. During the evening on the same day, 'Marge' further intensified into a typhoon and a reconnaissance aircraft at 6.00 p.m. reported maximum surface winds of 100 knots and a minimum sea-level pressure of 964 millibars near its centre.

Typhoon 'Marge' crossed Hainan Island on September 14 (Figure 42) and weakened rapidly over the Gulf of Tonkin. It finally dissipated over North Vietnam in the afternoon of September 15. All signals were lowered at 7.00 a.m. on September 14 when Typhoon 'Marge' was about 270 miles southwest of the Colony.

In Hong Kong the weather was mainly fine on September 12 and during the following morning but cloudy skies and scattered showers were experienced from the afternoon of September 13 to the morning of September 15. No strong winds were experienced in Hong Kong during the passage of 'Marge' but maximum gust peak speeds of 49 knots were recorded at Tate's Cairn and 33 knots at the Royal Observatory.

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

September 12	Nil
--------------	-----

September 13	2.7 mm
September 14	33.4 mm
September 15	24.1 mm

There were no abnormal changes in tide heights during the period when the Stand By Signal was on display.

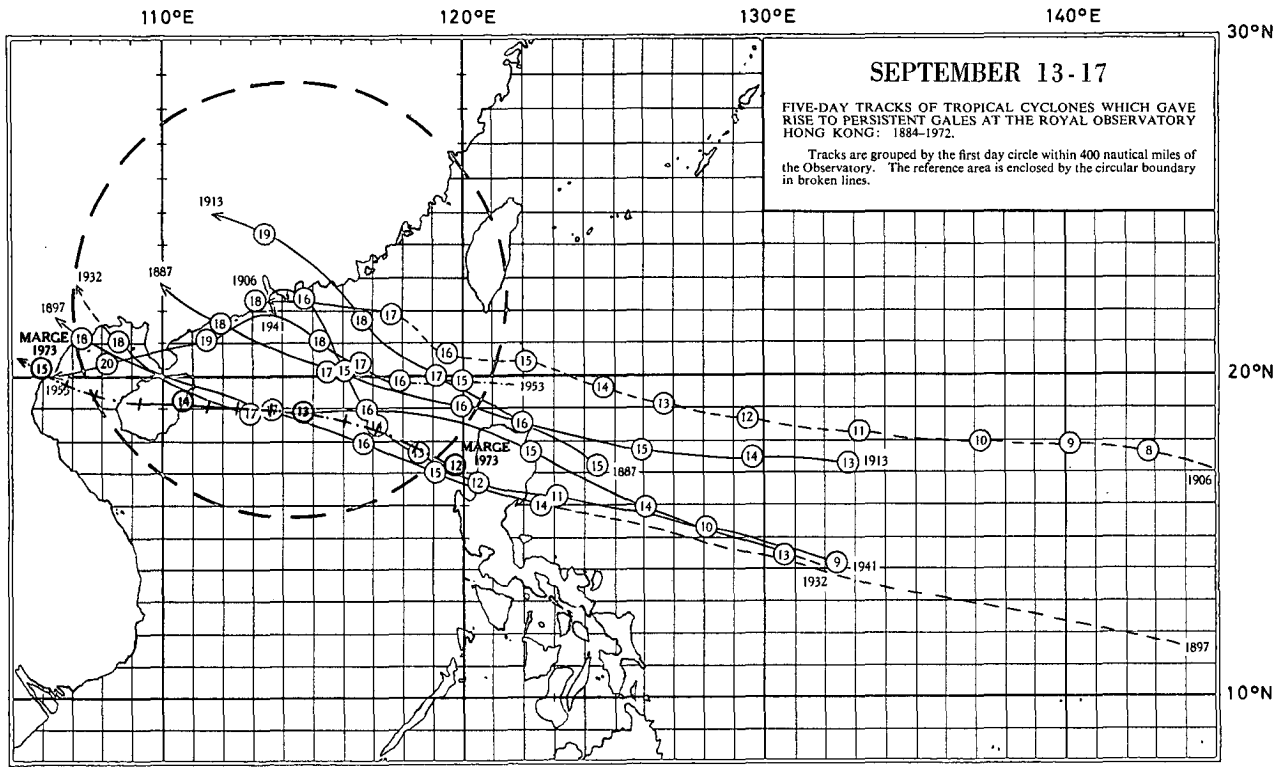


Figure 39. Track of Typhoon 'Marge': September 12-15, 1973.

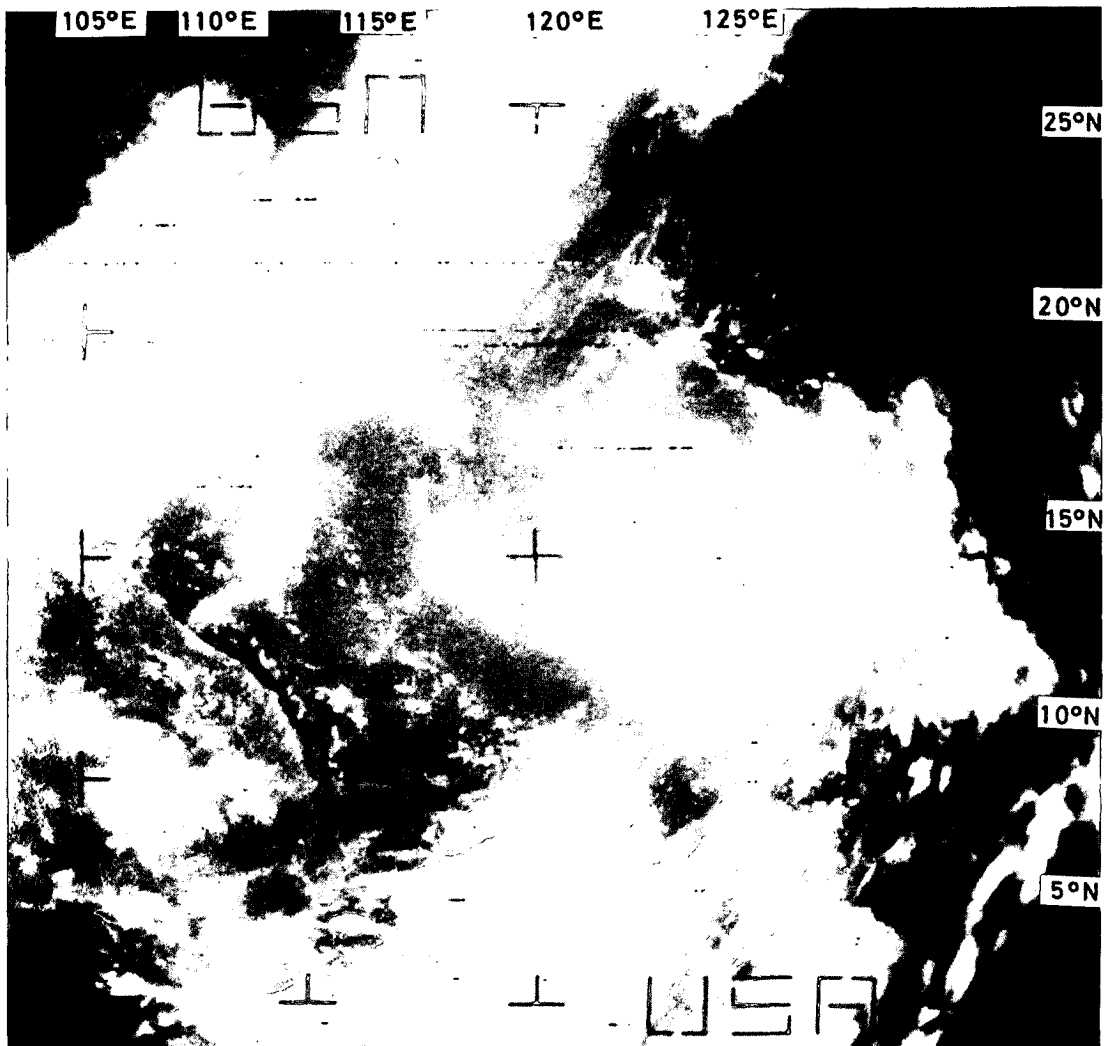


Figure 40. ESSA-8 APT picture of Typhoon 'Marge' taken at 11.30 a.m. on September 12, 1973.

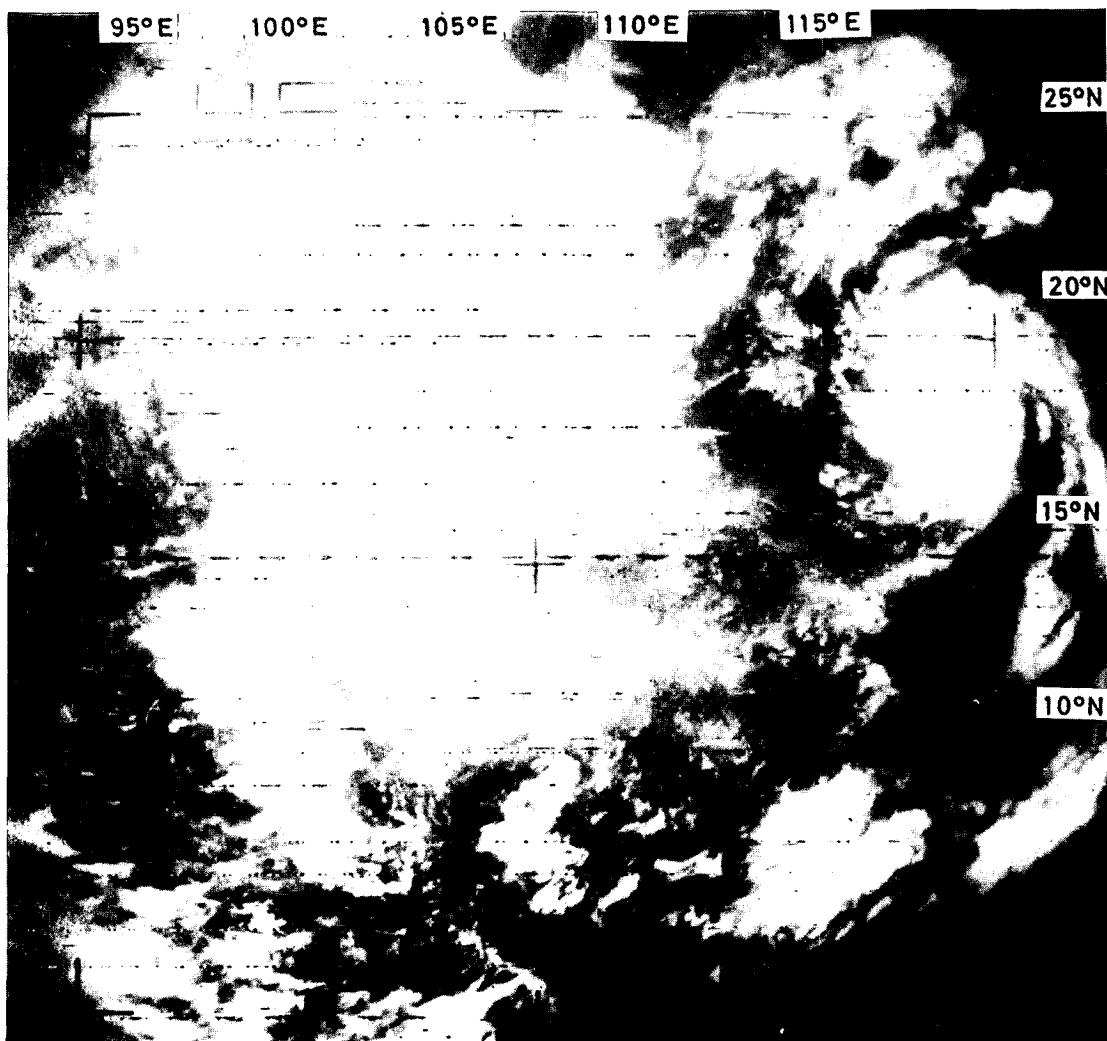


Figure 41. ESSA-8 APT picture of Typhoon 'Marge' taken at 12.21 p.m. on September 13, 1973.

