

HONGKONG.

REPORT OF THE DIRECTOR OF THE OBSERVATORY FOR 1892.

*Laid before the Legislative Council by Command of His Excellency
the Governor, on the 29th August, 1893.*

HONGKONG OBSERVATORY,
29th March, 1893.

SIR,—I have the honour to submit my annual report for 1892 to His Excellency the Governor. My eighth volume of observations and researches was published last summer and the ninth volume is in the printers' hands. It contains, in addition to this report, investigations of the typhoons of 1892, the meteorological observations made every hour in 1892, and also hourly readings of tides in 1889, observations on the duration of sunshine in Formosa and on rain-fall in China during the years 1890, 1891 and 1892.

2. The branch Observatory at the Peak, suggested by General PALMER, R.E., in 1881, declared necessary for storm-warnings by the Observatory Commission in 1890, and upon which improvements in local storm-warnings mainly depend, has not yet been constructed, but a self-recording anemograph has been ordered from London. When this is properly worked at the Peak and the readings correctly and immediately telegraphed every hour to the Observatory across the harbour, it is estimated that its value will amount to about half the value of the branch Observatory, the construction of which has been so long delayed. Observations are now also made every three hours at the Gap Rock lighthouse and cabled (during the day-time only) to the Observatory. If these observations are made and transmitted properly, they will be of considerable assistance to weather-forecasts and storm-warnings. The observations at Victoria Peak were found not to be made in a sufficiently honest or careful manner and His Excellency ordered them to be discontinued last year and the instruments to be removed. Pending the arrival of the anemograph, the direction and force of the wind is estimated every hour from 7 a. to 7 p. and telegraphed to the Observatory, but the information is not always trustworthy and at times misleading.

3. The China Coast Meteorological Register, based on information received from the Eastern Extension, and Great Northern Telegraph Companies, and Chinese Telegraph Administration, was issued as usual, and since the 1st July a short provisional account of the typhoons has been printed at the end of every month in the *Gazette* by order of His Excellency the Governor. The positions of the typhoon-centres are given for every day on which warnings were issued and the accuracy of the latter may be inferred from the former. The stations at Swatow, Amoy, Foochow and Anping were visited last year by Mr. F. G. FIGG, and the stations at Macao, Hoihow and Haiphong by myself. Some very necessary improvements were effected, and the stations at Bolinao, Pakhoi and Cape St. James should be visited next. Telegrams from one or two ports between the latter station and Haiphong are urgently required.

4. The telegrams are frequently received too late for insertion in the daily weather-reports. That this requirement is fully recognised everywhere else in the Empire and properly provided for may be seen *e.g.* from the following extract from the Report on the Administration of the Meteorological Department of the Government of India in 1887-88 (Page 16, §7): "In order to facilitate and expedite the working of these arrangements, the Telegraph Department has granted the privilege of precedence urgency to telegrams referring to stormy weather and the hoisting of storm-signals between the Meteorological Reporter of Calcutta and the Port Officers and Meteorological Superintendents of Cocanada, Gopalpur, Madras, Masulipatam, Negapatam and Vizagapatam. The names of other officers will be added to this list as found necessary for the proper working of the system. Instructions for the preparation and dispatch of the telegrams in proper form, in order to secure priority of transmission to ordinary urgent messages, will be sent by the India Meteorological Office to the various officers permitted to send them."

5. Telegraphic connection with Victoria was interrupted on the 8th January, 1892, from 6 p. to 10 p., on the 20th April, from 7 a. to 10.40 a., on the 27th August, from 3.45 p. to 4.32 p., and on the 3rd November from 10 a. to 4.23 p. Interruptions occurred therefore on 4 days and, of course, also during thunderstorms. Telephonic connection between the look-out on the Peak and the Central Police Station in Victoria (for transmitting observations every hour to the Observatory) was interrupted from the 16th June at 7 a. to the 23rd June at 2 p., and also from 10 a. to 4 p., on the 4th August, *i.e.* on 9 days as well as during thunderstorms.

6. Telegrams giving information about typhoons were issued on 61 days. The Red Drum was hoisted 4 times, Red Ball 1, Red North Cone 1, Red South Cone 2, Black Drum 3, Black Ball 1, Black North Cone 2, Black South Cone 3, Lanterns (horizontally) 3, and Lanterns (vertically) 1 times. The Gun was not fired in 1892.

7. During 1892, in addition to meteorological registers kept regularly at about 40 stations on shore, 558 ship-logs with entries during typhoons were copied. 157 were forwarded by the Captains or Owners, and 401 were copied on board ship in the harbour. The ship-logs received in 1892 were thus distributed: for 1888, 1 log; for 1889, 8 logs; for 1890, 10 logs; for 1891, 52 logs; for 1892, 487 logs. But the information concerning typhoons during these years was not yet complete on the 1st January, 1893. The following number was still required: for 1888, 12 logs; for 1889, 14 logs; for 1890, 13 logs; for 1891, 17 logs; for 1892, 41 logs. The total number of ships, whose log-books have been made use of, was 270. The total number of days' observations was 5278. This number might with advantage be increased. The difficulty is that we are all so closely engaged in the Observatory, that no more than one of us at a time can be spared for visiting ships in the harbour, and he can devote only half his hours of duty to work afloat. Every vessel entering the harbour ought to be boarded, and every log-book found to be properly kept ought to be copied. That would be useful for storm-warnings.

8. The following is a list of ships from which logs have been obtained in 1892; those to which a * is prefixed having been communicated directly by their respective Captains, and the remainder have been copied on board the several vessels. The majority are steam-ships and the others are distinguished as follows:—b, barque; s, ship; sch., schooner.

Albania (b), Achilles, *Activ, Aden, Aglaia, *U.S.S. Alert, Altair (b), *Alwine, Airlie, Amicitia, Ancona, Angers, Argyll, Aron (b), Arratoon Apar, Asagao, Ashington, Avochie, Bantam, Batavia, *Bayern, Belgic, Belle of Bath (s), Bellona, Benalder, Bengloe, Benlarig, Bittern (b), *Bombay, Bormida, Borneo, Breconshire, Bylgia (b), Carmarthen-shire, *Calédonien, Cambusdoon (b), Camelot, Canton, Cardiganshire, Carl Friedrich (s), Cathay, Catherine Apar, Catterthun, Changsha, Charger (s), Charmer (s), Charon Wattana (b), Charters Tower, Cheang Chew, Cheang Hock Kian, Cheang Hye Teng, Chelydra, *Chelydra, China, *Chingtu, *Chiyuen, Chowfa, *Choysang, Chusan, Cicero, City of Peking, City of Rio de Janeiro, Colonist, Constance (s), Continental, Cosmopolit, Crown of Arragon, Cyclops, Dardanus, Decima, Denbighshire, Deuterios, Devawongse, Diamond, *Djemnah, Donar, Don Juan, Doris, Dorothea (b), Electra, Else, Empress of China, *Empress of India, Empress of Japan, Enos Soule (b), *Esang, Esmeralda, Ethiopie, *K. K. F. Fasana, *H.M.S. Firebrand, Florence Treat (b), *Fokien, Fooksang, Formosa, Frejr, Frigga, Fuping, Fushun, Gaelic, Ganges, *General Werder, Ghazee, Glamorganshire, Glenartney, Glenavon, Gleneagles, Glenearn, Glenfruin, Glengarry, Glengyle, Glenogle, Glenorchy, Glenshiel, Guthrie, *Gwalior, *Hailoong, Haiphong, *Haitan, Harward (b), Heinrich (b), Hesperia, Higo Maru, Hiroshima Maru, *H. J. M. S. Hiyei, *Holstein, Hongay, Hupeh, Inconstant, Independent, Ingraban, J. D. Bischoff (s), Jenny (sch.), Jessonda (b), J. Y. Robbins (s), Kaisow, Keemun, Kiel, Kitty (b), *Kong Beng, Kowshing, Kriemhild, *Kutsang, Kwanglee, Kwellin, Kwongsang, *U.S. F. Lancaster, Lavinia (b), *Lennox, Levuka (b), Lightning, Loksang, Loosok, Lunedale, Lyee-moon, Macduff, Malacca, Marabout (s), Mathilde, *Meefoo, *Melbourne, Melpomene, *Memnon, *Menmuir, Michael Jebsen, Mongkut, Moyune, Namoa, *Namyong, Nanchang, Nanshan, Nanyang, *Natal, *Neckar, Nicoya (b), *Ningpo, Nizam, N. S. de Loreto, *Nürnberg, Oceana, Oceanic, Omega (b), Orestes, *Orion, *Oxus, *Pakshan, Palinurus, *H.M.S. Pallas, Paoting, Pathan, Peking, Pembroke-shire, Penshaw (b), *Petersbourg, Phra Chom Klao, Phra Chula Chom Klao, Phra Nang, Picciola, H.M.S. Plover, Polyhymnia, *H.M.S. Porpoise, Port Philip, Presto, Propontis, Protos, Radnorshire, Ravenna, Richard Parsons (b), Rio, Rohilla, Rosetta, Sachim (s), Sachsen, Salatiga, Salazie, Santa Clara (s), *Santa Cruz (sch.), *Sea Swallow (sch.), *H.M.S. Severn, *Shanghai, Sikh, Singan, Soochow, St. Andrews, Sterling (s), Strathesk, Strathleven, Sungkiang, Surat, Swatow, Sverre, Sydney, Taicheong, *Taichow, Taisang, Taiyick, Taiyuan, Taksang, Tarapaca (b), Telamon, Teresa, Tetartos, Teucer, *Thales, Thermopylæ (b) *Thibet, *Thisbe, Toonan, Torrington, Tsinan, Triumph, Vagabond (b), Velocity (b), *Venetia, *Verona, *Vorwaerts, Warrior (s), Wingsang, Wm. J. Rotch (b), Wm. Le Lacheur (b), *Woosung, Wosang, Xenia (b), Yangtse, Yarra, Yik-sang, Yuensang, Yungching, Yungping, *Zafiro.

9. All the observations made at noon each day during the typhoon seasons of the past five years have been reduced and tabulated and have served for the construction of weather-maps on the basis of which the typhoons that occurred during the past five years will be investigated.

10. With the view of enabling masters of vessels to know before-hand the weather that may be expected on voyages and to select the most favourable routes during the different months of the year, all the observations hitherto collected are being distributed according to degrees of latitude and longitude, the twelve months being treated separately. Means will be taken as soon as sufficient data are entered and they will serve for the construction of maps showing the most probable values of the meteorological elements in each square degree between Singapore and 180° E. Gr., and between 0° and 45° latitude. Owners, agents and captains having access to old log-books have been invited to forward

them to me in order that the observations may be utilised, after which the log-books will be returned. The routes followed by those lines of steamers that supply most information will, of course, be supplied with the most trustworthy information concerning the weather.

11. Unfortunately there is no prospect of additional clerical help for a purpose so useful to the shipping as this undoubtedly is. The immense bulk of records from stations on shore is not utilised for anything beyond investigations of typhoons.

12. Copies of the China Coast Meteorological Register with weather-forecasts for the following 24 hours are sent daily to the newspapers in time for insertion in the extra-number issued by each of them about noon. None of the papers prints it regularly before evening or even next morning, whereby of course their subscribers lose any benefit they might derive from the weather-forecasts. Moreover they all print the register very incorrectly. They issue news about typhoons which are derived from various sources and which are as a rule incorrect. Such items are mixed up with information supplied from the Observatory and tend to mislead the public. Although the meteorological signals and storm-warnings are issued in the interest of the shipping, and intelligent seamen are not so easily deceived as the public at large, it would still be a great improvement to have the China Coast Meteorological Register printed daily without delay and in a correct form. The subscriptions are sure to cover the expense. The cost of printing a daily weather-report is provided for by the Government in connection with every other Meteorological Office in the Empire. The information issued in 1892, concerning typhoons, is printed below (Appendix A.). The amount of accuracy obtained may be ascertained by comparison with the report on typhoons in 1892 (Appendix B.).

13. As stated in the "Instructions for making Meteorological Observations, etc.," (KELLY AND WALSH, 1892), meteorological instruments forwarded by observers, who regularly send their registers to the Observatory, are verified here free of cost. During the past year, 11 barometers, 2 aneroids, and 66 thermometers were verified. A couple of hundred aneroids or marine barometers on board ship were also compared with the Observatory standard.