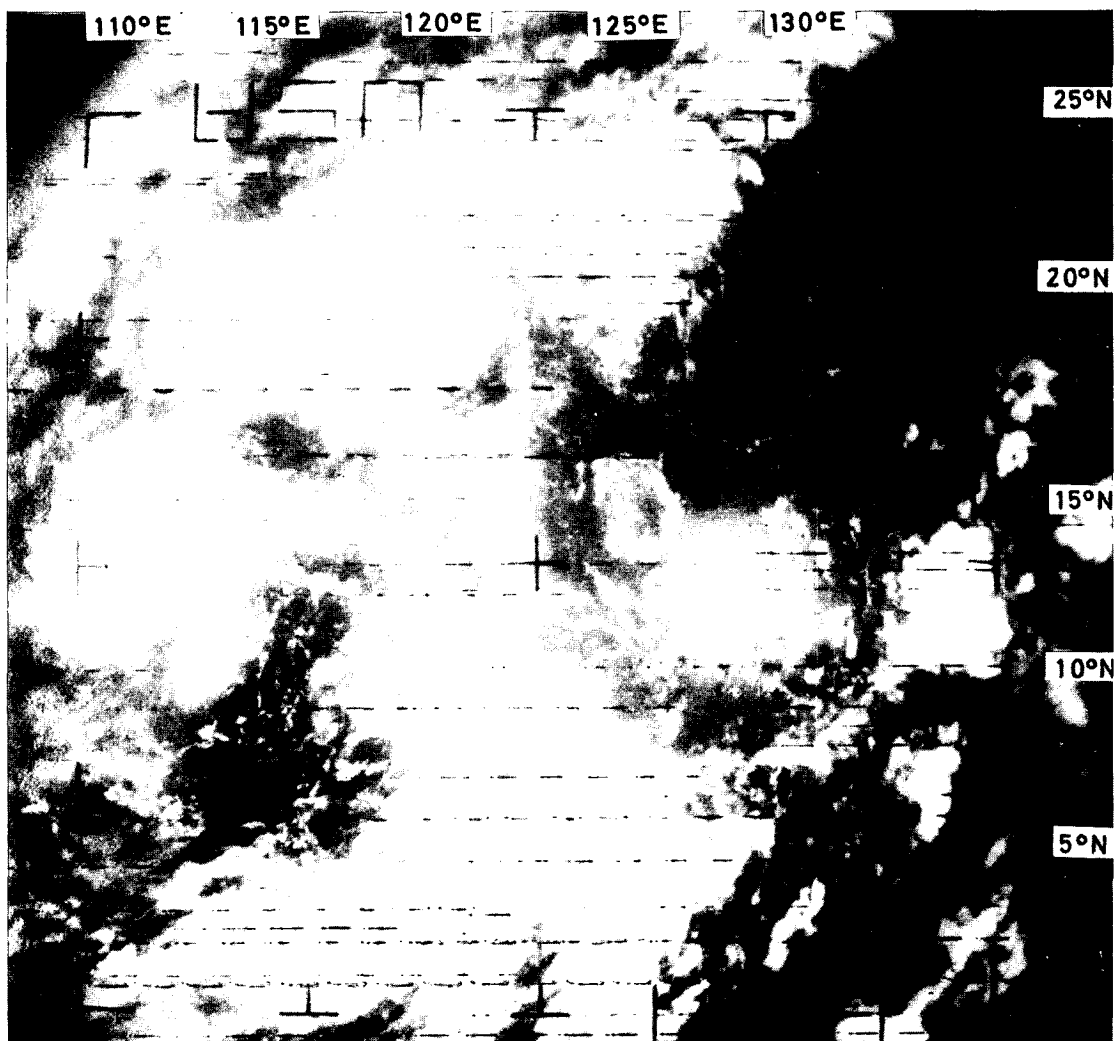


Figure 42. ESSA-8 APT picture of Typhoon 'Marge' taken at 11.17 a.m. on September 14, 1973.

TYPHOON 'NORA'

October 2-10, 1973

The track of this typhoon is shown in Figure 43

On October 2, a tropical depression named 'Nora' developed over the western North Pacific near the Caroline Islands. At 12.20 p.m. on the same day, a reconnaissance aircraft reported a minimum sea-level pressure of 1001.2 millibars and maximum surface winds of 30 knots near the centre of the depression. During the first two days, 'Nora' moved slowly westwards at about 5 knots towards the central Philippines and gradually intensified to a typhoon by the morning of October 4 (Figures 44 and 45). At 7.06 a.m. on the same day a reconnaissance aircraft reported that the minimum sea-level pressure near the centre of 'Nora' had dropped to 976 millibars and the maximum surface winds reached 80 knots. The cloud cover associated with 'Nora' as shown in satellite pictures received at the Royal Observatory at 11.08 a.m. was about 200 miles in diameter (Figure 45).

During the morning of October 4, Typhoon 'Nora' changed its course and moved in a general direction towards the Balintang Channel. During the period October 5-8, its circulation became more extensive with maximum surface winds of 140 knots and minimum sea-level pressure of 875 millibars observed by reconnaissance aircraft. Satellite pictures received at the Royal Observatory on October 5 and 6 indicated that the typhoon was well-organized with its associated cloud cover increasing to over 400 miles in diameter (Figures 46-49). At 11.00 a.m. on October 8, a ship reported surface winds of 85 knots when it was about 95 miles northeast of the centre of 'Nora'.

On October 8, a strong winter monsoon covered the Taiwan Straits and the northern part of the South China Sea and in Hong Kong, the Strong Monsoon Signal was hoisted at 4.00 a.m. However, with the approach of 'Nora' this was replaced by the Strong Wind Signal, No. 3, at 4.15 p.m. on the same day when the typhoon was about 400 miles to the east-southeast of the Colony.

'Nora' weakened considerably after entering the South China Sea and at 6.34 p.m. on October 9 when it was about 280 miles east of Hong Kong, a reconnaissance aircraft reported a minimum sea-level pressure of 976 millibars and maximum surface winds of 50 knots. It then moved north-northwestwards towards the Fukien Province and the No. 3 Signal was lowered at 5.50 a.m. on October 10 when the storm was about 270 miles east-northeast of the Colony. 'Nora' crossed the coast near Amoy during the morning of October 10 and degenerated into an area of low pressure later in the afternoon (Figures 50 and 51).

In Hong Kong the weather was fine and sunny during the period October 8-10 but strong northerly winds were experienced in many places in the Colony from October 8-9. The maximum winds recorded at Tate's Cairn and Waglan Island were 40 and 33 knots and the maximum gust peak speeds were 50 and 40 knots.

There was no rainfall nor any abnormal change in tide heights during the period when the Tropical Cyclone Warning Signals were displayed.

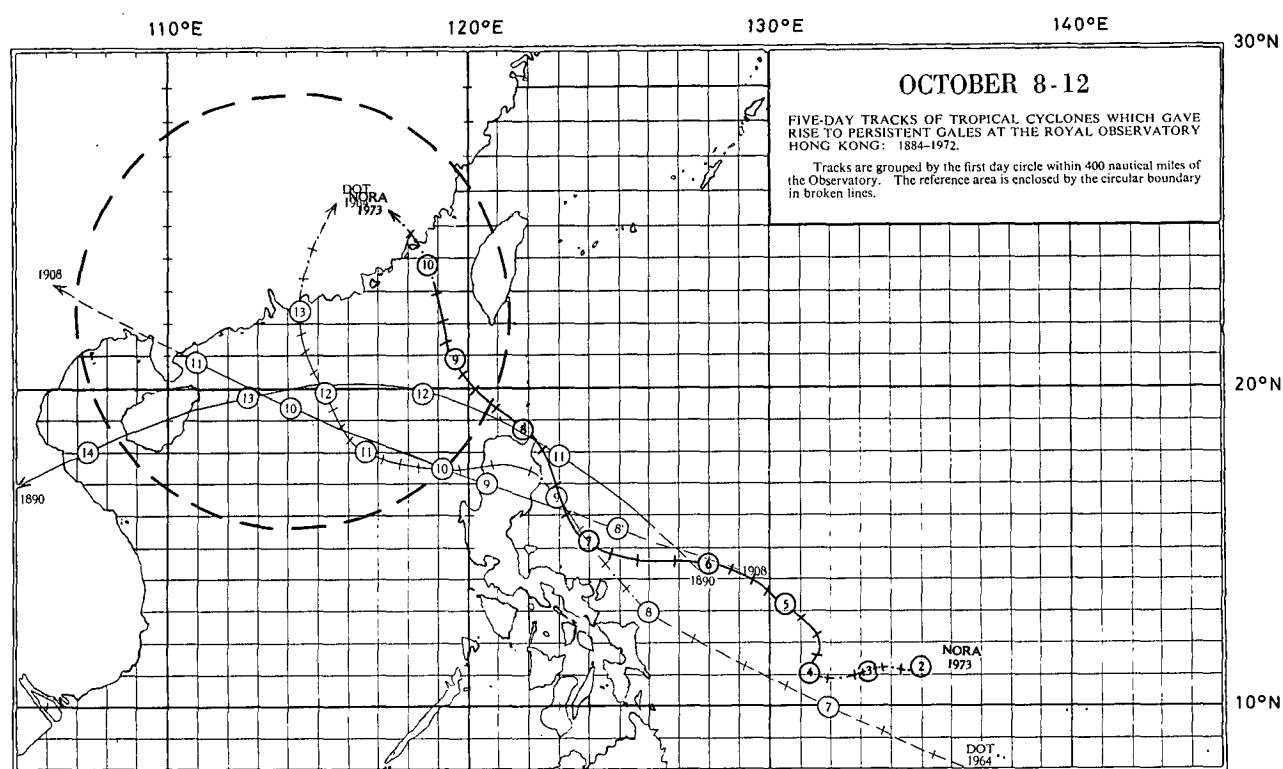


Figure 43. Track of Typhoon 'Nora' : October 2-10, 1973.

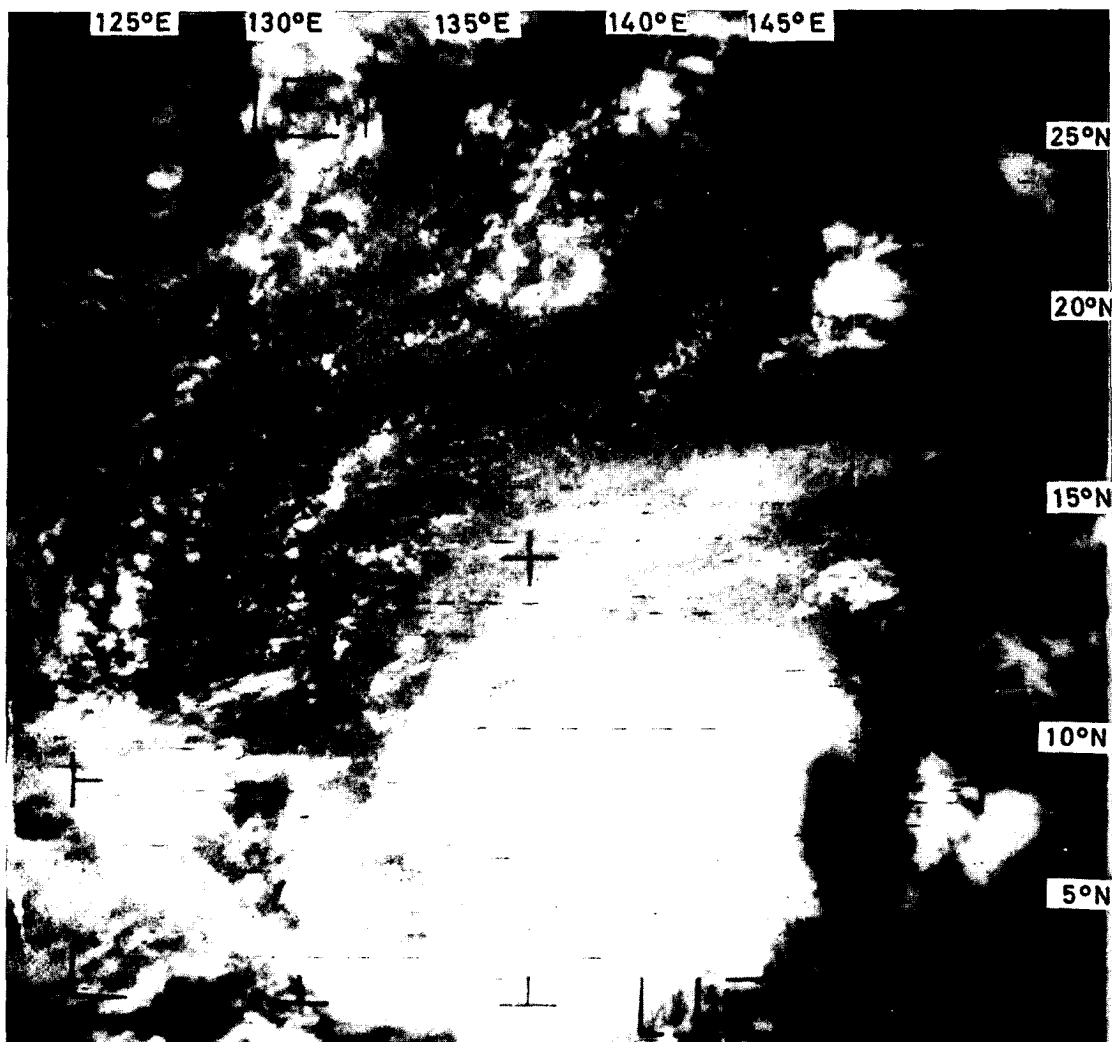


Figure 44. ESSA-8 APT picture of Typhoon 'Nora' taken at 10.16 a.m. on October 3, 1973.

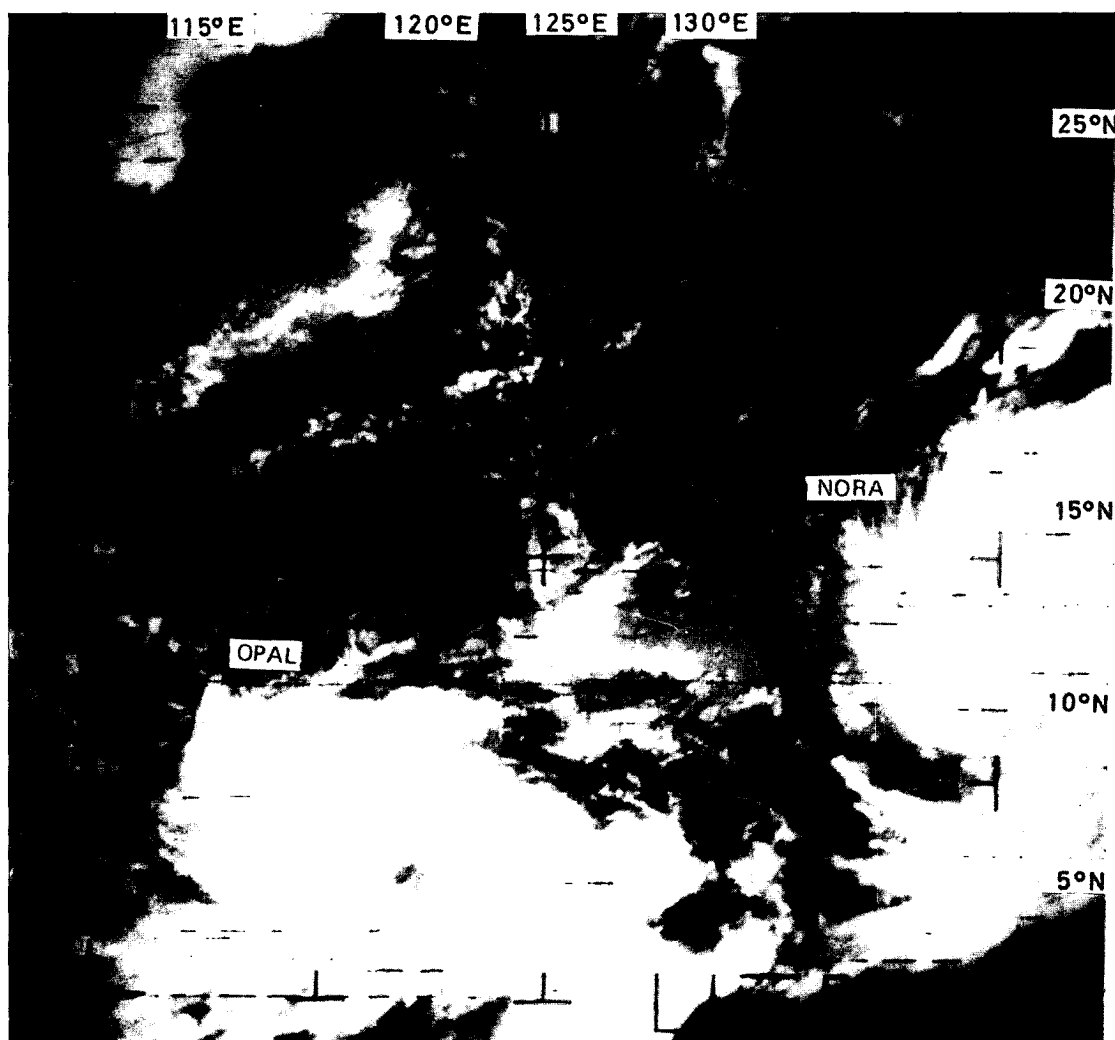


Figure 45. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.08 a.m. on October 4, 1973.

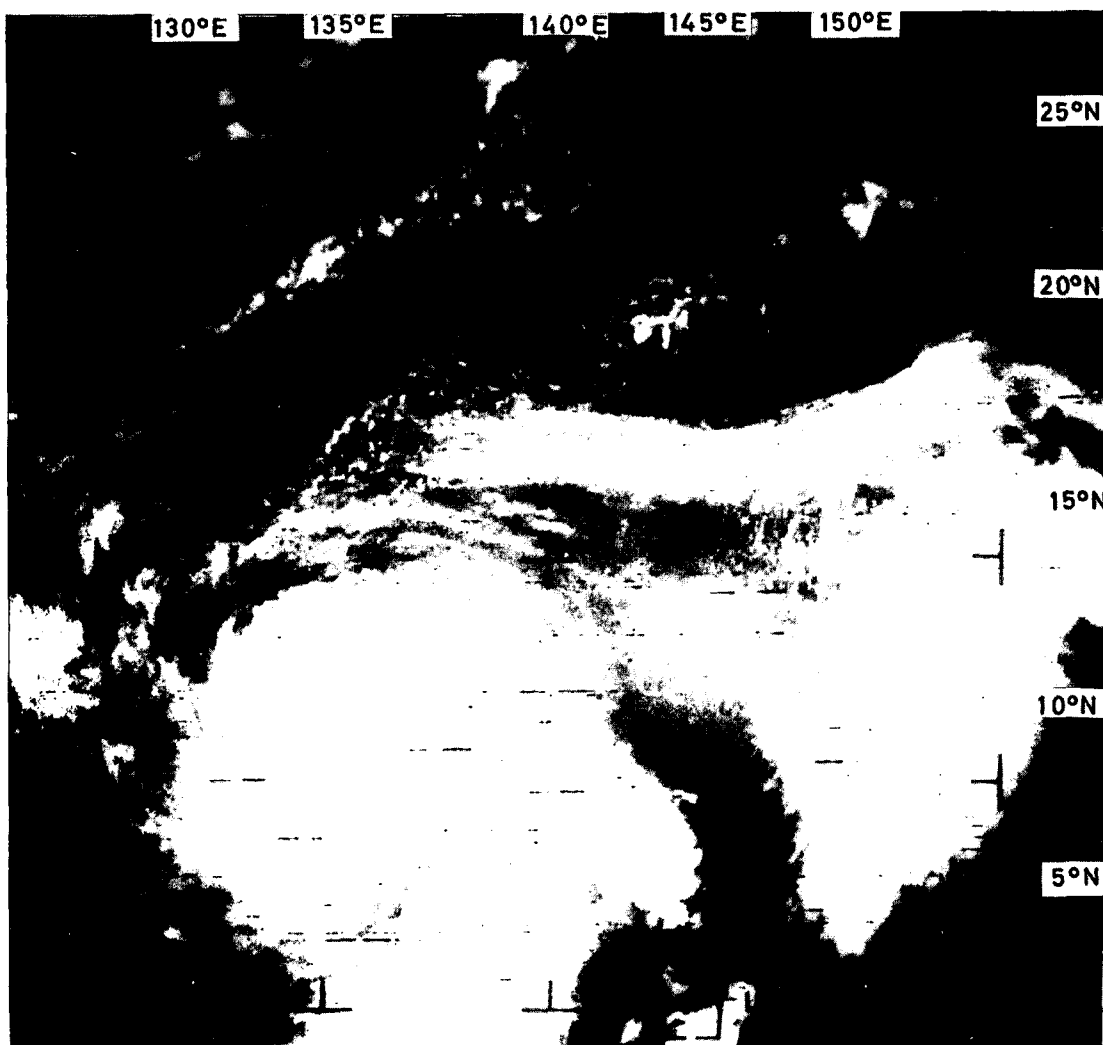


Figure 46. ESSA-8 APT picture of Typhoon 'Nora' taken at 10.04 a.m. on October 5, 1973.

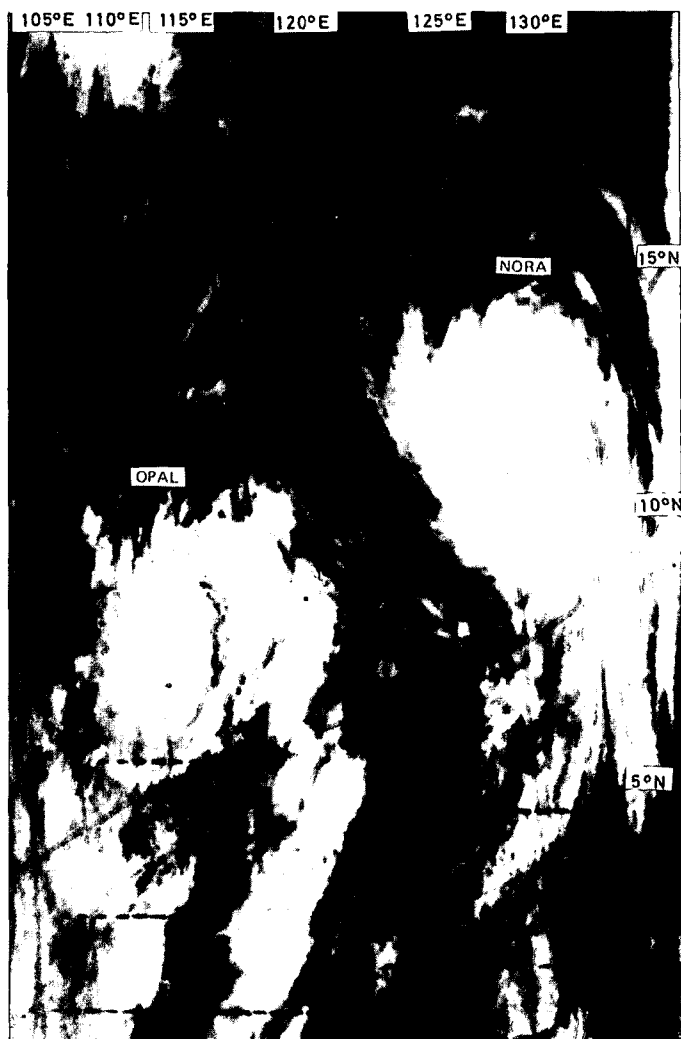


Figure 47. NOAA-2 DRIR picture of Typhoon 'Nora' taken at 9.58 a.m. on October 6, 1973.