14. The following table shows the spectroscopic rain-band observed daily at 10 a. The mean value for the year was 2.33.

Table I.
Rainband in 1892.

Date.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
1,	2	1	2	3	2	3	4	2	4	2	2	1
2,	2	1	3	2	4	3	3	4	3	2	2	1
3,	1	2	2	1	3	3	4	3	3	2	2	2
4,	1	1	2	1	3	2	3	3	4	2	2	2
5,	2	3	2	1	2	4	3	2	3	2	2	3
6,	2	2	2	3	3	3	3	2	2	3	2	1
7,	1	4	2	2	2	3	3	3	2	2	3	1
8,	0	1	2	2	3	2	3	3	4	2	3	1
9,	0	2	2	3	3	2	2	3	2	2	3	2
10,	1	3	2	3	5	2	4	3	3	2	3	3
11,	1	2	2	2	3	2	4	3	2	2	3	2
12,	1	1	2	3	2	2	3	3	2	1	3	2
13,	1	2	2	2	2	3	3	3	2	1	2	0
14,	2	2	2	2	3	3	3	3	3	2	3	0
15,	2	1	2	2	2	3	3	3	2	2	3	0
16,	2	1	2	2	3	5	4	3	2	3	2	0
17,	2	2	2	2	3	4	3	3	3	2	2	0
18,	2	2	2	2	2	3	3	3	3	1	3	0
19,	2	2	2	2	2	5	3	3	3	2	3	0
20,	1	3	2	3	3	3	4	4	3	2	2	0
21,	2	3	2	3	3	2	3	4	4	2	2	0
22,	1	2	2	5	4	3	3	4	3	2	2	1
23,	1	3	2	3	4	2	3	3	3	1	2	1
24,	3	3	3	3	2	3	3	4	2	2	2	0
25,	3	3	2	2	3	3	3	4	2	2	2	0
26,	3	2	3	2	3	3	3	3	2	2	1	0
27,	3	2	2	2	4	3	3	4	2	2	1	0
28,	3	2	3	3	4	4	3	4	2	2	0	0
29,	2	2	3	2	3	3	3	5	3	2	0	0
30,	2	...	2	3	3	3	3	4	3	1	0	1
31,	2	...	2	...	3	...	3	3	...	1	...	1
Means,.....	1.71	2.07	2.16	2.37	2.94	2.97	3.16	3.26	2.69	1.87	2.07	0.81

15. The tide-tables for 1893 are based upon the analysis of the hourly readings of tides in 1887 and 1888. The hourly readings for 1889 are now published. The harmonic analysis will be done in England under the supervision of Professor G. H. DARWIN. The readings for Mean Sea Level in 1889 were as follows:—January 6.00, February 5.81, March 5.55, April 5.68, May 5.72, June 5.56, July 5.37, August 5.52, September 6.05, October 6.29, November 6.79, December 6.20. Year 5.88. Average of three years 5.86.

The highest readings in 1889 were as follows:—January 10.05, February 10.65, March 9.20, April 9.35, May 9.55, June 10.15, July 10.00, August 9.55, September 9.80, October 10.65, November 10.60, December 10.50.

The lowest readings in 1889 were as follows:—January 1.35, February 2.10, March 2.25, April 1.75, May 1.55, June 1.60, July 1.25, August 1.40, September 1.90, October 2.30, November 1.85, December 1.25.

The highest reading during the three years was 10.65 and the lowest 1.10.

16. The number of transits observed in 1892 was 389, and the inclination of the axis was determined 141 times. The rates of the standard clocks are exhibited in the following tables. They are compared with the rates calculated from the formulæ exhibited at the head of the tables. Both clock-rates show the existence of waves. In case of Dent's clock the periods and amplitudes are larger, which make the errors appear to be twice as large as in case of Brock's clock, where the periods are shorter. The probable deviation of each ten-day rate from the preceding rate is $0^s.08$ in case of Dent's clock, and $0^s.07$ in case of Brock's. When it is taken into account that the former was cleaned and re-started later than the latter, it appears that one goes just as well as the other and equal weight is therefore given to them every morning when they are compared with the time-ball clock for setting the latter to correct time. Sir HOWARD GRUBB'S chronograph is working extremely well.

Table II.

Rate of Dent Standard Sidereal Time Clock in 1892.

$$r_0 = +2^s.01 - 0^s.063 (\tau - 70^\circ)$$

$$[\text{arc} = 3^\circ 9' \pm 1']$$

Period.			Observed rate r_0	Temp. τ	Calculated rate r_c	$r_0 - r_c$
			s.	°	s.	s.
December,	27—January,	6,.....	+ 1.24	66.0	+ 2.26	...
January,	6— "	16,.....	+ 1.44	65.4	+ 2.30	...
"	16— "	26,.....	+ 1.61	65.3	+ 2.30	...
"	26—February,	5,.....	+ 1.57	66.5	+ 2.23	...
February,	5— "	15,.....	+ 1.79	65.8	+ 2.27	...
"	15— "	25,.....	+ 1.85	66.1	+ 2.25	...
"	25—March,	6,.....	+ 2.00	66.2	+ 2.25	- 0.25
March,	6— "	16,.....	+ 2.15	66.3	+ 2.24	- 0.09
"	16— "	26,.....	+ 2.34	66.8	+ 2.21	+ 0.13
"	26—April,	5,.....	+ 2.48	66.2	+ 2.25	+ 0.23
April,	5— "	15,.....	+ 2.38	69.5	+ 2.04	+ 0.34
"	15— "	25,.....	+ 2.38	71.8	+ 1.89	+ 0.49
"	25—May,	5,.....	+ 2.04	75.3	+ 1.68	+ 0.36
May,	5— "	15,.....	+ 2.03	74.5	+ 1.73	+ 0.30
"	15— "	25,.....	+ 1.97	74.6	+ 1.72	+ 0.25
"	25—June,	4,.....	+ 1.53	82.2	+ 1.24	+ 0.29
June,	4— "	14,.....	+ 1.48	80.8	+ 1.33	+ 0.15
"	14— "	24,.....	+ 1.35	81.5	+ 1.28	+ 0.07
"	24—July,	4,.....	+ 1.22	81.9	+ 1.26	- 0.04
July,	4— "	14,.....	+ 1.13	82.9	+ 1.20	- 0.07
"	14— "	24,.....	+ 0.97	83.5	+ 1.16	- 0.19
"	24—August,	3,.....	+ 0.94	82.2	+ 1.24	- 0.30
August,	3— "	13,.....	+ 1.01	83.9	+ 1.14	- 0.13
"	13— "	23,.....	+ 1.01	83.3	+ 1.17	- 0.16
"	23—September,	2,.....	+ 1.05	80.7	+ 1.34	- 0.29
September,	2— "	12,.....	+ 1.03	80.7	+ 1.34	- 0.31
"	12— "	22,.....	+ 1.14	81.2	+ 1.31	- 0.17
"	22—October,	2,.....	+ 1.27	78.6	+ 1.47	- 0.20
October,	2— "	12,.....	+ 1.40	78.0	+ 1.51	- 0.11
"	12— "	22,.....	+ 1.52	77.0	+ 1.57	- 0.05
"	22—November,	1,.....	+ 1.67	73.5	+ 1.79	- 0.12
November,	1— "	11,.....	+ 1.74	74.1	+ 1.76	- 0.02
"	11— "	21,.....	+ 1.71	73.3	+ 1.80	- 0.09
"	21—December,	1,.....	+ 1.83	71.7	+ 1.90	- 0.07
December,	1— "	11,.....	+ 2.08	68.7	+ 2.09	- 0.01
"	11— "	21,.....	+ 2.46	64.9	+ 2.33	+ 0.13
"	21— "	31,.....	+ 2.32	65.6	+ 2.28	+ 0.04

Table III.

Rate of the Brock Standard Mean Time Clock in 1892.

$$r_c = +2^{\circ}.60 - 0^{\circ}.075 (\tau - 75^{\circ}) + 0^{\circ}.0020 (t - \text{July } 1)$$

Period.	Observed rate	Temp.	Arc.	Calculated rate.	$r_c - r_o$
	r_o	τ	a	r_c	
	s.	°	° ' "	s.	s.
December, 27—January, 6,	+ 2.48	72.8	4 12 36	+ 2.41	+ 0.07
January, 6— " 16,	+ 2.77	70.1	4 12 18	+ 2.63	+ 0.14
" 16— " 26,	+ 2.87	70.6	4 12 6	+ 2.61	+ 0.26
" 26—February, 5,	+ 2.51	71.7	4 11 18	+ 2.50	+ 0.01
February, 5— " 15,	+ 2.68	70.6	4 9 48	+ 2.65	+ 0.03
" 15— " 25,	+ 2.54	70.7	4 9 30	+ 2.66	- 0.12
" 25—March, 6,	+ 2.49	71.5	4 8 42	+ 2.62	- 0.13
March, 6— " 16,	+ 2.47	71.0	4 9 6	+ 2.68	- 0.21
" 16— " 26,	+ 2.62	71.5	4 8 36	+ 2.66	- 0.04
" 26—April, 5,	+ 2.63	71.9	4 8 0	+ 2.65	- 0.02
April, 5— " 15,	+ 2.41	74.9	4 8 48	+ 2.45	- 0.04
" 15— " 25,	+ 2.25	77.1	4 8 36	+ 2.30	- 0.05
" 25—May, 5,	+ 2.05	79.9	4 8 36	+ 2.11	- 0.06
May, 5— " 15,	+ 2.07	80.7	4 8 42	+ 2.07	0.00
" 15— " 25,	+ 2.13	79.9	4 8 6	+ 2.15	- 0.02
" 25—June, 4,	+ 1.85	85.8	4 4 0	+ 1.73	+ 0.12
June, 4— " 14,	+ 2.07	84.6	3 57 48	+ 1.84	+ 0.23
" 14— " 24,	+ 1.97	85.0	3 58 12	+ 1.83	+ 0.14
" 24—July, 4,	+ 1.97	85.2	3 57 48	+ 1.83	+ 0.14
July, 4— " 14,	+ 1.97	86.3	3 58 0	+ 1.77	+ 0.20
" 14— " 24,	+ 1.76	86.9	3 57 54	+ 1.75	+ 0.01
" 24—August, 3,	+ 1.82	86.0	3 58 12	+ 1.84	- 0.02
August, 3— " 13,	+ 1.87	86.7	3 57 6	+ 1.80	+ 0.07
" 13— " 23,	+ 1.78	85.2	3 58 42	+ 1.93	- 0.15
" 23—September, 2,	+ 1.86	83.3	4 0 6	+ 2.10	- 0.24
September, 2— " 12,	+ 1.93	83.0	3 59 0	+ 2.14	- 0.21
" 12— " 22,	+ 1.97	83.5	3 58 48	+ 2.12	- 0.15
" 22—October, 2,	+ 2.16	81.0	3 57 48	+ 2.33	- 0.17
October, 2— " 12,	+ 2.29	81.5	3 57 42	+ 2.31	- 0.02
" 12— " 22,	+ 2.58	79.2	3 55 48	+ 2.50	+ 0.08
" 22—November, 1,	+ 2.79	75.2	3 55 36	+ 2.82	- 0.03
November, 1— " 11,	+ 2.88	75.2	3 55 24	+ 2.85	+ 0.03
" 11— " 21,	+ 2.71	78.6	3 55 12	+ 2.63	+ 0.08
" 21—December, 1,	+ 2.87	76.1	3 54 54	+ 2.82	+ 0.05
December, 1— " 11,	+ 3.23	71.5	3 57 24	+ 3.18	+ 0.05
" 11— " 21,	+ 3.95	69.5	3 57 12	+ 3.35	...
" 21— " 31,	+ 3.84	70.0	3 58 0	+ 3.34	...

17. As stated in the time-ball notice published in the *Government Gazette* on the 10th January, 1885, the time-ball is not dropped on Sundays or on Government holidays. It was, however, dropped also on Sundays in 1892, except when any assistant was sick or absent on duty or leave. On the 3rd, 4th and 5th of March, the apparatus was under repair and the ball was not hoisted. On the 22nd April, a thunderstorm raged in the neighbourhood. On the 2nd May, a wire in the lock was found fused by lightning. On the 11th of May, the line was out of order. On the 16th June, a thunderstorm was raging. On the 8th of August, the key of the tower was forgotten. On these days the ball was not hoisted. On the 23rd November, the ball failed to drop, the tooth of the lock being so worn that the piston would not rest on it. The ball was therefore dropped 345 times, and failed once in 1892:—

Table IV.
Errors of Time Ball in 1892.

- means too late.

+ means too early.

Date.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1, .....	...	0.1	0.1	-0.5	0.1	0.1	0.1	...	0.1	-0.2	0.1	0.1
2, .....	...	0.1	-0.3	-0.5	...	0.1	0.1	0.1	0.1	-0.3	0.1	0.1
3,	+0.2	0.1	...	0.1	-0.2	0.1	0.1	0.1	0.1	-0.2	0.1	-0.5
4,	+0.2	0.1	...	0.1	0.1	0.1	0.1	0.1	0.1	-0.3	-0.3	0.1
5,	+0.4	0.1	...	0.1	0.1	0.1	0.1	0.1	0.1	-0.4	0.1	0.1
6,	0.1	-0.2	-1.1	0.1	0.1	...	0.1	0.1	0.1	-0.5	0.1	0.1
7,	-0.3	...	-1.3	0.1	0.1	-0.4	0.1	0.1	0.1	0.1	0.1	0.1
8,	0.1	0.1	-1.4	0.1	+0.2	0.1	0.1	...	0.1	0.1	0.1	0.1
9,	0.1	0.1	-1.5	0.1	0.1	0.1	0.1	0.1	+0.2	0.1	0.1	0.1
10,	0.1	-0.2	-1.6	0.1	0.1	0.1	0.1	0.1	+0.2	0.1	0.1	0.1
11,	0.1	0.1	-1.7	0.1	...	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12,	0.1	0.1	-1.7	+0.2	0.1	0.1	0.1	0.1	-0.2	-0.2	-0.2	0.1
13,	0.1	0.1	0.1	+0.2	0.1	0.1	0.1	0.1	-0.3	-0.3	-0.2	-0.3
14,	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.4	0.1	-0.3	-0.2
15,	0.1	0.1	-0.2	...	0.1	0.1	0.1	0.1	-0.5	0.1	-0.3	-0.6
16,	0.1	0.1	-0.5	0.1	0.1	...	0.1	0.1	0.1	-0.2	0.1	-0.9
17,	0.1	0.1	-0.7	0.1	0.1	+0.2	0.1	0.1	0.1	-0.3	0.1	0.1
18,	0.1	0.1	0.1	...	0.1	+0.3	0.1	0.1	-0.2	0.1	0.1	0.1
19,	0.1	+0.2	-0.2	0.1	0.1	+0.4	0.1	+0.2	-0.3	0.1	0.1	-0.2
20,	0.1	+0.2	-0.3	0.1	0.1	+0.4	+0.2	0.1	-0.3	0.1	0.1	0.1
21,	0.1	...	-0.5	0.1	+0.2	0.1	0.1	0.1	-0.4	+0.2	0.1	0.1
22,	0.1	+0.3	-0.2	...	+0.2	0.1	0.1	-0.2	-0.4	+0.2	0.1	0.1
23,	0.1	0.1	0.1	+0.4	+0.2	0.1	0.1	0.1	-0.2	0.1	...	0.1
24,	0.1	0.1	0.1	+0.3	0.1	0.1	0.1	0.1	-0.5	-0.2	+0.3	...
25,	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	+0.4	...
26,	+0.2	0.1	0.1	+0.3	0.1	0.1	0.1	0.1	-0.2	0.1	+0.5	0.1
27,	+0.2	0.1	0.1	+0.6	...	0.1	+0.2	0.1	-0.3	0.1	-0.5	+0.2
28,	0.1	0.1	-0.3	0.1	-0.3	0.1	+0.2	0.1	0.1	0.1	-0.4	0.1
29,	0.1	0.1	-0.4	0.1	-0.3	0.1	+0.2	0.1	0.1	0.1	0.1	0.1
30, .....	...	...	-0.4	0.1	0.1	0.1	0.1	0.1	-0.2	0.1	0.1	-0.2
31,	0.1	...	-0.3	...	0.1	...	0.1	0.1	...	0.1	...	0.1

18. An extension of the main-building is urgently required as the Observatory is not nearly of the dimensions recommended by General H. S. PALMER, R.E., twelve years ago. In fact, the building was not hitherto properly finished, the pendant to the west to correspond to the transit-room towards the east not yet having been built. There is a drawing of it in the Office of Public Works, constructed by Mr. J. M. PRICE, the architect, who built the Observatory. Besides my private apartments and the laboratories, most of which are too small, there is only one office for the accommodation of the whole staff. It is 13 feet broad and 20 feet long. The telegraph and telephone apparatus are in the same room. There are often six officials working together, the same room being occupied almost constantly day and night. In a climate like this such overcrowding is undesirable. In other departments the different foreign officials have each a separate office apart from the natives. In order to carry out the investigations printed in Appendix B I had to give the assistants the use of my dining-room, although that caused me very grave inconvenience and some expense.

19. Some of the principal duties of the staff are distributed as follows, the number of hours during which each official attended during the year being added in parenthesis:—

Mr. J. I. PLUMMER, Chief Assistant, (1853 hours), makes astronomical and magnetic observations,—the latter under Mr. FIGG's superintendence,—regulates clocks and copies ship-logs.

Mr. F. G. FIGG, First Assistant, (2047 hours), attends to storm-warnings and investigations of typhoons. He teaches all the other assistants and does any work which is too difficult for them.

Miss A. DOBERCK, Assistant Meteorologist, (883 hours in half a year) issues weather-forecasts and daily meteorological registers, and attends to meteorological observations and tabulations.

Mr. HO TOSHANG, Second Assistant, (1936 hours), hoists and sets the time-ball and attends to the continuous records and the construction of the monthly and annual reports, in which he is assisted by two native clerks, one (2048 hours), of whom besides attends to electric, and the other (2083 hours), to photographic work.

20. Observations of magnetic declination and horizontal force were made with the unifilar magnetometer, Elliott Brothers, No. 55, and the dips were observed with dip-circle, Dover No. 71. Some deflections which were badly observed were excluded and are printed in parenthesis.

The methods adopted in making the observations and in determining and applying the corrections are explained in Appendix G. of *Observations and Researches made in 1885*: "On the verification of

the unifilar magnetometer, Elliott Brothers, No. 55." The value of $\log \pi^2 K$ was 3.44955 at 25°. The value of P was + 8.732. The mean value of the magnetic moment of the vibrating needle was 0.46028 in English Units and 600.93 in C.G.S. Units.

The times of vibration exhibited in the table are each derived from 12 observations of the time occupied by the magnet in making 100 vibrations, corrections having been applied for rate of chronometer and arc of vibration.

The observations of horizontal force are expressed in C.G.S. units (one centimeter, one gramme, one second), but the monthly synopsis exhibits X, the horizontal, as well as Y, the vertical, and the total forces, which have been computed by aid of the observed dips, and their values are also given in English units (one foot, one grain, one second) and in Gauss's units (one millimeter, one milligram, one second).

21. The cisterns of the barograph and standard barometers are placed 109 feet above M.S.L. The bulbs of the thermometers are rotated 108 feet above M.S.L., and 4 feet above the grass. The solar radiation thermometer is placed at the same height. The rim of the rain-gauge is 105 feet above M.S.L., and 21 inches above the ground.

22. The monthly Weather Reports are arranged as follows :—

Table I. exhibits the hourly readings of the barometer reduced to freezing point of water, but not to sea level, as measured (at two minutes to the hour named) from the barograms.

Tables II. and III. exhibit the temperature of the air and of evaporation as determined by aid of rotating thermometers. Table II. exhibits also the extreme temperatures reduced to rotating thermometer. Table III. exhibits also the solar radiation (black bulb in vacuo) maximum temperatures reduced to Kew arbitrary standard.

Table IV. exhibits the mean relative humidity in percentage of saturation and mean tension of water vapour present in the air in inches of mercury for every hour of the day and for every day in the month calculated by aid of Blanford's tables from the data in Tables II. and III.

Table V. exhibits the duration of sunshine expressed in hours from half an hour before to half an hour after the hour (true time) named.

Table VI. exhibits the amount of rain (or dew) in inches registered from half an hour before to half an hour after the hour named. It exhibits also the estimated duration of rain.

Table VII. exhibits the velocity of the wind in miles and its direction in points (1-32). The velocity is measured from half an hour before to half an hour after the hour named, but the direction is read off at the hour.

Table VIII. exhibits the amount (0-10), name (Howard's classification) and direction whence coming of the clouds. Where the names of upper and lower clouds are given, but only one direction, this refers to the lower clouds.

Table IX. exhibits for every hour in the day, the mean velocity of the wind reduced to 4 as well as to 2 directions, according to strictly accurate formulæ, and also the mean direction of the wind.

Below this is printed a list of phenomena observed.

23. The following annual Weather Report for 1892, is arranged as follows :—

Table V. exhibits the mean values for the year (or hourly excess above this) obtained from the monthly reports. The total duration of rain was 996 hours. There fell at least 0.01 inch of rain on 141 days.

Table VI. exhibits the number of hours during portion of which at least 0.005 inch of rain (or dew) was registered.

Table VII. exhibits the number of days with wind from eight different points of the compass. The figures are obtained from the mean daily directions in Table VII. of the monthly reports. Days with wind from a point equidistant from two directions given are counted half to one of these and half to the other *e.g.*, half of the days when the wind was NNE are counted as N, and the other half as NE.

Table VIII. exhibits the number of days on which certain meteorological phenomena were registered, and also the total number of thunderstorms noted in the neighbourhood during the past year. A slight earthquake was noticed about 10 a. on the 22nd April. Afterglows stronger than usual were noticed since the 15th December.

Table IX. shows the frequency of clouds of different classes.

Table X. is arranged nearly the same as in previous years.

Table XI. exhibits the monthly and annual extremes. The extremes of humidity and vapour tension are only approximate as the hourly values are not calculated.

Table XII. contains five-day means.

Tables XIII., XIV. and XV. contain magnetic observations.

I have the honour to be,

Sir,

Your most obedient Servant,

W. DOBERCK,
Director.

To the Honourable G. T. M. O'BRIEN, C.M.G.,
Colonial Secretary, &c., &c., &c.

Table V.
Mean Values and Hourly Excess above the Mean of Meteorological Elements in 1892.

	1 a.	2 a.	3 a.	4 a.	5 a.	6 a.	7 a.	8 a.	9 a.	10 a.	11 a.	Noon.	1 p.	2 p.	3 p.	4 p.	5 p.	6 p.	7 p.	8 p.	9 p.	10 p.	11 p.	Midt.	Mean or Total.
Pressure,	+0.04	-0.06	-0.14	-0.17	-0.11	+0.01	+0.17	+0.032	+0.43	+0.46	+0.36	+0.15	-0.09	-0.29	-0.42	-0.45	-0.41	-0.32	-0.17	-0.001	+0.13	+0.21	+0.21	+0.14	29.840
Temperature,	-1.5	-1.7	-1.9	-2.0	-2.1	-2.1	-1.5	-0.4	+0.6	+1.4	+2.3	+2.8	+3.0	+2.9	+2.5	+1.9	+0.9	-0.0	-0.4	-0.6	-0.7	-0.9	-1.1	-1.3	71.0
Humidity,	+4	+5	+5	+5	+5	+5	+4	+1	-2	-4	-6	-8	-8	-7	-6	-5	-3	0	0	1	2	3	4	4	77
Vapour Tension,	+0.03	+0.01	+0.00	-0.02	-0.05	-0.05	+0.00	+0.02	-0.01	-0.04	-0.03	-0.04	-0.03	-0.01	0.00	+0.02	-0.02	0.00	0.00	0.00	+0.003	+0.006	+0.009	+0.007	0.619
Sunshine (Total),	1.620	3.485	2.705	4.035	4.570	6.195	7.3	75.9	149.2	162.7	178.4	192.1	198.6	192.4	180.8	162.8	97.8	12.0	3.340	2.215	2.950	3.205	2.050	2.950	1802.5
Rainfall, (Total),	38	38	39	51	54	51	59	52	52	43	37	38	39	38	27	35	41	35	38	30	34	33	39	32	973
Hours of Rain (Total),	0.043	0.092	0.069	0.079	0.085	0.121	0.113	0.104	0.134	0.131	0.109	0.119	0.071	0.049	0.090	0.129	0.079	0.104	0.088	0.074	0.087	0.097	0.083	0.092	0.093
Intensity of Rain,	-0.9	-1.2	-1.4	-1.1	-1.2	-1.2	-1.1	-0.1	+0.9	+0.8	+2.2	+1.8	+2.0	+2.0	+1.7	+1.3	+0.5	-0.4	-1.1	-1.2	-0.8	-0.4	-0.6	-0.7	12.8
Wind-Velocity,	+5	+6	+7	+6	+7	+8	+6	+9	+6	+2	+4	+9	+13	+12	+9	+8	+8	+3	+1	+5	+5	+6	+4	+6	E 4° N
Wind-Direction,	+1	...	...	+3	...	...	+5	...	...	+2	...	...	0	...	...	0	...	...	-4	...	...	...	...	65	
Cloudiness, .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	125.3
Solar Radiation, .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	49.1
Excess of do., .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

∞

Table VI.