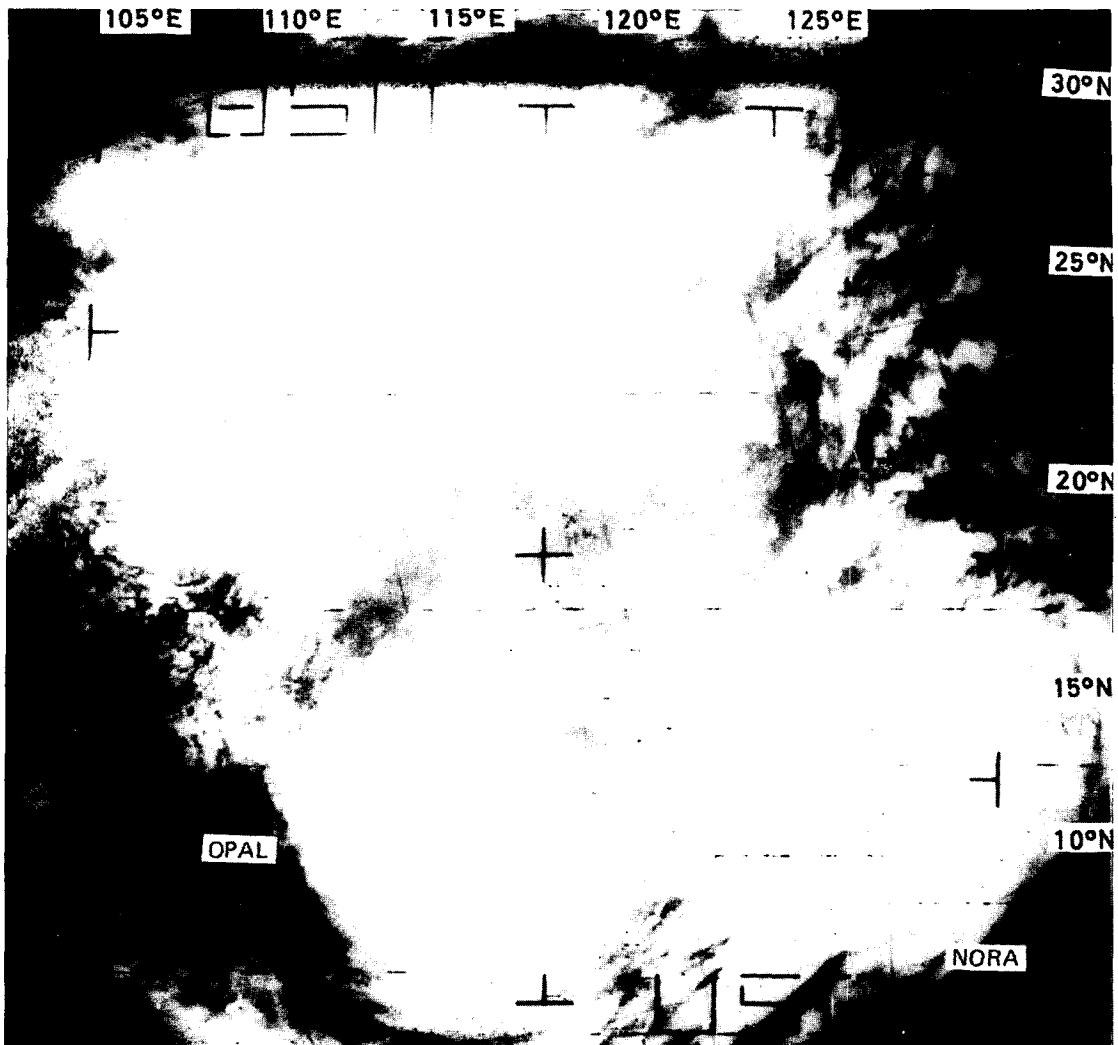


Figure 48. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.45 a.m. on October 7, 1973.



Figure 49. NOAA-2 DRIR picture of Typhoon 'Nora' taken at 9.53 a.m. on October 8, 1973.

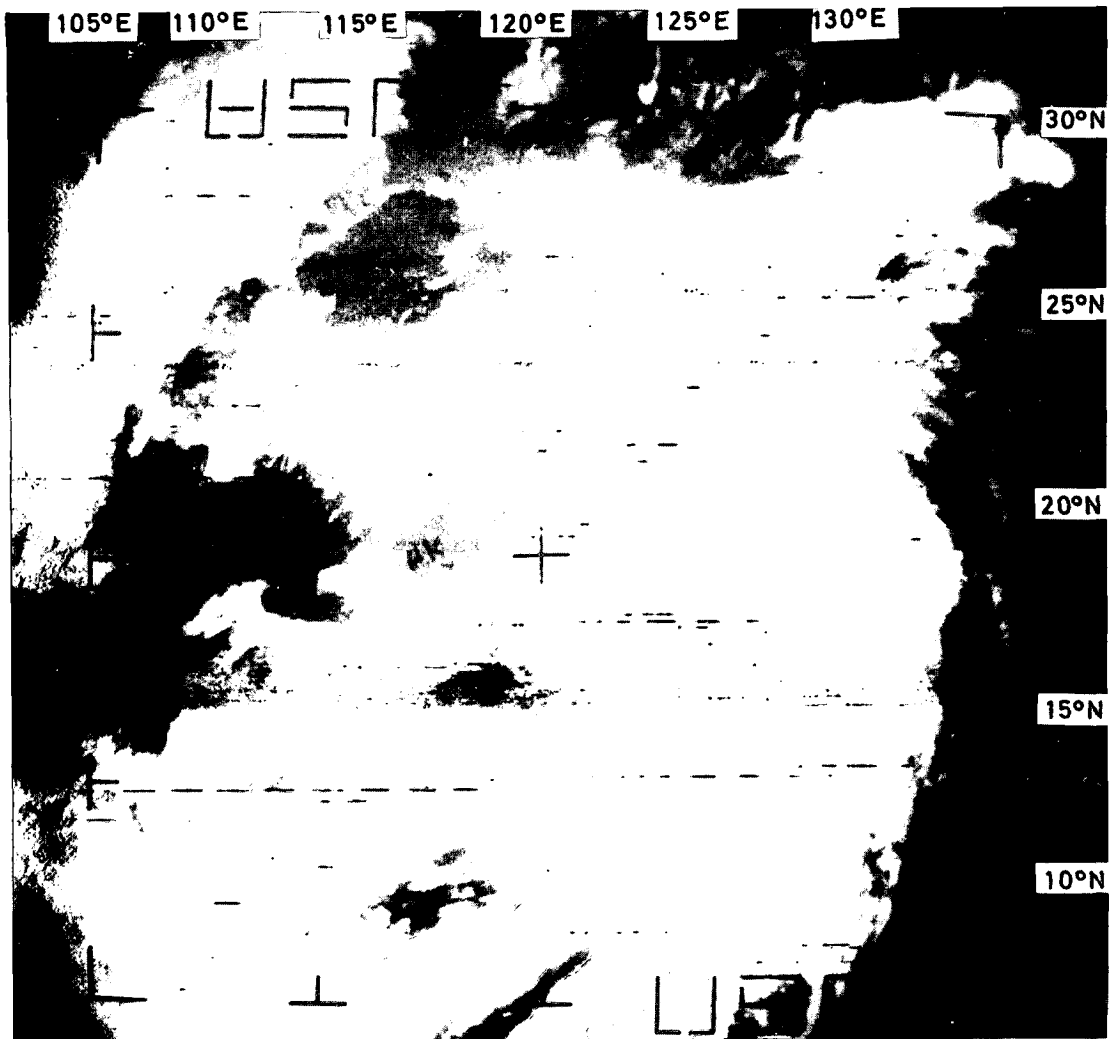


Figure 50. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.32 a.m. on October 9, 1973.

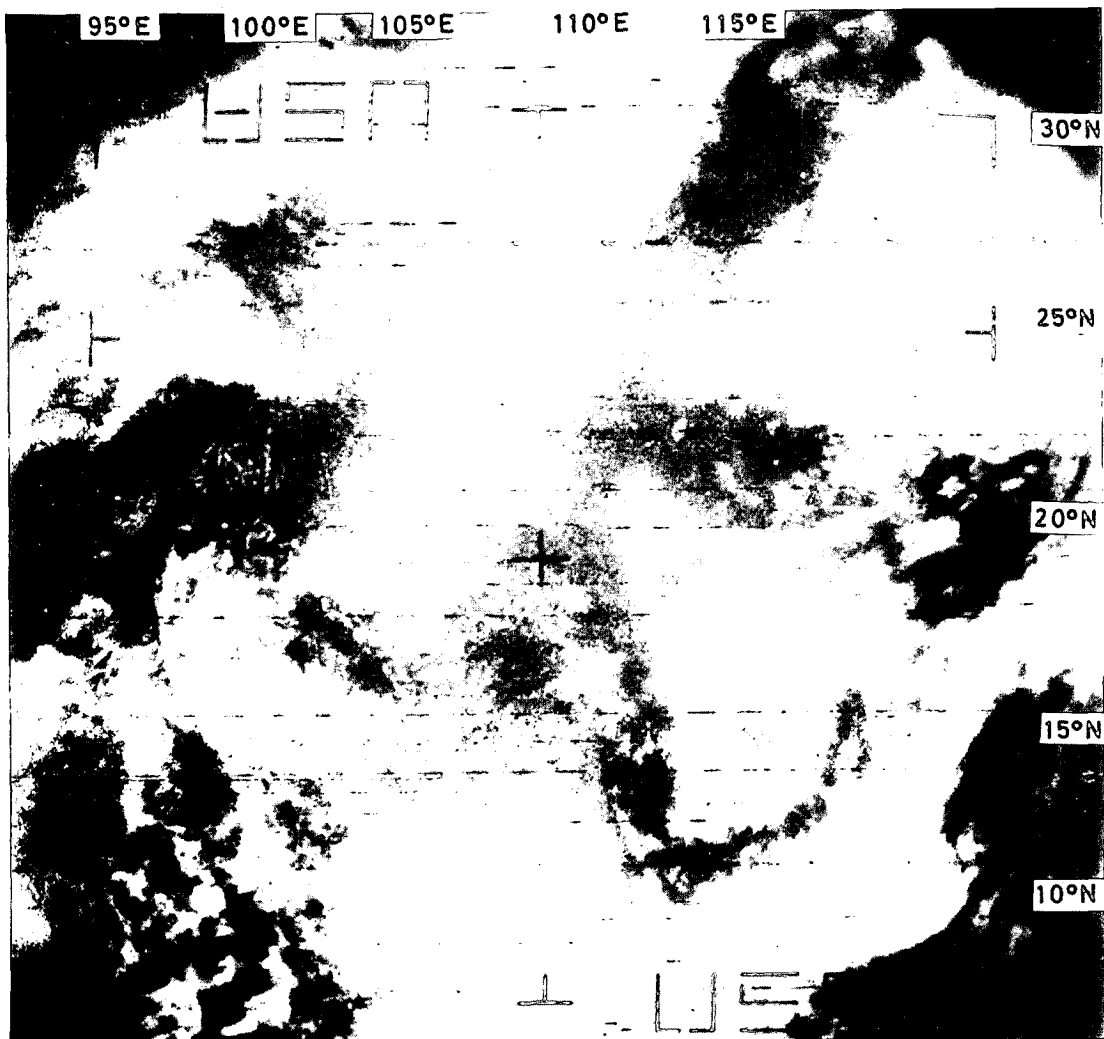


Figure 51. ESSA-8 APT picture of Typhoon 'Nora' taken at 11.23 p.m. on October 10, 1973.

TYPHOON 'RUTH'**October 11–19, 1973***The track of this typhoon is shown in Figure 52*

On October 11, a tropical depression named 'Ruth' developed over the western North Pacific near the Caroline Islands and moved westwards towards Luzon. At 9.40 a.m. the next morning, a reconnaissance aircraft reported a minimum sea-level pressure of 999 millibars and maximum surface winds of 35 knots near the centre of the depression. A sequence of satellite pictures received at the Royal Observatory from October 12–14 is presented in Figures 53–55.

'Ruth' intensified into a typhoon during the morning of October 15 and its associated cloud cover as shown in satellite pictures received at the Royal Observatory at 10.55 a.m. was about 360 miles in diameter (Figure 56). At noon a reconnaissance aircraft reported that the minimum sea-level pressure near the centre of 'Ruth' had dropped to 972 millibars and the maximum surface winds reached 75 knots.

Typhoon 'Ruth' entered the South China Sea early on October 16 (Figure 57) and continued to move westwards towards the Paracel Islands. At noon on the same day, a ship reported winds of 65 knots when it was about 60 miles east-northeast of the typhoon. Meanwhile, pressure had been rising steadily over northwest China and on October 16 the winter monsoon was slowly intensifying over the Taiwan Straits and the north-eastern part of the South China Sea. As the monsoon was expected to enhance the freshening of winds due to Typhoon 'Ruth', the Stand By Signal, No. 1, was hoisted by the Royal Observatory at 6.00 p.m. on October 16 when the typhoon was still some 410 miles to the south-southeast of the Colony. This was replaced by the Strong Wind Signal, No. 3, at 7.15 a.m. the next morning when the typhoon was about 340 miles to the south of Hong Kong because winds were expected to become strong as soon as the wind direction turned from north to east.

'Ruth' became an intense typhoon over the western part of the South China Sea. At 6.55 p.m. on October 17, reconnaissance aircraft reported that the minimum sea-level pressure near its centre had further dropped to 957 millibars. When 'Ruth' passed over the Paracel Islands during the night of October 17, a station on one of the islands about 30 miles to the south of the typhoon reported winds of 80 knots and a mean sea-level pressure of 970.8 millibars. Satellite picture received at the Royal Observatory on October 17 and 18 indicated that although the cloud cover remained at about 360 miles in diameter, the circulation of the typhoon was more well-organized with intense spiral rain bands (Figures 58 and 59).

Typhoon 'Ruth' turned to a northwesterly course in the morning of October 18 and in Hong Kong, the Strong Wind Signal was lowered at 9.40 a.m. when the typhoon was centred about 360 miles to the south-southwest of the Colony. 'Ruth' crossed Hainan Island during the night of October 18 and weakened rapidly (Figure 60). It then moved northwards over the Gulf of Tonkin and dissipated over Kwangsi Province 24 hours later.

In Hong Kong, the weather was fine on October 16 and during the morning of October 17. However, light rain developed in the afternoon and persisted until the early morning of October 18. Winds freshened from the north in the evening of October 16 and became strong in exposed places in the afternoon of October 17 as the wind direction turned to easterly. During the period when the tropical cyclone warning signals were hoisted, the maximum winds recorded at Waglan Island and Tate's Cairn were 33 and 27 knots and the maximum gust peak speeds were 43 and 41 knots. During the afternoon of October 18, winds over the Colony became generally strong again due to the winter monsoon and the Strong Monsoon Signal was hoisted at 8.00 p.m. on the same day.

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

October 16	Nil
October 17	0.8 mm
October 18	0.5 mm
October 19	Trace

There were no abnormal changes in tide heights during the period when the Tropical Cyclone Warning Signals were displayed.

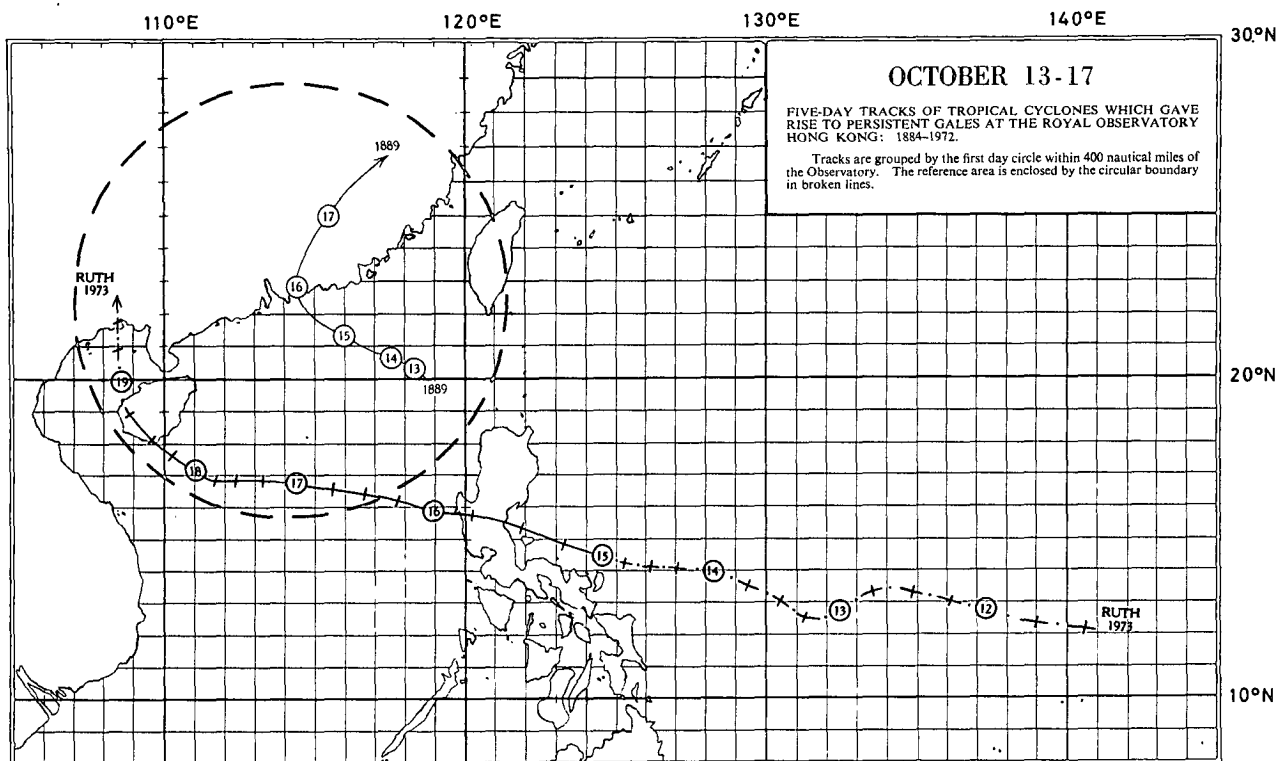


Figure 52. Track of Typhoon 'Ruth': October 11-19, 1973.

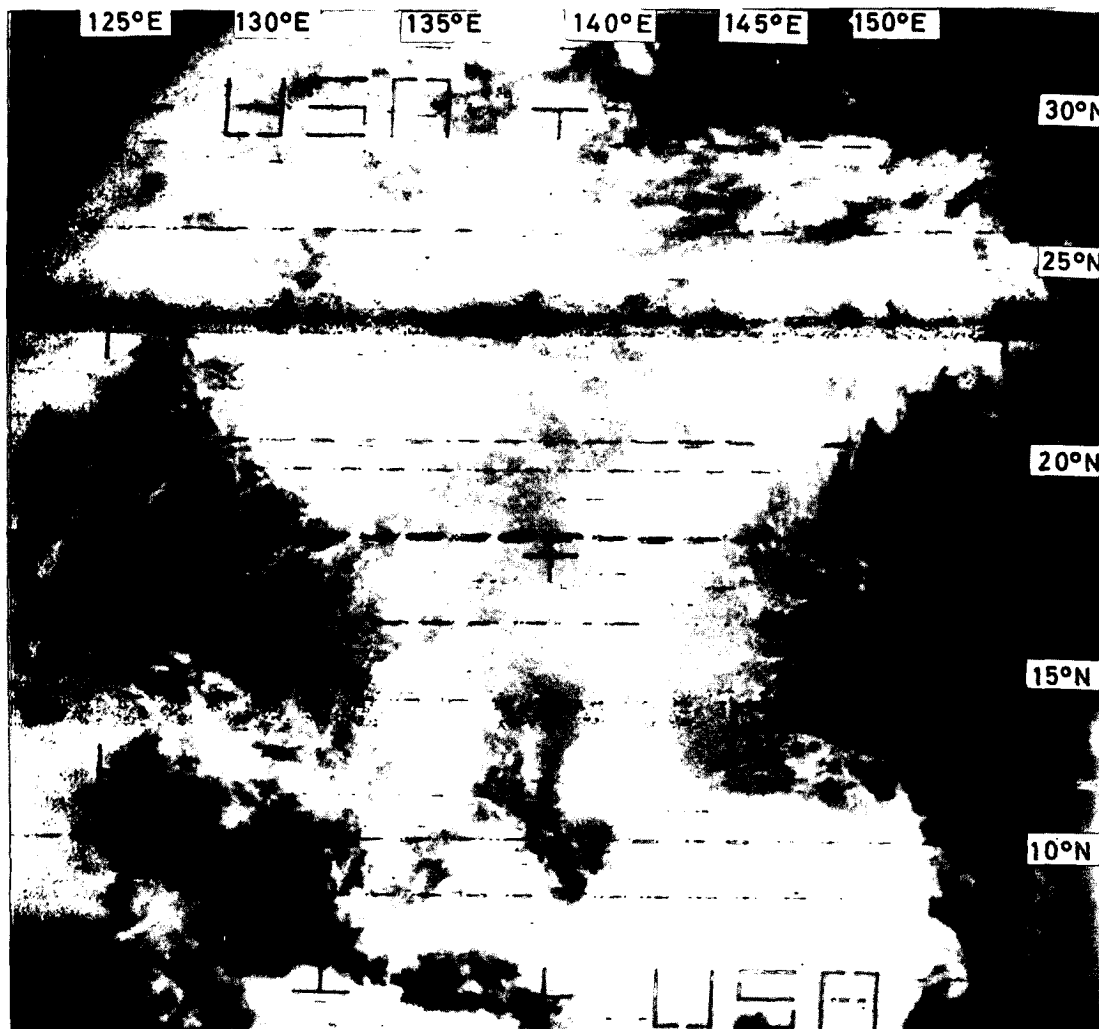


Figure 53. ESSA-8 APT picture of Typhoon 'Ruth' taken at 10.16 a.m. on October 12, 1973.

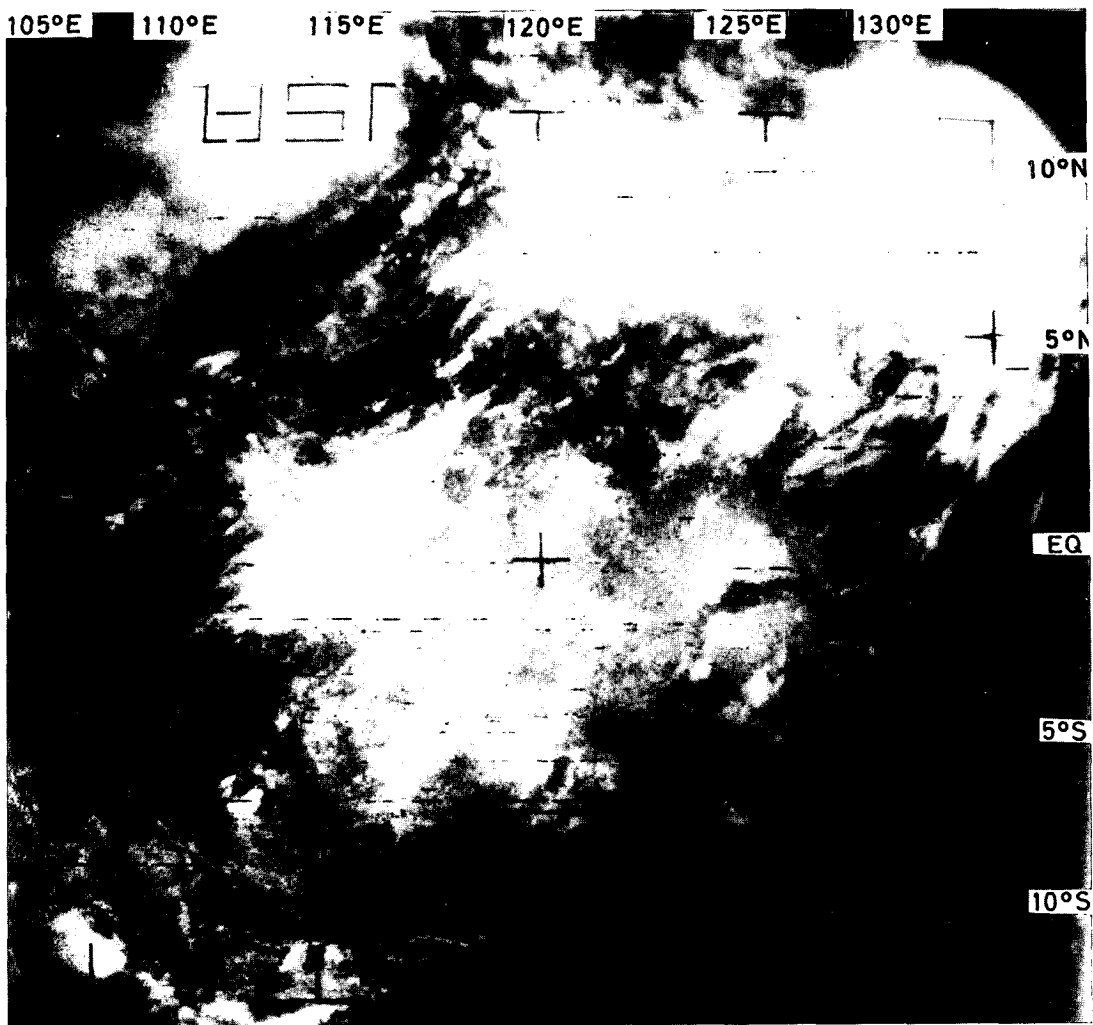


Figure 54. ESSA-8 APT picture of Typhoon 'Ruth' taken at 11.14 a.m. on October 13, 1973.