Number of Hours during portion of which it rained, for each Month in the Year 1892.

Month.	1 a.	2 a.	3 a.	4 a.	5 a.	6 a.	7 a.	8 a.	9 a.	10 a.	11 a.	Noon.	1 p.	2 p.	3 p.	4 p.	5 p.	6 p.	7 p.	8 p.	9 p.	10 p.	11 p.	Midt.	Total.
January,	2	...	...	1	2	1	1	1	1	1	1	1	2	1	1	1	2	1	1	...	1	1	1	...	21
February,	1	2	4	6	4	4	3	3	3	3	1	...	...	2	1	2	2	2	1	3	2	2	2	1	32
March,	8	6	7	9	11	7	11	5	5	4	3	4	3	3	3	3	4	3	6	3	4	6	4	6	64
April,	4	3	5	4	4	5	6	7	8	3	3	6	4	5	5	7	6	3	4	3	2	1	3	4	128
May,	7	9	6	8	9	9	7	8	8	7	9	9	6	7	7	8	9	10	6	7	6	7	8	6	105
June,	3	2	6	7	6	5	6	6	10	9	7	8	7	7	6	6	8	6	7	...	3	3	4	2	179
July,	6	6	4	6	3	3	10	11	8	6	6	5	8	9	4	3	2	4	6	7	7	4	6	2	180
August,	5	3	4	4	7	7	6	6	5	4	5	5	4	3	3	3	5	4	5	6	7	5	7	4	138
September,	1	1	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
October,	1	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	15
November, .....	...	2	2	3	2	3	4	2	3	3	2	2	1	...	...	1	2	1	...	1	2	3	...	...	47
December,	2	2	3	3	2	3	4	2	3	3	2	1	1	3	...	1	2	1	...	1	2	3	...	...	...
Total,	38	38	39	51	54	51	59	52	52	43	37	38	39	38	27	35	41	35	38	30	34	33	39	32	973

Table VII.

Number of days with wind from eight different points of the Compass during each month of the year 1892.

Month.	N.	NE.	E.	SE.	S.	SW.	W.	NW.
January,	5	6	18	...	...	...	1	1
February,	2	5	19	1	...	1	1	...
March,	3	5	18	1	3	...	...	1
April,	1	2	23	3	...	...	...	1
May,	2	2	18	2	3	3	1	...
June, .....	...	1	7	2	7	12	1	...
July,	1	1	17	6	3	1	2	...
August, .....	...	...	13	1	4	9	3	1
September,	5	4	12	1	...	1	3	4
October,	7	3	20	...	...	...	...	1
November,	4	5	19	...	...	1	1	...
December,	10	9	9	...	...	1	1	1
Sum,.....	40	48	193	17	20	29	14	10

Table VIII.

Total Number of Days on which different Meteorological Phenomena were noted and Total Number of Thunderstorms during each month of the year 1892.

Month.	Fog.	Electric Phenomena.	Lightning.	Thunder.	Thunderstorms.	Unusual Visibility.	Dew.	Rainbows.	Lunar Halo.	Lunar Corona.	Solar Halo.	Solar Corona.
January,	5	...	...	...	...	5	2	1	...	5	1	...
February,	12	...	...	...	...	8	5	...	...	6	...	...
March,	6	1	1	1	1	11	1	...	...	1	...	2
April,	11	8	6	8	3	5	2	1	...	6	1	2
May,.....	2	12	11	6	2	4	2	1	5	4	2	...
June,.....	...	16	16	6	3	1	...	4	2	9	4	...
July,.....	...	18	15	10	5	11	6	5	8	11	12	...
August,.....	...	20	19	11	3	16	5	3	2	9	5	...
September,	1	6	4	4	...	12	4	1	2	10	3	...
October, .....	...	...	...	...	...	4	1	...	2	4	3	3
November,	1	...	...	...	...	9	8	...	2	1	1	2
December,	7	...	...	...	...	7	6	...	...	4	...	1
Sums,.....	45	81	72	46	17	93	42	16	23	70	32	10

Table IX.

Total Number of Times that Clouds of different Forms were observed in each month of the year 1892.

Month.	c.	e-str.	e-cum.	sm-cum.	cum.	cum-str.	str.	R-cum.	cum-nim.	nim.
January,.....	...	2	5	68	64	...	10	12	22	8
February,	1	6	2	43	85	...	8	18	32	48
March, .....	...	3	4	27	88	...	15	52	42	38
April, .....	...	9	12	66	86	...	3	17	28	49
May,	4	30	9	49	127	1	8	24	20	50
June,	6	48	41	23	159	...	1	5	21	49
July,	5	89	65	26	174	2	8	2	23	31
August,	7	52	51	34	142	4	5	4	19	44
September,.....	...	34	26	78	99	...	10	18	20	35
October,.....	...	19	18	70	119	...	1	1	2	4
November, .....	...	25	10	69	87	...	5	27	7	13
December, .....	...	3	5	63	35	...	7	9	7	23
Sums,.....	23	320	248	616	1265	7	81	189	243	392

Table X.

Month.	Baro- metric Tide.	Mean Diurnal Variabi- lity of Temper- ature.	Weight of water vapour in troy grains in ea. cubic ft. of air.	RAINFALL.		Hourly Intensity of Rain.	MEAN DIRECTION OF CLOUDS WHENCE COMING.			NUMBER OF DAYS WITH CLOUDS BELOW.	
				Mean.	1892.		Lower.	Upper.	Cirrus.	2,000 ft.	1,000 ft.
	<i>ins.</i>	°		<i>ins.</i>	<i>ins.</i>	<i>ins.</i>					
January,	0.118	1.96	4.14	0.98	0.520	0.021	E 7° N	W 30° S	...	5	2
February,	0.108	3.86	5.16	1.32	1.250	0.009	E 17° S	W 1° S	W	22	13
March,	0.110	3.99	5.00	3.24	3.900	0.038	E 11° S	W 16° S	...	24	6
April,.....	0.092	2.07	6.74	5.27	11.595	0.083	E 33° S	W 8° S	...	23	12
May,	0.084	2.12	7.91	12.54	8.575	0.075	S 37° E	W 5° N	N 4° E	22	7
June,	0.073	1.21	9.14	15.81	34.375	0.240	S 15° W	N 11° W	N 23° W	19	4
July,	0.068	0.97	9.63	15.98	10.785	0.169	S 20° E	N 8° W	N 39° W	22	2
August,.....	0.075	1.07	9.04	14.35	12.090	0.153	S 2° E	E 17° N	E 36° N	10	1
September,	0.078	2.13	8.01	12.65	7.005	0.079	E 8° N	E 38° N	...	10	1
October,.....	0.100	1.15	5.82	5.36	0.020	0.005	E 23° N	N 19° W	...	...	...
November,.....	0.108	1.89	5.87	1.17	0.340	0.008	E 6° N	S 22° W	...	10	...
December,.....	0.110	1.77	3.35	1.00	0.515	0.009	E 11° N	W 36° S	...	2	2
Mean,.....	0.094	2.02	6.65	90.17	90.970	0.074	E 27° S	W 32° N	N 19° W	169	50

Table XI.

Monthly Extremes of the Principal Meteorological Elements registered during the year 1892.

MONTH.	BAROMETER.		TEMPERATURE.		HUMI- DITY.	VAPOUR TENSION.		RAIN.		WIND VELOCITY.	RADIA- TION.
	Max.	Min.	Max.	Min.	Min.	Max.	Min.	Daily Max.	Hourly Max.	Max.	Sun Max.
January,.....	30.367	29.845	75.6	46.5	31	0.617	0.169	0.350	0.155	46	137.2
February,	30.222	29.568	78.8	48.9	42	0.726	0.230	0.430	0.420	42	139.1
March,	30.143	29.552	80.3	46.3	44	0.779	0.244	1.800	0.320	46	136.1
April,.....	30.098	29.642	84.1	57.0	20	0.891	0.182	3.995	1.800	36	146.5
May,	30.015	29.571	87.9	64.1	35	0.999	0.344	3.615	2.085	38	152.0
June,	29.817	29.531	90.2	70.0	60	1.001	0.680	10.845	2.150	39	154.9
July,.....	29.830	29.304	90.0	74.2	66	1.045	0.778	2.020	0.705	33	159.6
August,	29.834	29.523	91.1	73.7	53	0.968	0.716	1.305	0.805	35	152.8
September,.....	29.903	29.317	93.9	65.6	37	0.985	0.381	1.690	1.145	32	150.7
October,	30.084	29.528	87.6	64.0	22	0.819	0.177	0.015	0.005	31	146.0
November,.....	30.227	29.595	83.0	52.1	32	0.762	0.192	0.220	0.110	35	143.3
December,	30.328	29.918	73.2	44.2	18	0.549	0.069	0.180	0.040	32	130.2
Year,.....	30.367	29.304	93.9	44.2	18	1.045	0.069	10.845	2.150	46	159.6

Table XII.

Five-Day Means of the Principal Meteorological Elements observed at Hongkong in 1892.