Figure 55. NOAA-2 DRIR picture of Typhoon 'Ruth' taken at 9.39 a.m. on October 14, 1973.

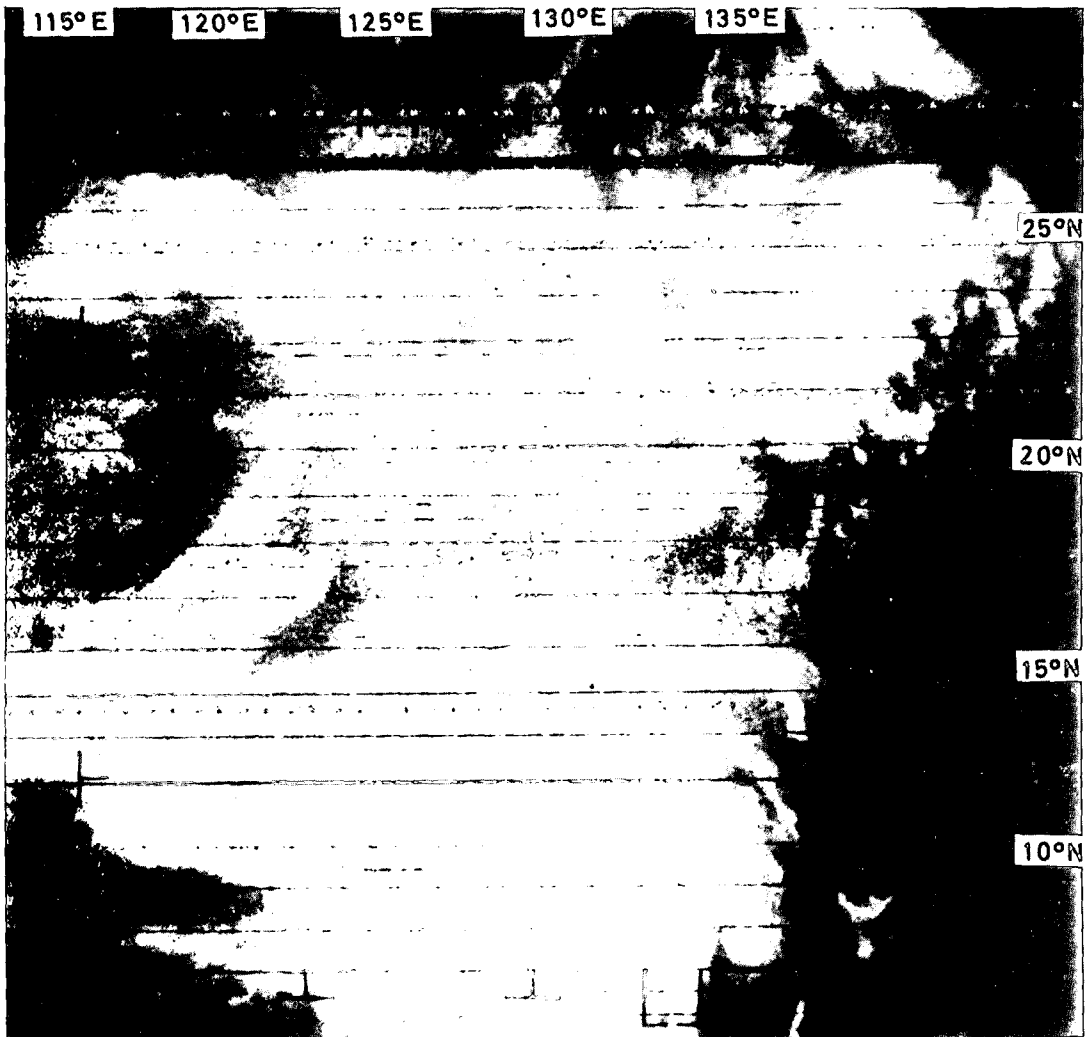


Figure 56. ESSA-8 APT picture of Typhoon 'Ruth' taken at 10.55 a.m. on October 15, 1973.

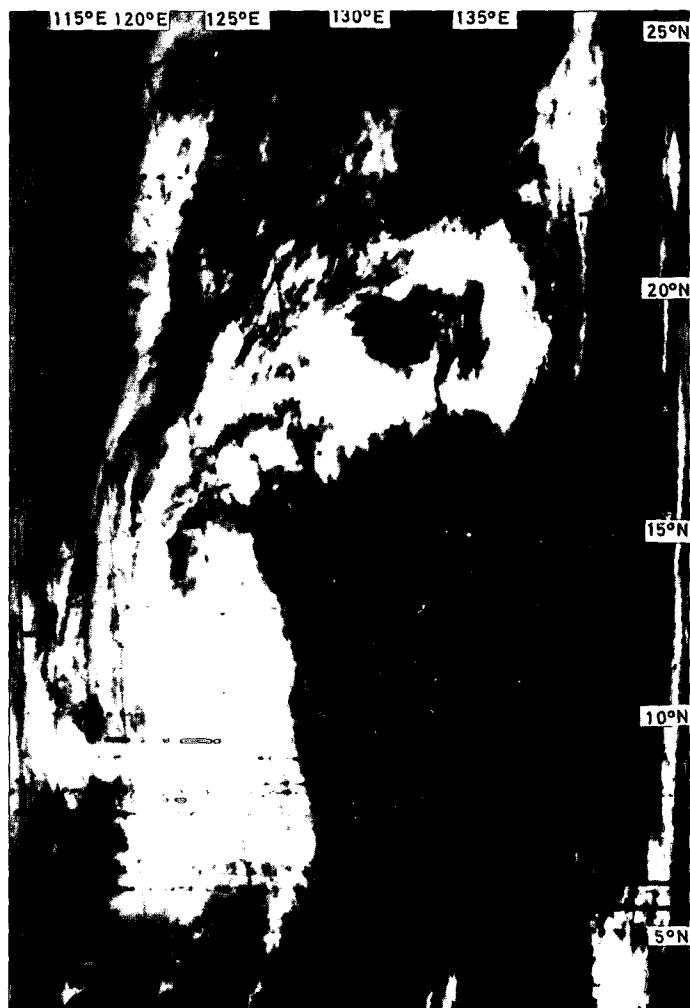


Figure 57. NOAA-2 DRIR picture of Typhoon 'Ruth' taken at 9.34 a.m. on October 16, 1973.

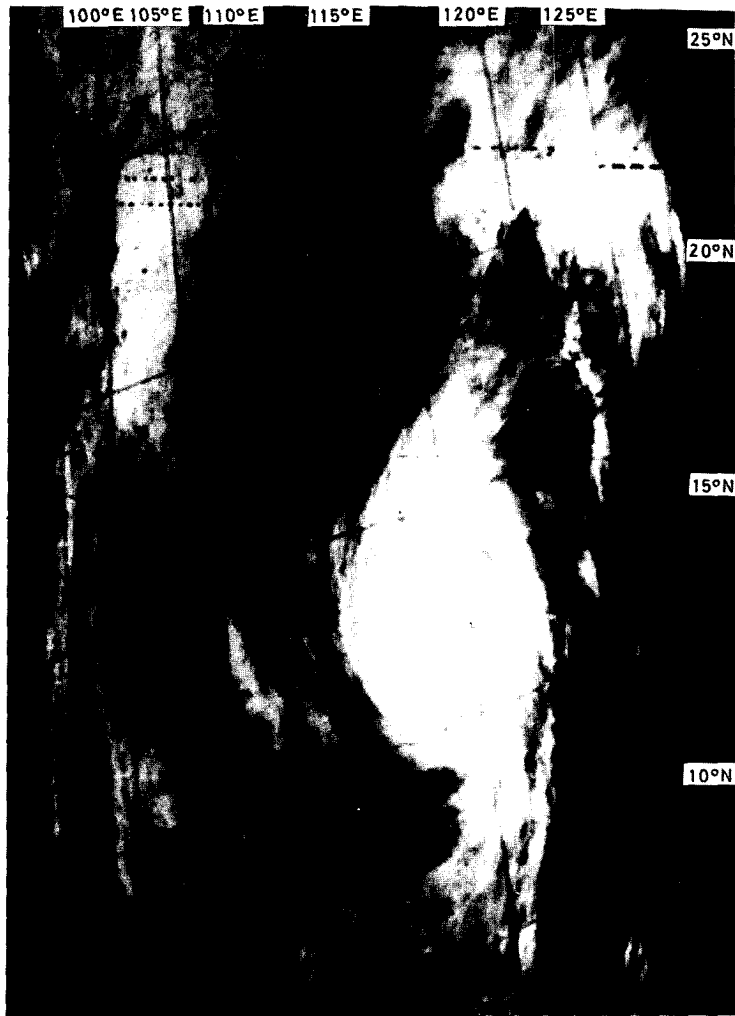


Figure 58. NOAA-2 DRIR picture of Typhoon 'Ruth' taken at 10.28 a.m. on October 17, 1973.

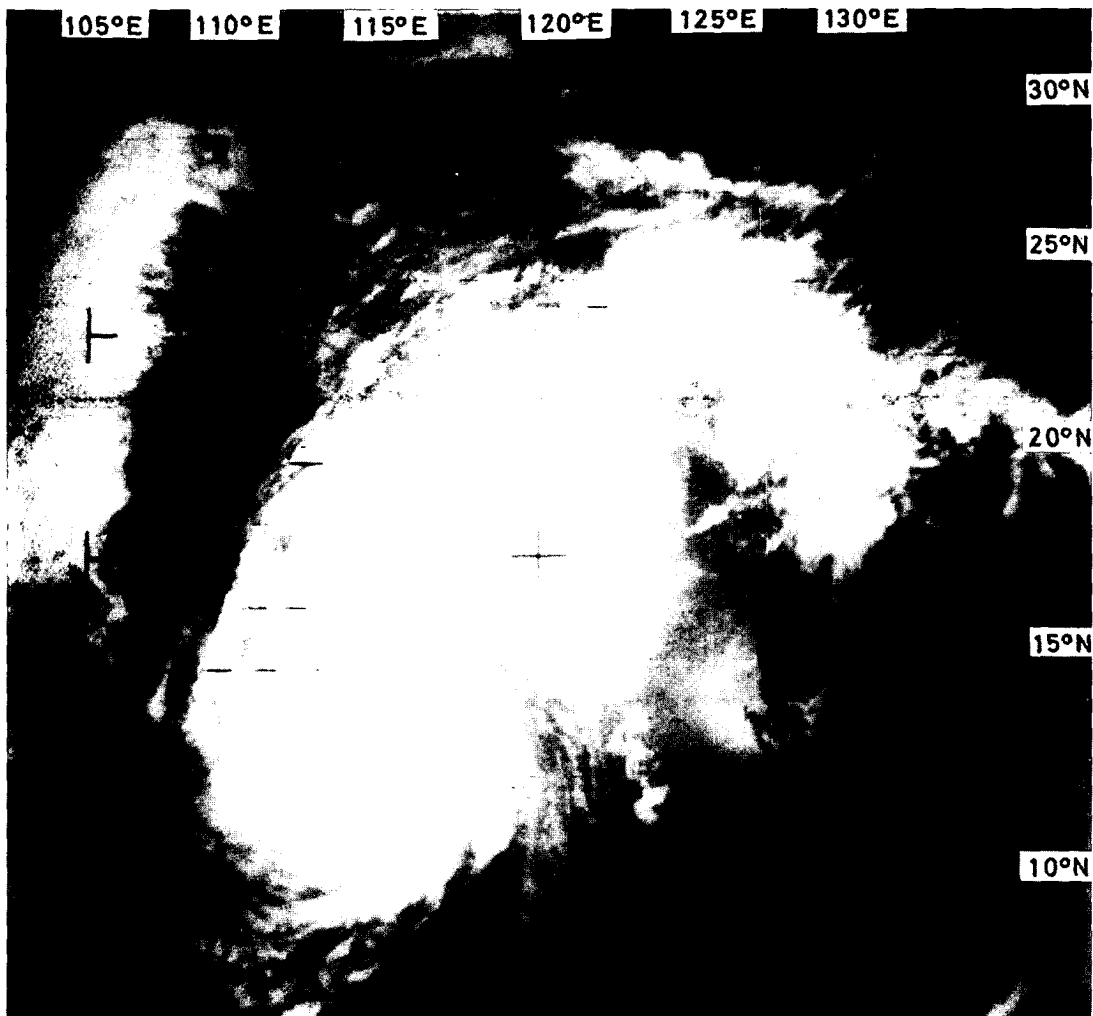


Figure 59. ESSA-8 APT picture of Typhoon 'Ruth' taken at 11.34 a.m. on October 18, 1973.