FIVE-DAY PERIODS.	Barometer.	Temperature.	Humidity.	Vapour Tension.	Wind Velocity.	Nebulosity.	Sunshine.	Rain.
January 1- 5	30.137	60.6	75	0.397	9.0	8.9	2.7	0.005
" 6-10	.122	56.2	59	.271	10.1	3.1	7.2	0.000
" 11-15	29.975	59.1	64	.326	13.6	1.5	9.4	0.000
" 16-20	30.075	57.9	72	.348	11.8	6.7	4.2	0.000
" 21-25	.184	59.8	68	.356	13.7	4.7	5.5	0.000
" 26-30	.001	63.0	90	.521	15.6	8.1	1.3	0.099
" 31- 4	29.967	65.6	79	.499	10.3	2.9	8.1	0.001
February 5- 9	30.063	57.2	74	.348	18.3	9.5	1.7	0.031
" 10-14	29.935	64.3	86	.521	10.9	6.5	5.6	0.000
" 15-19	30.021	56.5	82	.378	15.2	9.8	0.0	0.024
" 20-24	29.731	65.3	94	.587	17.1	9.6	1.0	0.121
" 25- 1	.805	60.6	91	.483	22.8	9.5	0.5	0.061
March 2- 6	.715	68.1	83	.584	11.1	9.1	2.9	0.094
" 7-11	.917	59.3	82	.415	21.9	9.9	0.0	0.007
" 12-16	.946	55.8	80	.367	11.9	9.8	0.2	0.000
" 17-21	.959	59.0	79	.401	16.1	9.2	1.7	0.003
" 22-26	.888	64.7	86	.526	18.7	3.2	4.6	0.020
" 27-31	.971	60.1	85	.441	22.2	9.6	0.9	0.656
April 1- 5	30.006	66.5	54	.544	11.2	6.4	4.6	0.015
" 6-10	29.846	69.8	85	.622	14.8	7.5	3.3	0.252
" 11-15	.847	66.9	82	.547	14.8	8.9	1.7	0.127
" 16-20	.799	69.9	87	.644	17.9	9.2	1.1	0.488
" 21-25	.743	74.1	95	.803	13.3	7.5	4.4	1.424
" 26-30	.827	74.5	90	.775	17.3	7.7	4.1	0.013
May 1- 5	.870	72.8	80	.650	10.5	6.2	5.4	0.291
" 6-10	.750	75.5	88	.776	12.8	8.3	2.9	0.767
" 11-15	.784	72.6	77	.614	18.3	8.9	2.8	0.000
" 16-20	29.778	72.0	81	.632	17.0	7.8	3.5	0.056
" 21-25	.671	77.3	88	.825	12.5	9.0	2.2	0.560
" 26-30	.689	81.2	85	.900	11.7	8.2	4.4	0.041
" 31- 4	.707	83.5	77	.893	10.2	5.6	9.8	0.045
June 5- 9	.618	77.6	84	.795	16.5	8.0	5.2	0.973
" 10-14	.599	82.1	77	.851	10.7	6.5	8.4	0.032
" 15-19	.600	78.2	92	.882	13.2	9.8	0.8	4.739
" 20-24	.685	82.2	81	.887	12.4	8.1	5.0	0.111
" 25-29	.704	81.1	84	.885	11.5	7.0	5.9	0.563
" 30- 4	.718	80.5	86	.893	14.6	8.5	0.8	0.699
July 5- 9	.754	82.0	83	.908	5.1	6.3	7.3	0.000
" 10-14	.703	81.4	83	.891	5.8	7.4	5.1	0.470
" 15-19	.619	82.0	83	.906	12.0	7.2	6.6	0.323
" 20-24	.417	81.6	84	.905	12.6	7.8	4.6	0.343
" 25-29	.588	79.7	91	.921	6.4	7.8	1.5	0.727
" 30- 3	.655	81.6	84	.902	7.3	5.6	6.4	0.470
August 4- 8	.749	83.4	76	.874	9.4	3.4	10.7	0.177
" 9-13	.740	81.9	78	.851	4.9	4.0	9.2	0.233
" 14-18	.686	82.3	79	.877	9.1	4.3	9.0	0.042
" 19-23	.711	78.5	86	.835	10.8	7.3	5.0	0.404
" 24-28	.727	78.5	88	.855	8.5	7.6	3.2	0.582
" 29- 2	.620	77.7	90	.857	10.9	8.7	1.5	0.824
September 3- 7	.504	81.1	72	.758	7.0	5.5	8.2	0.123
" 8-12	.515	78.9	78	.769	7.8	4.8	6.9	0.083
" 13-17	.705	81.5	68	.725	14.4	3.5	9.7	0.022
" 18-22	.691	76.9	83	.775	12.8	9.6	1.0	0.848
" 23-27	.774	77.1	76	.712	6.1	6.4	4.8	0.000
" 28- 2	.842	75.6	73	.659	14.2	6.7	4.3	0.018
October 3- 7	.846	77.3	71	.666	16.3	4.7	8.4	0.000
" 8-12	.728	77.5	50	.474	11.9	3.2	9.9	0.000
" 13-17	.930	75.3	70	.616	17.1	2.4	9.8	0.000
" 18-22	.980	73.4	70	.579	14.7	4.3	8.5	0.004
" 23-27	.954	71.3	63	.487	14.6	2.5	8.7	0.000
" 28- 1	.896	71.4	54	.412	12.4	0.5	9.7	0.000
November 2- 6	.903	71.0	72	.550	16.9	1.7	9.4	0.000
" 7-11	.906	72.8	85	.689	17.4	7.9	1.7	0.009
" 12-16	.990	70.1	78	.578	13.7	8.1	2.7	0.059
" 17-21	.895	72.4	77	.614	16.5	6.4	5.3	0.000
" 22-26	.894	69.1	69	.511	9.7	4.5	5.8	0.000
" 27- 1	30.155	60.5	51	.270	9.1	3.6	8.2	0.000
December 2- 6	.131	63.2	67	.389	12.0	9.2	1.3	0.009
" 7-11	.029	61.1	78	.419	8.8	9.9	0.2	0.074
" 12-16	.224	52.8	43	.175	11.3	4.3	6.5	0.020
" 17-21	.178	53.9	36	.152	13.0	0.7	8.4	0.000
" 22-26	.026	60.3	67	.354	9.2	0.7	8.9	0.000
" 27-31	.040	61.1	61	.330	10.5	1.4	8.5	0.000

Table XIII.

Observations of Magnetic Declination and Dip.

1892.	H.K.M.T.	Declination East.	Observer.	H.K.M.T.	Dip North.	Needle.	Observer.
January,	14 ^a 2 ^h 49 ^m p.	0° 36' 6"	J.I.P.	15 ^a 3 ^h 33 ^m p.	32° 6'.37	3	J.I.P.
February,	17 2 56 p.	35 3	"	15 3 " 39 p.	6.45	4	"
March,	17 3 3 p.	32 39	"	15 3 " 50 p.	8.55	3	"
April,	15 2 33 p.	35 11	"	15 3 " 50 p.	6.99	4	"
				12 3 " 40 p.	4.77	3	"
				16 3 " 38 p.	3.10	4	"
May,	17 2 55 p.	31 39	"	13 3 " 40 p.	1.27	3	"
	17 3 55 p.	32 43	"	16 3 " 38 p.	4.17	4	"
June,	17 3 3 p.	33 1	"	13 3 " 40 p.	32 1.38	1	"
				14 3 " 51 p.	31 58.38	2	"
July,	16 2 58 p.	30 52	"	14 3 " 54 p.	0.92	3	"
August,	16 2 44 p.	33 34	F.G.F.	13 3 " 40 p.	3.86	4	"
September,	13 2 47 p.	32 45	"	14 3 " 51 p.	1.27	3	"
				14 3 " 54 p.	0.03	4	"
October,	14 2 42 p.	32 40	"	15 3 " 46 p.	5.51	3	"
November,	16 2 53 p.	34 25	J.I.P.	14 3 " 51 p.	4.73	4	"
December,	16 2 48 p.	34 15	"	15 3 " 46 p.	4.76	3	F.G.F.
				14 3 " 33 p.	7.13	4	"
				16 3 " 35 p.	2.50	3	"
				17 4 " 15 p.	2.44	4	"
				14 3 " 51 p.	4.60	1	"
				14 3 " 49 p.	0.96	2	"
					32 3.05	3	"
					31 5.96	4	"
					32 59.38	3	J.I.P.
					32 1.45	4	"
					31 59.67	3	"
					32 2.49	4	"

Table XIV.

Observations of Horizontal Magnetic Force.

DATE. 1892.	H.K.M.T.	Time of one Vibration.	Temperature Cent.	Log m X.	Value of m.	H.K.M.T.	Distance in Centimeters.	Temperature Cent.	Deflection.	Log $\frac{m}{X}$.	Value of X.	Observer.
January 13,...	2 ^h 35 ^m p.	3 ^a .5837	16° .85	2.34152	605.22	3 ^h 28 ^m p.	30	17° .5	7° 6' 42".5	3.22230	0.36275	J.I.P.
February 16,...	2 42 p.	3 .5842	14 .9	2.34099	604.37	3 47 p.	40	15 .4	2 59 24	3.22162	0.36281	"
March 16,...	2 51 p.	3 .5852	15 .8	2.34080	602.93	3 50 p.	40	16 .9	2 59 4	3.21974	0.36352	"
March 18,...	4 28 p.	3 .5920	23 .1	2.34034	602.87	3 57 p.	40	23 .5	2 57 42 .5	3.22011	0.36317	"
April 13,...	2 44 p.	3 .5937	20 .2	2.33944	601.64	3 35 p.	40	21 .0	7 437 .5	3.21924	0.36316	"
May 16,...	2 52 p.	3 .5965	23 .4	2.33916	600.69	3 42 p.	40	23 .55	2 57 35	3.21813	0.36351	"
June 15,...	2 48 p.	3 .6024	29 .6	2.33902	599.97	3 39 p.	40	29 .15	7 3 12 .5	3.21723	0.36383	"
July 15,...	2 56 p.	3 .6065	30 .4	2.33819	599.65	3 41 p.	40	30 .4	2 57 7 .5	3.21762	0.36331	"
August 16,...	3 19 p.	3 .6078	33 .15	2.33897	600.21	3 56 p.	40	31 .8	2 56 5	3.21764	0.36363	F.G.F.
September 13,...	3 24 p.	3 .6054	30 .5	2.33906	600.15	3 56 p.	40	29 .85	7 0 1	3.21746	0.36375	"
October 14,...	3 17 p.	3 .6048	28 .4	2.33864	600.30	3 52 p.	40	27 .2	2 56 11	3.21809	0.36331	"
November 15,...	2 50 p.	3 .6062	26 .8	2.33796	598.27	3 41 p.	40	26 .0	7 1 44	3.21585	0.36397	J.I.P.
December 15,...	2 50 p.	3 .5965	18 .0	2.33869	597.82	3 51 p.	40	16 .6	6 59 27 .5	3.21445	0.36485	"
							40		[2 54 9]			
							40		7 1 19			
							40		2 55 21			

Table XV.

Results of Magnetic Observations in 1892.

MONTH.	Declination East.	Dip North.	MAGNETIC FORCE.									
			ENGLISH UNITS.			METRIC UNITS.			C. G. S. UNITS.			
			X.	Y.	Total.	X.	Y.	Total.	X.	Y.	Total.	
1892.												
January,	0° 36' 6"	32° 6' 25"	7.8674	4.9366	9.2880	3.6275	2.2762	4.2825	0.36275	0.22762	0.42825	
February,	35 3	7 46	7.8677	4.9417	9.2918	3.6281	2.2785	4.2843	0.36281	0.22785	0.42843	
March,	32 39	3 56	7.8803	4.9367	9.2991	3.6335	2.2763	4.2877	0.36335	0.22763	0.42877	
April,	35 11	1 18	7.8762	4.9258	9.2896	3.6316	2.2712	4.2833	0.36316	0.22712	0.42833	
May,	32 11	2 23	7.8839	4.9340	9.3006	3.6351	2.2750	4.2883	0.36351	0.22750	0.42883	
June,	33 1	0 39	7.8908	4.9328	9.3058	3.6383	2.2744	4.2907	0.36383	0.22744	0.42907	
July,	30 52	5 7	7.8795	4.9400	9.3000	3.6331	2.2778	4.2880	0.36331	0.22778	0.42880	
August,	33 34	5 57	7.8864	4.9470	9.3096	3.6363	2.2810	4.2925	0.36363	0.22810	0.42925	
September,	32 45	2 37	7.8890	4.9379	9.3070	3.6375	2.2768	4.2913	0.36375	0.22768	0.42913	
October,	32 40	4 30	7.8795	4.9380	9.2990	3.6331	2.2768	4.2877	0.36331	0.22768	0.42877	
November,	34 25	0 25	7.8937	4.9338	9.3087	3.6397	2.2749	4.2921	0.36397	0.22749	0.42921	
December,	34 15	1 5	7.9130	4.9480	9.3328	3.6485	2.2814	4.3032	0.36485	0.22814	0.43032	
Mean,	0 33 33	32 3 31	7.88395	4.9377	9.3027	3.6352	2.2767	4.2893	0.36352	0.22767	0.42893	

Appendix A.

INFORMATION ISSUED IN 1892, CONCERNING TYPHOONS.

June 7th.—The following notice was issued at 1 p. on the 6th:—"6.10 a. strong NE wind expected in northern part of China Sea." Barometer falling. Gradients moderate for E winds. Weather: cool and wet. (Issued at 10.48 a.)

June 26th.—At 4 p. on the 25th, the following notice was issued: "typhoon E of Luzon," and at 10 a. on the 26th, "small depression SW of Luzon."—Barometer rising. Gradients slight for NE winds. Weather: clear, warm and dry.

July 17th.—Barometer rising at Amoy, falling at Bolinao. Gradients moderate for E winds. Weather: hot and cloudy. (Issued at 10.33 a.)

July 18th.—At 2.15 p. on the 17th, the following notice was issued: "typhoon in China Sea West of Luzon," and directions to hoist the *Red South Cone*. Barometer steady. Gradients moderate for NE winds. Weather: warm and fine. (Issued at 10.45 a.)

July 19th.—At 10.0 a. directions were given to hoist the *Black South Cone*, and at 10.20 a. the following notice was issued: "typhoon South of Hongkong moving Northwestward in the direction of Hainan. Weather: wet and squally. (Issued at 10.25 a.)