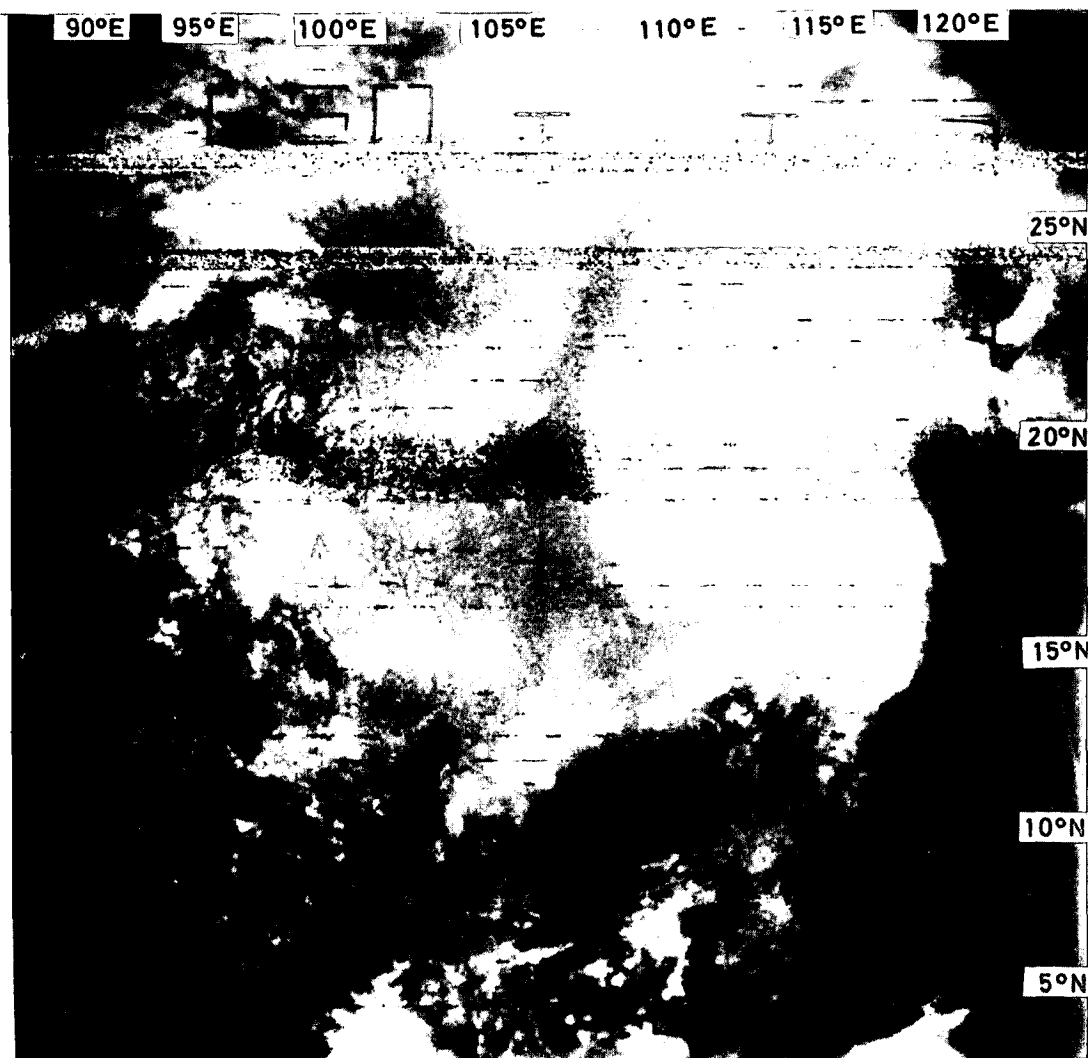


Figure 60. ESSA-8 APT picture of Typhoon 'Ruth' taken at 12.25 a.m. on October 19, 1973.

TABLE 1

LIST OF TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND THE SOUTH CHINA SEA IN 1973

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.			°N	°E					G.M.T.		°N	°E	
1 Tropical Storm Wilda	July	1	0000	18.0	118.6	1	4	July	4	0000	28.1	118.3		
2 Typhoon Anita	July	5	0600	11.5	113.0	6	8	July	8	1200	19.0	106.0		
3 Typhoon Billie	July	13	0600	16.8	125.5	14	19	July	19	1800	38.6	120.8		
4 Typhoon Dot	July	14	0000	17.5	115.2	14	20	July	20	0600	34.7	126.3		
5 Typhoon Ellen	July	17	1800	21.2	139.2	18	29	July	29	0000	34.7	137.3		
6 Tropical Storm Fran	July	29	0000	19.3	123.6	29	30	July	30	0600	22.8	123.8		
7 Typhoon Georgia	August	9	0000	20.0	117.6	9	13	August	13	0000	23.1	110.2		
8 Tropical Depression Hope	August	9	0600	26.3	154.6	10	12	August	12	1800	34.7	143.8		
9 Typhoon Iris	August	10	0600	21.8	130.5	11	17	August	17	1200	38.4	126.6		
10 Tropical Depression	August	13	0000	30.0	158.7	13	14	August	14	0600	31.2	152.8		
11 Tropical Storm Joan (I)	August	18	0600	19.2	129.3	19	20	August	20	0600	20.9	123.1		
Joan (II)	August	20	0600	21.0	119.4	21	22	August	22	1800	20.1	105.8		
12 Tropical Storm Kate	August	22	1200	20.2	117.3	23	26	August	26	0000	21.0	106.0		
13 Tropical Depression	August	29	0000	20.5	112.4	29	2	September	2	0000	19.4	105.8		
14 Severe Tropical Storm Louise	September	3	0000	19.5	121.1	3	7	September	7	0600	21.6	107.2		
15 Typhoon Marge	September	12	0000	17.2	119.7	12	15	September	15	0600	20.6	105.0		
16 Typhoon Nora	October	2	0000	11.3	135.2	2	10	October	10	0600	24.9	118.1		
17 Typhoon Opal	October	4	1200	11.3	114.5	5	8	October	8	1200	14.3	108.0		
18 Typhoon Patsy	October	6	1200	13.0	142.7	7	15	October	15	0600	16.8	106.8		
19 Typhoon Ruth	October	11	1200	12.3	140.8	12	19	October	19	1200	21.7	108.5		
20 Tropical Storm Sarah	November	10	0000	12.2	111.6	10	10	November	10	1800	12.1	108.6		
21 Tropical Storm Thelma	November	15	0000	10.3	110.6	15	18	November	18	1800	12.3	99.3		
22 Severe Tropical Storm Vera	November	19	1200	10.7	126.8	20	26	November	26	1200	18.2	112.5		

TABLE 2

TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1973

Tropical Cyclone	No. of Warnings Issued	Date and Time of Issue of				Duration of Warnings (hours)		
		First Warning		Last Warning				
Tropical Storm Wilda*	22	July	1	0000	July	3	1800	66
Typhoon Anita	27	July	5	0600	July	8	1200	78
Typhoon Billie	21	July	13	0900	July	16	0600	69
Typhoon Dot*	28	July	14	0000	July	17	0600	78
Tropical Storm Fran	7	July	29	0300	July	30	0600	27
Typhoon Georgia*	31	August	9	0000	August	12	1800	90
Tropical Storm Joan*	23	August	19	0600	August	22	1200	78
Tropical Storm Kate*	27	August	22	1200	August	26	0000	84
Severe Tropical Storm Louise*	34	September	3	0000	September	7	1200	108
Typhoon Marge*	21	September	12	0600	September	15	0600	72
Typhoon Opal	19	October	4	1200	October	8	1200	96
Typhoon Nora*	25	October	6	1800	October	10	0900	87
Typhoon Patsy	15	October	11	1200	October	15	0000	84
Typhoon Ruth*	32	October	15	0000	October	19	1500	111
Tropical Storm Sarah	5	November	10	0000	November	11	0000	24
Tropical Storm Thelma	4	November	15	0000	November	15	1800	18
Severe Tropical Storm Vera	29	November	20	0000	November	26	1800	162
Total	370							1,332

* 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 1973

SUMMARY

Signal	No. of Occasions	Total Duration	
1	8	234 h	15 min
3	6	159	50
8 NORTHWEST	1	6	00
8 SOUTHWEST	1	2	35
8 NORTHEAST	1	7	40
8 SOUTHEAST	—	—	—
9	1	6	30
10	—	—	—

DETAILS

Tropical Cyclone	No. of Warning Bulletins Issued	Signal	Hoisted		Lowered			
			Date	Time	Date	Time		
Tropical Storm Wilda	19	1	July	1	0930	July	3	0515
Typhoon Dot	42	1	July	14	1850	July	15	0515
		3	July	15	0515	July	16	1400
		8 NE	July	16	1400	July	16	2140
		9	July	16	2140	July	17	0410
		8 NW	July	17	0410	July	17	1010
		8 SW	July	17	1010	July	17	1245
Typhoon Georgia	19	3	July	17	1245	July	17	1515
		1	August	9	1500	August	9	2210
Tropical Storm Joan	11	3	August	9	2210	August	11	0810
		1	August	20	1850	August	21	1810
Tropical Storm Kate	25	1	August	22	2120	August	25	0555
Severe Tropical Storm Louise	31	1	September	3	1500	September	5	0915
		3	September	5	0915	September	6	1150
Typhoon Marge	16	1	September	12	1630	September	14	0600
Typhoon Nora	17	3	October	8	1515	October	10	0450
Typhoon Ruth	17	1	October	16	1700	October	17	0615
		3	October	17	0615	October	18	0840

TABLE 4

FREQUENCY OF HOISTING AND TOTAL DURATION OF DISPLAY
OF TROPICAL CYCLONE WARNING SIGNALS:
1946-1973

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	288
1973			8	6	1	1	1	0	1	0	18	417
1956 to 1973	Total		113	111	7	15	25	14	9	8	302	4847
	Mean		6.3	6.2	0.4	0.8	1.4	0.8	0.5	0.4	16.8	269.3

* 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: 1946-1973

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
Total	462	167
Mean	16.5	6.0

TABLE 6

DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG: 1946-1973

Signal	Duration for each occasion			Duration per year		
	Mean	Maximum	Minimum	Mean	Maximum	Minimum
1	17h 43min	102h 10min	1h 20min	94h 55min	273h 15min	0h 0min
3*	20 19	71 45	1 00	125 17	196 05	23 55
8 NW†	7 31	13 00	1 30	2 57	13 00	0
8 SW†	5 30	11 10	2 30	3 21	16 10	0
8 NE†	11 26	35 35	2 15	16 19	61 45	0
8 SE†	7 19	17 20	0 20	7 03	28 52	0
8	8 45	35 35	0 20	29 41	82 25	0
9	3 41	6 30	1 10	2 07	11 00	0
10	6 26	9 10	2 30	2 04	12 10	0

* 1956-1973.

† 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 7

CASUALTIES AND DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG: 1937-1973

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
f. 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	34	303	*	110	15	286
1972 T. Pamela	3	0	0	1	0	8
1973 T. Dot	14	*	*	1	0	38

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

* Data unavailable.

† Struck by lightning.