July 20th.—At 7.10 p. directions were issued to hoist *two lanterns vertically*. "The typhoon appears to have recurved and to be now rather near to and SE of Hongkong. Bad weather but no great storm is expected in the neighbourhood." (Issued at 11.20 a.)

July 21st.—At 4.20 a. directions were issued to take down the *Black South Cone*, at 9.30 a. to hoist the *Black North Cone* and the following notice: "it is blowing hard in the Formosa Channel." The centre of the typhoon appears to be situated in the southern part of the Channel moving northwards. (Issued at 10.36 a.)

July 22nd.—At 8.45 p. the *Red North Cone* was hoisted. "The typhoon appears to be situated near the North Coast of Formosa." Barometer rising slowly. Gradients moderate for W winds. Weather: hot and rather dry. (Issued at 11 a.)

July 23rd.—At 2.50 p. on the 22nd directions were given to take down the *Red North Cone*. Barometer rising slowly. Gradients very moderate for SE winds. Weather: cloudy, hot and rather dry. (Issued at 10.42 a.)

July 25th.—At 10.30 a. on the 24th, the following notice was issued: "typhoon South of Hongkong," and directions given to hoist the *Red South Cone*, and at 4.15 p. on the 24th, the following notice was issued: "the typhoon appears to be moving towards WNW." Barometer falling. Weather: wet and unsettled. (Issued at 10.58 a.)

July 26th.—At noon on the 25th, directions were given to take down the *Red South Cone*. Barometer rising except in Haiphong. Gradients moderate for SE winds. Weather: warm and showery. (Issued at 10.27 a.)

July 27th.—At 4 p. on the 26th, the following notice was issued: "the typhoon is raging in the Gulf of Tongking." Last night the centre crossed Haiphong without causing any damage. Barometer rising. Gradients moderate for SE winds. Weather: warm, cloudy and damp. (Issued at 10.21 a.)

July 30th.—At 4 p., the following notice was issued: "there appears to be a typhoon in the Pacific NE of Bolinao. Severe earthquake in Hoihow yesterday morning." Barometer steady. Gradients slight. Weather: cloudy, warm and showery. (Issued at 10.27 a.)

August 2nd.—At 10.30 a. on the 1st, the following notice was issued: "there is a depression in the China Sea SE of Hongkong," and at 10.20 a. on the 2nd: "the depression is moving Northwards." Barometer rising. Strong SW wind. Weather: squally and wet. (Issued at 11.8 a.)

August 3rd.—At 4.15 p., the following notice was issued: "the depression has entered the mainland." Barometer rising. Gradients moderate for SW winds. Weather: warm and cloudy. (Issued at 10.30 a.)

August 13th.—At 5.10 p., the following notice was issued: "typhoon NE of Formosa moving NEastward." Barometer rising. Gradients slight for SE winds. Weather: cloudy, warm and damp. (Issued at 10.32 a.)

August 16th.—"Typhoon in the Pacific East of Formosa." Barometer falling. Gradients slight for SW winds. Weather: clear, hot and rather dry. (Issued at 10.25 a.)

August 17th.—"The typhoon has entered the mainland between Amoy and Foochow." Barometer ceasing to fall. Gradients moderate for SW winds. Weather: fine and dry. (Issued at 11.35 a.)

August 18th.—At 4.11 p. on the 17th, the following notice was issued: "the typhoon appears to be moving North-Westward." Barometer rising. Gradients moderate for SW winds. Weather: warm and showery, possibly thunderstorms. (Issued at 10.27 a.)

August 21st.—At 1 p. on the 20th, the following notice was issued: "there appears to be a depression NE of Cape S. James moving Westward." Barometer rising. Gradients moderate for E winds. Weather: cloudy, rather cool, perhaps showery. (Issued at 10.51 a.)

August 24th.—Barometer falling at Bolinao probably owing to another depression. Gradients very moderate for NE winds. Weather: warm and showery. (Issued at 10.37 a.)

August 31st.—At 4 p. on the 30th, the following telegram was issued: "depression West of Bolinao." At 10.45 a. on the 31st, orders were given to hoist the *Black South Cone*, and the following notice was issued: "the typhoon appears to be moving Westward." Barometer falling. Weather: wet and squally. (Issued at 10.45 a.)

September 1st.—At 5.15 a., orders were given to take down the *Black South Cone* and hoist the *Black Ball*. At 10.45 a., orders were given to take down *Black Ball* and hoist *Red Ball*, and the following notice was issued: "the typhoon appears to have approached the Gulf of Tongking." Barometer steady. Gradients moderate for SE winds. Weather: rather cool and wet. (Issued at 10.49 a.)

September 2nd.—At 10.25 a., orders were given to take down the *Red Ball*. Barometer almost steady here, but falling at Haiphong and Amoy. Gradients moderate for S winds. Weather: warm and showery. (Issued at 10.28 a.)

September 5th.—"There is a depression in the China Sea." Barometer falling at all stations. Weather: hot and dry. (Issued at 11.13 a.)

September 6th.—At 10 a. directions to hoist the *Red Drum*. "There is a typhoon near southern Formosa." Strong N winds in the northern part of the China Sea. Weather: fine. (Issued at 10.50 a.)

September 7th.—At 10.30 a. directions to hoist the *Black Drum*, and the following notice: "typhoon approaching Swatow." Falling barometer. Moderate NW wind. Fine and very dry weather. (Issued at 11.58 a.)

September 8th.—At 6 p. on the 7th, notice was issued: "it is blowing hard between Swatow and Foochow," at 6.15 p. directions to hoist the *Black North Cone*, at 12.20 a. on the 8th to hoist *two lanterns horizontally*, at 10.50 a. to hoist the *Black Drum* in place of the *Cone*.—Falling barometer, increasing NW wind and rain. (Issued at 10.57 a.)

September 9th.—At 4 p. on the 8th, the following notice was issued: "centre of typhoon about 100 miles E of Hongkong, nearly stationary," at 6 p., "the centre of the typhoon is South of Hongkong moving Westward," and directions to hoist *Black South Cone*.—Barometer rising. Moderate E winds. Weather: cloudy and squally. (Issued at 10.32 a.)

September 10th.—At 10.15 a., orders were given to take down the *Black South Cone*. Barometer rising. Gradients slight for SE winds. Weather: cloudy and dry. (Issued at 11.55 a.)

September 17th.—At 5.8 p. on the 16th, the following notice was issued: "typhoon near southern Formosa," and at 9.30 a. on the 17th, directions to hoist the *Black Drum*, and at 10.20 a. the following notice: "typhoon approaching SE coast." Barometer falling. Strong N wind probable. Weather: cloudy, hot and dry. (Issued at 10.24 a.)

September 19th.—At 4 p. on the 17th the notice: "bad weather in the Formosa Channel," at 7 p. directions to hoist *two lanterns horizontally*, at 10.50 a. on the 18th the notice: "typhoon now approaching coast between Amoy and Swatow," at 4 p. the notice: "typhoon near Swatow approaching coast between Hongkong and Swatow," at 6.20 p. to hoist *two lanterns horizontally*, and, at 5.15 a. on the 19th to take down the *lanterns* and the *Drum*. Barometer rising. Gradients moderate for SE winds. Weather: cool, gloomy and slight rain. (Issued at 10.45 a.)

September 22nd.—There is a depression in the China Sea SE of Hongkong. Barometer falling. Gradients moderate for N winds. Weather: cloudy, cool and rather dry. (Issued at 10.35 a.)

September 27th.—At 4.53 p. on the 26th, the following notice was issued: "depression between Shanghai and Formosa." Barometer rising. Gradients very gentle. Weather: clear, hot and dry. (Issued at 10.24 a.)

October 10th.—At 10.24 a. on the 9th, the following notice was issued: "typhoon East of Bolinao," and at 4 p.: "in the China Sea strong NNW gale," and at 10.30 a. on the 10th, "typhoon near Bashee Channel moving NW-ward at present," and directions to hoist the *Red Drum*. Barometer falling. Fresh to strong NW wind. Weather: cloudy, hot and very dry. (Issued at 10.50 a.)

October 11th.—At 4 p. on the 10th, the following notice was issued: "typhoon approaching coast near Amoy," and at 9 p. directions to take down the *Drum*. Barometer rising. Moderate NW winds. Weather: cloudy, warm and very dry. (Issued at 10.37 a.)

October 12th.—The following notice was issued at 4 p. on the 11th: "the typhoon has recurved and is now NE of Formosa." Barometer rising. Gradients very moderate for N winds. Weather: clear, warm and very dry. (Issued at 10.25 a.)

October 28th.—"Typhoon East of Bolinao." Barometer rising in southern China, falling at Bolinao. Gradients rather steep for N winds. Weather: clear, warm and dry. (Issued at 10.45 a.)

October 29th.—The following notice was issued at 8 a. on the 29th: "typhoon raging in northern Luzon, apparently moving NWestward at present. Strong N gales in China Sea," and directions to hoist the *Red Drum*.

October 31st.—At 10.40 a. on the 30th, the following notice was issued: "typhoon appears to have recurved near northern Luzon and to have moved NEward" and orders were given to take down the *Red Drum*. Barometer rising slightly. Gradients moderate for N winds. Weather: clear, warm and very dry. (Issued at 10.57 a.)

November 14th.—At 10.45 a. on the 13th, the following notice was issued: "there appears to be a depression in the China Sea East of Annam, moving Westward." Barometer almost steady. Gradients moderate for NE winds. Weather: overcast and cool with light rain. (Issued at 10.51 a.)

November 20th.—Barometer steady in southern China, falling at Bolinao. Gradients rather steep for NE winds. Weather: cloudy, warm and rather dry. (Issued at 11.10 a.)

November 21st.—At 10.10 a. the following notice was issued: "typhoon East of Bolinao." Barometer falling. Gradients rather steep for N winds. Weather: cloudy, warm and rather dry. (Issued at 10.57 a.)

November 22nd.—At 10.40 a. the following notice was issued: "the typhoon appears to be East of Bashee Channel, moving Northwards at present." Barometer falling. Moderate NW winds. Weather: clear, warm and rather dry. (Issued at 10.55 a.)

November 23rd.—At 4 p. on the 22nd, the following notice was issued: "typhoon in southern Formosa," and orders given to hoist the *Red Drum*. At 10.40 a. orders given to take down the *Red Drum* and the following notice issued: "typhoon has recurved and is moving NEward." Barometer rising. Light W winds. Weather: hot and settled fine. (Issued at 10.46 a.)

December 1st.—At 10.45 a. the following notice was issued: "Strong NE gales in China Sea." Barometer steady. Gradients rather steep for NE winds. Weather: clear, cool and dry. (Issued at 10.45 a.)

December 3rd.—The following notice was issued at 10.30 a. "NE gales continue in the China Sea." Barometer almost steady. Gradients steep for NE winds. Weather: overcast, cold and damp. (Issued at 10.30 a.)

Appendix B.

THE TYPHOONS IN 1892.

By W. Doberck and F. G. Figg.

It appears that typhoons in the China Sea originate in elongated slight depressions, which sometimes but rarely lie across the Philippines as well as the China Sea, but usually exist only over the sea. To the north of them it blows moderate NE breezes and south of them somewhat less strongly from the SW. The NE breezes reach generally only as far as northern Formosa in summer, but in autumn the NE (and farther north the NW) monsoon blows much farther north. Sometimes the SW breezes to the south of the axis of the depression are stronger than the NE breezes to the north of it, and extend apparently down to the equator and are probably a continuation of the SE trade. To the E of these depressions in the Philippines there are light S and SE breezes. In Annam it probably blows from the N. In summer these depressions begin with rising pressure in the interior of China. In autumn it seems the pressure rises slightly near the equator and SW winds extend gradually northward over the China Sea. In January and February depressions do not occur. During the rest of the year they occur about once a month on an average. During the summer months and in autumn they usually give rise to a typhoon or a small circular depression. The troughlike depression then ceases to exist. In spring they do not alter into typhoons but cease to exist owing to the NE monsoon filling them and spreading to the southward.