TABLE 9

TROPICAL CYCLONES CAUSING PERSISTENT GALES AT THE ROYAL OBSERVATORY

1884-1973

Name of Tropical Cyclone	Date and Time of Occurrence of Minimum Pressure			Maximum Mean Hourly Wind		Maximum Gust Peak Speed (kn)	Duration of Gales (h)	Sequence of Wind Direction	Minimum Pressure (millibars)		Remarks
	Date		Time	Direction	Speed (kn)				Hourly Reading	Instantaneous Minimum	
	1884	July	29	0300	E/S	34	5	ENE to ESE v	997.5		
		September	11	0200	ENE	57	15	N/E to SSE v	979.8		
	1885	August	17	1400	ESE	34	1	E to S/E v	997.8		
	1887	September	17	1700	E/S	44	14	NE to SE v	999.3		
		September	21	0400	E	36	5	ENE to SE/E v	1000.6		
		September	25	1400	E	35	3	ENE to ESE v	1000.4		
	1889	October	16	0400	W/N	39	4	NW/N to W b	997.0		
	1890	October	13	0400	NE/E	34	1	NE to ENE v	1006.4		
	1891	July	19	0500	SSW	41	5	NW/W to SSW ... b	980.9		
		August	3	0400	ESE	39	10	NNE to SE..... v	990.7		
	1893	September	9	0300	NW	38	3	NNW to NW/W... b	983.2		
		September	28	1600	E/N	39	14	NE/E to E/N v	999.3		
		October	2	1400	E	52	23	NNE to SE v	991.8		
		October	8	0400	E/N	37	4	N/E to ESE v	1000.7		
	1894	September	19	0300	E/S	43	15	NE/E to SE v	995.4		
		September	25	0900	E/N	55	10	NE to SE v	994.5		
		September	30	0600	E	41	17	NE/N to SE/E ... v	999.6		
		October	5	1700	SE/S	54	27	NE/E to SW/S ... v	987.0		
	1895	July	28	1600	NE/E	34	2	NE/N to E/S v	995.1		
	1896	July	29	2200	E/S	69	10	NNE to S/E v	976.6		
		August	9	1600	ENE	42	10	NE/E to SE/E ... v	997.8		
		October	6	0400	E/N	42	17	NE/E to SE v	996.4		
	1897	September	17	1500	NE/E	36	2	NE/E to ENE ... v	1004.6		
	1898	August	5	0300	E	39	7	ENE to SE v	987.1		
		August	17	1700	E	39	8	ENE to SE v	995.8		
	1900	September	11	0500	E	43	12	NE/E to SE v	996.6		
		November	10	0600	NNE	57	11	NE/E to SW/W ... b	975.0		

Centre recurved around
Hong Kong.
Highest hourly wind velocity.

TABLE 9—Contd.

Name of Tropical Cyclone	Date and Time of Occurrence of Minimum Pressure			Maximum Mean Hourly Wind		Maximum Gust Peak Speed (kn)	Duration of Gales (h)	Sequence of Wind Direction	Minimum Pressure (millibars)		Remarks
				Direction	Speed (kn)				Hourly Reading	Instantaneous Minimum	
	1902	July	18	1600	SW/S	39	2	N to SW/S	b	984.4	
		August	2	2000	SW/S	52	3	NW/W to SW/S ...	b	986.9	
	1904	August	10	0200	E/S	34	1	E to ESE.....	v	998.1	
		August	25	1700	E/N	36	6	E/N to NNE	b	986.8	
	1905	August	30	1500	ENE	41	10	N/E to E/N	v	988.2	
	1906	September	18	1000	SSW	49	2	NW to S.....	b	986.2	
		September	20	0400	E/S	36	3	ENE to ESE	v	1000.5	
		September	29	0900	E/N	50	15	NNE to SE.....	v	993.9	
	1907	September	14	0100	E/S	48	12	NE/N to SE	v	993.3	
	1908	July	28	0100	SSE	52	5	N to S/E.....	v	978.0	Centre passed over Cheung Chau.
		October	11	0100	E/S	34	1	NE/E to E/N	v	1003.6	
	1909	October	19	1700	ESE	48	13	NNE to SE.....	v	987.4	
		October	25	1700	E	35	1	NE to SE	v	1003.6	
	1911	July	4	0300	ESE	36	63	ENE to SE.....	v	996.9	Dines anemograph installed in 1911.
		July	27	1000	ESE	38	64	N to SSE	v	988.2	
		August	5	0900	S/E	39	69	ENE to SSE	v	991.1	
	1913	August	17	1100	ENE	55	91	NE/E to SE/E ...	v	991.1	
		September	18	2300	SW/W	36	61	WNW to SSW ...	b	992.2	
	1915	November	5	1600	E	36	60	NE/E to SE	v	1002.3	
	1916	September	7	0200	E	35	56	ENE to SE/E.....	v	999.1	
	1917	August	13	1100	SSW	40	81	backed from NW	b	986.6	Centre passed a few miles to N'ward.
	1918	August	15	0800	E/N	40	82	NE/E to S/E	v	987.7	
	1919	August	22	1600	E/S	38	73	E/N to SE/E	v	999.2	
	1922	September	20	1700	ENE	35	65	NE/E to E/S	v	999.8	
	1923	July	2	0500	E/S	39	—	ENE to S/E	v	990.8	
		July	22	1700	ESE	41	76	E/N to S/E.....	v	988.7	
		July	27	1000	S/W	38	—	SW/S to S/W	b	983.1	
		August	18	1000	NNE	67	113*	N/W to ESE	v	971.7	
	1926	July	22	0900	N/E	38	74	NE/N to ESE.....	v	991.7	Centre passed a few miles to S'ward.
		September	27	0600	E/N	46	88	N to ESE	v	991.8	
	1927	August	20	1400	NE/E	53	101	NNE to SE.....	v	982.4	
	1928	July	15	0100	E	38	66	NE/E to SE/E ...	v	992.7	
	1929	August	22	1400	SE	57	102	NNE to S/E	v	983.2	
	1930	July	24	1800	E	42	72	NE/N to ESE	v	990.9	

TABLE 9—Contd.

Name of Tropical Cyclone	Date and Time of Occurrence of Minimum Pressure			Maximum Mean Hourly Wind		Maximum Gust Peak Speed (kn)	Duration of Gales (h)	Sequence of Wind Direction	Minimum Pressure (millibars)		Remarks	
				Direction	Speed (kn)				Hourly Reading	Instantaneous Minimum		
	1931	August	1	1200	E/N	60	118*	5	NE to NSE	v	989.2	
		September	2	1500	S/E	41	82	3	NE/N to S/E	v	988.7	
	1932	September	17	0500	NE/E	35	69	2	NE/E to ESE	v	996.1	
	1936	August	17	0300	E/N	62	115*	6	NE/E to SE/S ...	v	979.3	
	1937	September	2	0400	NE/E	59	130*	5	NNW to SE/S ...	v	958.3	
	1939	November	23	1600	E/N	35	64	1	E to NW	v	989.5	Max. gust peak speed 145 kn at North point.
	1940	August	21	0900	E	45	72	12	NNW to E/S	v	990.2	Centre passed over Observatory.
	1941	June	30	1600	ENE	44	83	9	NE to E	v	977.8	
		September	16	1200	E/N	55	94	9	N to S/E	v	983.7	
	1942 - 1945 No records due to World War II. (No very severe typhoons).											
	1946	July	18	1600	N/E	—	95	7	N to S	v	985.7	
	1948	June	10	1200	E	39	48	1	NE to ESE	v	993.1	992.9
		July	27	1700	SSW	45	64	8	NNE to SW	b	981.1	980.1
		September	3	0400	E	46	75	14	NE to ESE	v	996.3	995.5
	1949	September	8	0300	E	56	81	6	N to SE	v	991.3	990.8
	1950	October	5	0400	E	34	59	1	N to ENE	v	997.3	997.2
Typhoon Susan	1951	June	18	1800	E	36	63	2	ENE to ESE	v	1001.7	1001.6
		August	1	1800	ENE	44	76	19	ENE to ESE	v	990.8	990.1
		September	2	1400	ENE	36	59	4	ENE to E	v	1002.9	1002.4
Typhoon Ida	1953	September	18	1800	NE	42	75	8	N to ESE	v	995.0	994.7
Typhoon Pamela	1954	August	29	1400	ENE	47	87	12	NNE to ESE	v	992.9	992.4
Typhoon Gloria		November	6	1100	E	47	84	5	NNE to SE	v	997.6	997.1
Typhoon Mary	1957	September	22	1700	ENE	59	101	14	N to SE	v	986.2	984.3
	1960	June	9	0500	SSE	50	103	19	ENE to SW	v	974.3	973.8
	Centre passed over Cheung Chau.											

TABLE 9—Contd.

Name of Tropical Cyclone	Date and Time of Occurrence of Minimum Pressure				Maximum Mean Hourly Wind		Maximum Gust Peak Speed (kn)	Duration of Gales (h)	Sequence of Wind Direction	Minimum Pressure (millibars)		Remarks
	Date			Time	Direction	Speed (kn)				Hourly Reading	Instantaneous Minimum	
Typhoon Alice	1961	May	19	1200	ESE	43	89	6	ENE to SW v	981.6	981.1	Centre passed over Observatory.
Severe Tropical Storm Olga		September	10	0200	W	35	64	1	NNE to SW b	986.5	986.1	
Typhoon Wanda	1962	September	1	1000	N	68	140	8	NNW to S v	955.1	953.2	Centre passed about 10 miles to S'ward. Max. gust peak speed at Tate's Cairn 154 kn.
Typhoon Viola	1964	May	28	0700	ESE	35	82	3	ENE to SSE v	993.0	991.9	
Typhoon Ida		August	8	2300	NE	42	112	2	NNE to SSE v	972.3	972.0	
Typhoon Ruby		September	5	1300	ESE	58	122	6	N to SE v	971.0	968.2	
Typhoon Sally		September	10	2100	WSW	35	56	1	NNW to SW b	989.9	989.1	
Typhoon Dot		October	13	0500	N	46	94	8	N to SW b	978.9	977.3	
Severe Tropical Storm Lola	1966	July	13	2000	E	35	82	1	ENE to SSE v	990.1	989.5	Centre passed about 10 miles to S'ward. Max. gust peak speed at Tate's Cairn 154 kn.
Typhoon Shirley	1968	August	21	1800	N	37	72	4	NNE to SSW b	968.7	968.6	
Typhoon Freda	1971	June	18	0100	E	34	79	1	ENE to SE v	984.4	984.3	
Typhoon Lucy		July	22	1100	W	34	68	1	NW to S b	978.2	977.9	
Typhoon Rose		August	17	0100	ESE	53	121	6	E to S v	984.5	982.8	
Typhoon Dot	1973	July	17	0500	ENE & W	34	77	2	ENE to W b	978.3	978.0	

Note: No corrections for air-density have been made to the wind speeds in this table.

* Estimated.

v=veering.

b=backing.

TABLE 10

A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG
DURING THE PASSAGES OF TROPICAL CYCLONES IN 1973

Name of Tropical Cyclone	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 M.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	mm
T.S. Wilda	0.4	1.0	0.9	WSW 08	W 21	WSW 11	W 22	E 22	W 27	1002.0	3.4	23.3	39.5	49.0	52.4
T. Dot	0.7	1.3	1.2	ENE 35	E 59	E 38	E 61	E 77	E 86	978.3	222.6	—	—	2.3	224.9
T. Georgia	0.4	0.9	—	E 19	E 37	E 23	E 41	ENE 51	E 54	1002.8	347.3	0.6	3.1	3.1	350.4
T.S. Joan	0.5	0.7	—	E 20	E 35	E 22	E 39	E 50	E 50	998.4	268.3	2.2	21.0	33.9	302.2
T.S. Kate	0.4	0.6	—	E 18	E 32	E 20	E 34	E 47	E 44	1001.1	59.4	24.8	24.8	36.7	96.1
S.T.S. Louise	0.1	0.2	0.8	E 17	E 31	E 18	E 32	ENE 43	ESE 42	1006.9	10.5	—	—	—	10.5
T. Marge	0.2	0.3	—	E 10	E 24	E 14	E 28	E 33	E 33	1007.6	27.8	32.4	—	—	60.2
T. Nora	0.7	0.9	0.7	N 14	N 32	N 16	N 34	N 38	N 40	1002.3	—	—	—	—	—
T. Ruth	0.5	0.7	0.6	N 15	E 34	N 16	ENE 35	E 35	ENE 42	1010.5	—	—	—	—	—

Note: (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.