The depressions have their major axes lying E and W, or ENE and WSW. Their average latitude from June to September is 16° N, later more southerly, and in November perhaps 10° N. They do not appear to move at all, and they may be traced for 3 or 4 days. The barometer is read little more than a tenth of an inch lower in the axis than along the coasts all round them. Along these coasts light winds circulate against the hands of a watch. In such depressions the weather is squally and wet, and the wind variable,—frequently in heavy squalls with great downpour of rain, but thunder is seldom heard. It appears that in such squalls S wind happens to extend itself northwards and N wind southwards, and revolving storms are thereby generated. If this occurs in the middle of the China Sea, it is likely to give rise to a typhoon. Of course, it more often happens that a circular storm originates near the E and W corner of the elongated depression as the winds there already revolve as in a rotary storm except to the W or E of the centre forming, so that the N or respectively S squalls need only gain ground on one side, but in such cases only minor circular depressions or very small typhoons are originated.

The heavy rain is, of course, not the cause of the phenomena, for the rain itself is caused by the air rising in the axis of these depressions, also the water vapour condensing gives out heat and thus in the first instance makes the mercury rise in the barometer before a squall, but there cannot be any doubt that the quantity of water-vapour condensed to form perhaps 10 inches of rain per day, and whose pressure is thus abstracted from the barometric pressure of the air, causes the permanency of the depressions. It is different with the rainfall in the SW monsoon. That is spread over a large area and does not give rise to a low pressure in one spot surrounded by higher pressures.

It is rather difficult to say whether a depression in the China Sea, when its existence has been ascertained, is a typhoon or only a minor disturbance, but if the indications explained in the "Law of Storms in the Eastern Seas" (Hongkong 1886) are observed exactly as laid down in the pamphlet, then it is certain to be a typhoon. A minor depression gives signs less well marked and more confused.

When the wind rises in a typhoon it blows in gusts and the mercury heaves in the barometer. When the wind has reached force 11 it blows in fierce squalls of sometimes from 10 to 15 minutes duration, while the mercury heaves up and down as much as a tenth of an inch. The mercury often gives a jump upwards as the wind begins to veer in a squall. Then it drops down and gives another jump upward as the wind comes back to nearly its old direction. During these squalls an enormous quantity of rain falls in a few minutes. The temperature falls and rises a fraction of a degree a more. The wind does not return to quite the former direction, except just in front of the centre. At the time when the centre is nearest, a fierce squall is usually felt and in that squall the direction of the wind changes considerably and the barometer begins to rise. The squalls appear to be caused by an up-and-down movement of the air. As the air comes rushing down, the raindrops tend to evaporate in the hotter stratum near the earth's surface and owing to the increased tension of water-vapour, the barometer (after a fall caused by the cold of evaporation) begins to rise. The wind veers towards the direction of the wind above, which latter is known from the motion of the clouds. Then the air starts to rise with a deluge of rain, caused by the condensation of vapour arriving at the cooler stratum above, while the barometer (after a rise caused by the heat of liquefaction) drops down owing to the cessation of the pressure of water-vapour condensed into the rain fallen, and the wind resumes the direction determined by the central depression; for the latter is so great in a typhoon and gradients so steep near the centre, that subsidiary depressions have never occurred in the China Sea.

Within 75 miles of the centre of a typhoon, or within 50 miles in case of a small typhoon, the angle between the direction towards which the wind is blowing and the direction in which the centre is

situated is 50° in the northern part of the China Sea and in the southern part of the sea it is 40° . The centre bears 12 points from the wind. North of Formosa it bears 10 points from the wind. Near the centre the wind does not blow in a circle round the centre as is sometimes stated concerning hurricanes elsewhere.

About on an average 150 miles from the centre the incurvature in front and in the dangerous semi-circle is 3 points, *i.e.* the centre bears 11 points from the wind. In the manageable semi-circle it is 4 points, *i.e.* the centre bears 12 points from the wind. In rear it is 5 points, *i.e.* the centre bears 13 points from the wind. It will be remarked that the wind blows across the path in front and helps a vessel to run across the path in front of the centre keeping the wind on the starboard quarter 3 points from the stern. In rear the wind blows more straight in towards the centre.

At places farther from the centre the wind's incurvature towards the centre is greater *e.g.* at a distance of 200 miles the centre bears on an average 13 points from the wind. At distances above 300 miles the centre bears about 15 points from the wind. On the weather maps the light winds at a distance from the centre appear to blow almost straight towards the typhoon. It is only when the wind-velocity increases that the rotation of the earth and subsequently centrifugal force cause the air particles to deviate from the straight line from high to low pressure.

The prevailing wind carries the centre along with it and combines with the rotary storm causing the wind in the right-hand (the dangerous) semi-circle to be stronger and to blow more nearly round the centre, than in the left (the manageable) semi-circle, where the wind is more moderate and has greater incurvature.

In the daily tables of observations made at noon at the stations the first column shows the readings of the barometer (corrected and reduced to sea level), the second column shows their change since noon on the previous day (+ means a rise, - a fall). The third and fourth columns show direction and force of wind, and the fifth the weather. In the observations made at noon and taken from ship logs the first column is the latitude, the second the longitude, the third the barometer reading (with all corrections applied as accurately as possible in each case), the fourth and fifth wind direction and force, and the sixth weather. The bearing of the ship and its distance in miles is sometimes given after the second column, and for the stations the same is sometimes given before the first column.

Plates I, II and III exhibit the paths of the typhoons in 1892 except the typhoon in the beginning of November in the Gulf of Siam. There were 21 in all. The positions of the centres are given at noon (local time) for the date marked. Where the curves are dotted, they are only approximately correct.

Plate IV exhibits six figures. Figure 1 shows a typhoon from July 20th at noon to the 22nd at noon inclusive. The isobars for 29.20, 29.30, 29.40, and 29.50 are drawn. The wind-directions are shown by aid of continuous curves. The forces are shown in figures, and the direction of the motion of the centre is shown by a barbed arrow. Figure 2 shows a typhoon from August 16th at 9 p. to the 17th at 9 p. inclusive. The isobars for 29.30, 29.40, and 29.50 are drawn. Figure 3 shows a typhoon from September 6th at noon to the 8th at 6 a. inclusive. The isobars for 29.00, 29.10, 29.20, 29.30, and 29.40 are drawn. The motion of the centre is shown by a barbed arrow. The arrows in the lower part of the figure shows the directions of divergent winds. Figure 4 shows a typhoon from October 10th at 9 a. to the 11th at noon inclusive. There are no isobars in this figure. Figure 5 is a weather-map for noon of the 17th August. The isobars for 29.30, 29.40, 29.50, and 29.60 are drawn. The wind-directions and forces observed on shore and on board ship are shown. The arrows fly with the wind. Figure 6 is a weather-map for noon on the 18th September. The isobars for 29.30, 29.40, 29.50, and 29.60 are drawn. The wind is shown the same as above. The top of the plate is N and the bottom is S. A scale of 100 miles is shown in figure 4. That applies to all the figures on plate IV.

LIST OF OBSERVING STATIONS.

Station.	Latitude North.	Longitude East.	Station.	Latitude North.	Longitude East.	Station.	Latitude North.	Longitude East.
Newchwang,	40° 35'	122° 00'	Steep Island,	30° 12'	122° 36'	Lamoeks,	23° 15'	117° 18'
Yuensan,	39 09	127 33	Ningpo,	29 58	121 44	Canton,	23 07	113 17
Taku,	38 55	117 51	Kiukiang,	29 43	116 07	Anping,	22 59	120 13
Howki,	38 04	120 39	Wenchow,	28 00	120 35	Breaker Point,	22 56	116 28
Chefoo,	37 34	121 32	Foochow,	26 08	119 38	Takow,	22 36	120 16
Chemulpo,	37 29	126 37	Middle Dog,	25 58	119 02	Hongkong,	22 18	114 10
N.E. Shantung Py, ...	37 24	122 42	Turnabout,	25 26	119 59	South Cape,	21 55	120 51
Fusan,	35 05	129 06	Tamsui,	25 10	121 25	Pakhoi,	21 29	109 06
Chinkiang,	32 12	119 30	Keelung,	25 08	121 45	Haiphong,	20 52	106 40
Woosung,	31 35	121 27	Ockseu,	24 59	119 28	Hoihow,	20 08	110 20
Wuhu,	31 22	118 22	Amoy,	24 27	118 04	Bolinao,	16 24	119 55
North Saddle,	30 52	122 40	Chapel Island,	24 10	118 13	Manila,	14 37	120 57
Hankow,	30 33	114 20	Fisher Island,	23 33	119 28	Cape St. James,	10 20	107 04
Ichang,	30 12	111 19	Swatow,	23 20	116 43			

JUNE.

On the 4th and 5th June, 1892, the barometer was falling generally on the China Coast and in Luzon and light to moderate SW winds were prevalent. On the 6th a recovery of pressure took place along the China Coast particularly in the North and the wind became chiefly NE light to strong breezes. Two vessels in the neighbourhood of the northern entrance of the Formosa Channel reported fresh NE gales. The weather was chiefly overcast on the South Coast with light rain at most stations and temperature had decreased. At Hongkong there had been a slight thunderstorm during the early morning hours. Vessels in the northern part of the China Sea had light variable winds and steady barometer. Farther South the S. S. *Chingtu* had a falling barometer and light SE breezes. The S. S. *Ingraban* had light variable airs, squally weather and swell. The S. S. *Memnon* still farther South had a steady barometer, fresh SW breeze and squally weather. At Cape St. James there was a strong SW breeze, squally weather and a swell.

The following are some of the observations for the 6th June at noon:—

COAST STATIONS.

Bolinao,	29.77	— .03	SSW	2	c.
South Cape, .....	.81	+ .01	NE	2	c.
Hoihow, .....	.74	— .01	ENE	2	o.
Hongkong, .....	.78	+ .03	E	5	o.
Breaker Point, .....	.80	+ .03	NE	5	op.
Lamocks, .....	.82	+ .05	NE	5	od.
Chapel Island, .....	.85	+ .09	N	6	c.
Turnabout, .....	.88	+ .04	NNE	5	op.
Steep Island, .....	.96	+ .11	NE	3	c.

VESSELS.

S.S. <i>Memnon</i> ,	12° 18'	117° 09'	29.78	SW	5	q.
S.S. <i>Chingtu</i> ,	15 51	118 40	.67?	SE	3	c.
S.S. <i>Ingraban</i> ,	16 02	110 13	.73	Var.	2	q. swell.
S.S. <i>Rio</i> ,	19 56	112 33	.77	S	2	
S.S. <i>Alwine</i> ,	20 03	110 20	...	Var.	...	
S.S. <i>Choy Sang</i> ,	at Matsou		.84	NNE	8	or.
Sch. <i>Sea Swallow</i> ,	24 40	118 56.	83	NE	7	

It appears, therefore, that there was an area of deficient pressure across the China Sea, perhaps between the parallels of 14° and 18° N where the barometer was falling and light variable winds prevailed. On the Northern side of this area NE light to strong breezes were blowing and on the Southern side fresh SW breezes. Probably a disturbance was forming at this time.

Towards evening on the SE coast, the barometer commenced to fall, the weather was wet generally and fresh NE breezes continued. At Hoihow there were heavy NE squalls with thunder and lightning. At Hongkong heavy rain was falling, the lower clouds coming from East. North of Foochow it was dry, but cloudy.

On the 7th June the barometer was still falling slowly on the SE coast and much the same wind and weather prevailed as on the previous evening except that the rain was less heavy. The barometer was also falling in Luzon with light S breezes and cloudy weather. At Cape St. James there was a strong SW breeze. Those vessels in the neighbourhood of Hainan were experiencing N to NE moderate gales with rain squalls and high sea. The S. S. *Rio* farther South had SW to NW moderate breezes and showery weather.

Conditions were almost unchanged during the latter part of the day.

Observations at noon on the 7th June:—

COAST STATIONS.

Bolinao,	29.73	— .04	S	2	c.
South Cape, .....	.75	— .00	NNE	4	c.
Hoihow, .....	.68	— .06	NNE	4	c.
Hongkong, .....	.74	— .04	E	4	o.
Breaker Point, .....	.77	— .03	NE	5	op.
Lamocks, .....	.77	— .05	NNE	5	om.
Chapel Island, .....	.80	— .05	NE	4	od.
Turnabout, .....	.86	— .02	N	4	od.
Steep Island, .....	.96	00	E	3	c.

VESSELS.

S.S. <i>Nizam</i> ,	7° 32'	108° 20'	29.82	SSW	2	r.
S.S. <i>Memnon</i> ,	9 07	116 58	.74	SW	...	cross sea.
S.S. <i>Presto</i> ,	17 54	107 58	.71	N/W	6	or high sea.
S.S. <i>Ingraban</i> ,	19 14	112 05	.68	NNE	...	
S.S. <i>Alwine</i> ,	20 21	110 55	.62	NE	8	
S.S. <i>Rio</i> ,	16 01	110 28	.65	W	4	op.

On the 8th June the weather on the SE coast had improved somewhat, there was no rain and it was less cloudy on the whole. The barometer was, however, falling slightly and NE light to moderate breezes prevailed. In Hoihow the barometer was rising and fresh NE breezes were blowing, weather cloudy. In Luzon the barometer was falling with light S breezes and overcast weather. At Cape St. James the weather was squally with a strong W breeze. Vessels in the China Sea to the East of Cochin China and Annam had moderate to fresh W and SW breezes while those to the NE of Hainan and South of Hongkong had fresh breezes to moderate gales from the NE with cloudy squally weather.

The following observations are for noon of June 8th:—

COAST STATIONS.

Bolinao,	29.71 - .02	SE	2	o.
South Cape, .....	.72 - .03	NNE	3	o.
Hoihow, .....	.72 + .04	NE	5	c.
Hongkong, .....	.73 - .01	E	3	c.
Breaker Point, .....	.75 - .02	NE	5	c.
Lamocks, .....	.74 - .03	NE	5	cm.
Chapel Island, .....	.73 - .07?	NE	4	c.
Turnabout, .....	.85 - .01	NNE	4	om.
Steep Island, .....	.92 - .04	NE/E	3	c.

VESSELS.

S.S. <i>Cheang Chew</i> ,	10° 28' 109° 25'	...	WSW	5	b.
S.S. <i>Nizam</i> ,	11 3 110 46	29.70	SW	4	o.
S.S. <i>Donar</i> ,	11 42 109 16	.70	W	3	
S.S. <i>Venetia</i> ,	19 46 114 32	.67	NE	5	o.
S.S. <i>Alwine</i> ,	21 5 112 31	.66	NE	7	high sea.
S.S. <i>Ingraban</i> ,	21 37 113 25	.72	NE	6	swell, high sea.

The *Venetia* at 8 p.m. in 18° 23', 114° 12' had barometer (29.61) falling, NE 4, and rain squalls. The *Nizam* steering about NNE had at midnight WSW 4, barometer 29.71 confused swell from NW and SW and lightning was noted in the NE.

It appears that on the 7th and 8th there was no well defined centre, but a diffused depression existing around the position 16° to 17° N and 115° E.

By noon on the 9th June a great change may be remarked. The barometer had fallen very considerably at Bolinao and at S. Cape; less so on the SE coast while it was rising in Hainan and the Gulf of Tongking. The wind had again freshened from the NE in Southern China. In Northern Luzon light SE breezes blew. Weather was cloudy for the most part, and it was raining at S. Cape. In Hoihow the sky had cleared. At Hongkong the direction of the lower clouds which had been from E on the 8th backed to NE on the morning of the 9th. The centre of Typhoon I. was perhaps in 18°, 117° moving NEward at noon on June 9th.

The observations for June 9th at noon were as follows (the approximate bearing and distance in miles of the observer seen from the centre is added after the name of the station or the place of the vessel):—

COAST STATIONS.

Bolinao,	SE	200	29.63 - .03	SE	2	o.
Hoihow,	WNW	400	.76 + .04	NE	3	b.
Hongkong,	NNW	300	.70 - .03	E	1	c.
Breaker Point,	N	300	.70 - .05	NE	5	c.
South Cape,	NE	330	.64 - .08	NNE	3	or.
Lamocks,	N	310	.71 - .03	NNE	5	cm.
Chapel Island,	N	350	.71 - .02	NE	6	c.
Turnabout,	NNE	500	.79 - .05	N	6	om.
Steep Island,	NNE	950	.91 - .01	NE	2	b.

VESSELS.

S.S. <i>Cheang Chew</i> ,	WSW	450	14° 5' 110° 20'	29.60	W	4	
S.S. <i>Donar</i> ,	WSW	450	14 45 110 16	.71?	NW	3	swell.
S.S. <i>Nizam</i> ,	SW	300	14 53 112 57	.61	WSW	5	fine.
S.S. <i>Venetia</i> ,	WSW	250	16 3 113 24	.64	NW	3	o. cross sea.
S.S. <i>Zafiro</i> ,	SE	180	16 0 119 0	.61	SW	4	or.
S.S. <i>Sunghiang</i> ,	N	300	23 5 116 44	.71	NE	5	o.
S.S. <i>Esmeralda</i> ,	N	300	Breaker Point		ENE	5	

During the evening the barometer continued to rise slowly in Hainan with light variable airs and fine weather. At Hongkong the barometer was steady with E 2 and cloudy sky. The lighthouses in the Formosa Channel had strong NE breezes and in some instances a moderate gale, weather cloudy and barometer steady.

In Southern Formosa, the barometer was falling moderately fast (S. Cape 200 miles NE of centre at midnight, 29.60) with NE 5 overcast sky and at S. Cape drizzling rain. At Bolinao, 180 miles SE of centre, the barometer (at 9 p. 29.58) was falling, the wind SSE 2 with heavy rain. The lower clouds came from SE.

The S. S. *Zafiro* steering about NW by N had the wind veering from SW 4 at noon, to NW 6 at 10 p.m. with high confused sea and squally weather. The barometer fell 0.11 between noon and midnight and at the latter hour read 29.50. On the 10th at 4 a. she had the barometer lowest (29.45) with N 6, rain squalls and a high sea. Her complete log for the 9th to 11th is appended. The centre appears to have crossed in front of her course about noon on the 9th. The *Venetia* was at midnight on the 9th in $13^{\circ} 46'$, $112^{\circ} 34'$, (SW 400) the barometer was rising (29.69) wind W 4 and weather wet with thunder and lightning. H.M.S. *Porpoise* at anchor in Manila Bay had SW 4 and wet squally weather during the afternoon and evening.

On the 10th June the barometer was still falling at all stations in the neighbourhood of the Formosa Channel particularly at S. Cape. Winds were chiefly NE light to strong breezes with cloudy squally weather and rain in S. Formosa. In Hongkong and to the Westward the barometer was steady and light airs were prevalent. At Bolinao there were light S breezes with wet weather and a rising barometer. At sea, South East of Hainan, light to moderate N breezes prevailed with high sea and swell and in the district to the East of Annam moderate SW breezes with squally weather. The *Zafiro* about 120 miles West of the centre had NNW 6, wet squally weather and heavy sea. The barometer was rising as she was then steering away from the depression. The centre at noon on the 10th was in $19\frac{1}{2}^{\circ}$, 119° .

Observations for the 10th June at noon:—

COAST STATIONS.

Bolinao,	SSE	200	29.64	+	.01	S	3	or.
South Cape,	NE	170	.59	-	.05	NNE	4	od.
Hoihow,	WNW	500	.76	.00	NNE	2	c.	
Hongkong,	NW	350	.70	.00	WSW	1	c.	
Breaker Point,	NW	250	.70	.00	NE	3	cm.	
Lamoeks,	NNW	250	.68	-	.03	NNE	5	c.
Chapel Island,	NNW	300	.67	-	.04	N	5	c.
Turnabout,	N	350	.78	-	.01	NNE	3	cm.
Steep Island,	NNE	650	.91	.00	NE	3	b.	

VESSELS.

S.S. <i>Teucer</i> ,	SW	750	$11^{\circ} 6'$	$109^{\circ} 48'$	...	SW	3	fine.
S.S. <i>Venetia</i> ,	SW	600	12 35	111 43	29.71	W	4	pg.
S.S. <i>Kong Beng</i> ,	SW	700	12 49	109 32	.72	S	4	fine.
S.S. <i>Yiksang</i> ,	SSE	300	outside Manila		.73	SSW	6	high cross sea.
H.M.S. <i>Porpoise</i> ,	SSE	300	Manila Bay		.74	SW	2	o.
S.S. <i>Don Juan</i> ,	S	170	16 36	119 13	.78	var.	...	
S.S. <i>Cheang Chew</i> ,	WSW	500	17 17	110 59	.64?	N	3	fine.
S.S. <i>Donar</i> ,	WSW	370	17 39	111 11	.70	N	4	N swell.
S.S. <i>Nizam</i> ,	WSW	300	18 5	114 2	.62	NNE	5	fine; high NE sea.
S.S. <i>Zafiro</i> ,	W	120	19 17	117 2	.56	NNW	6	orq. high sea.
S.S. <i>Paoting</i> ,	NW	250	22 55	116 31	.65	ENE	5	o.

At Hongkong during the evening the barometer was rising slightly with light variable airs and fine but cloudy weather. The lower clouds came from NNE, but the direction of the upper (c-str) clouds could not be obtained. At the stations on the SE coast the barometer was steady with light to moderate NE breezes and cloudy weather. At the lighthouse stations in the Formosa Channel, it was blowing a moderate to fresh NE gale with cloudy weather. At some stations north of the Channel the barometer was rising slightly with light winds and fine weather. At S. Cape (at 9 p. NE 120) the barometer showed a rise (at 9 p. 29.63), wind NE 4 with rain squalls. At Bolinao (S 270) the barometer was rising, wind S 2 with rain at 4 p.m. and the lower clouds from SW.

The *Sungkiang* at midnight (NNW 90 miles) in about 22° , 119° had strong NE wind overcast weather, high sea and barometer (29.71) falling rapidly. She was bound southward having left Amoy for Manila in the morning and was advancing almost directly towards the centre. The *Esmeralda* which left Amoy for Manila at 4 p.m. had at midnight NE 6, high sea, barometer falling rapidly, (reading uncertain). The *Zafiro* had the barometer rising during the evening (29.66 at 8 p.) with N 4 and heavy sea. The *Yiksang* in 15° , 120° at 8 p.m. had the barometer slightly rising (29.75), SW 6 and high sea. The *Paoting* proceeding ENE from her noon position had at midnight ENE 6 overcast sky and barometer (29.72) falling. The *Nizam* proceeding Northwards had NNE 5 at midnight, high but decreasing sea barometer (29.65) rising.

On the 11th June the barometer was slowly rising at Hongkong, there was a light W air and the sky was partially clouded. The lower clouds came from W. At Hoihow the barometer was also rising with light variable airs and fine weather. On the SE coast and at the stations in the Formosa Channel the barometer had fallen a little for the most part and farther north the fall was more decided. In the Channel the NE winds had for this reason decreased somewhat in force. The weather was chiefly overcast. At the Formosa stations there had been on an average a slight increase of pressure since noon of the previous day, but the weather had become very wet and squally at Anping and Fisher Island as well as at S. Cape.

From the log of the *Sungkiang*, which is annexed, it will be seen that during the early morning hours the barometer was falling quickly and the wind increasing in force (at 6 a.m. NE 7). An attempt to heave the ship to at this time met with failure. After the direction backed gradually still increasing in force, at 8 a.m. a strong N gale was experienced with the lowest reading of the barometer shortly after (at 8.30 a.m. 29.26). The barometer rose slightly during the following two hours (at 10 a. 29.29) and the wind backed to NW by N force 9. There was heavy rain and high confused sea. Later the barometer rose quickly, (at 2 p.m. 29.56) and the wind continued to back towards W at the same time decreasing in force. The centre must have been within 30 miles to the E of the ship's position at 9 a.m. and was at the time moving NNEward.

The *Esmeralda* was hove to some time during the early morning, the barometer falling rapidly and the NE wind increasing in force. At 7 a.m. she was estimated to be in 22°02', 118°38' or about NW/W 80 miles from the centre. At 8 a.m. she had a NNE gale with heavy rain squalls and swell. The main trysail was set to steady the ship. The lowest reading of the barometer was registered at this time but as two barometers were read and entered in the log the readings cannot be made use of. The barometer had risen at noon but the wind continued a NNE gale with thick rainy weather. At 4 p.m. the wind backed to N and moderated and the vessel was put on her course to the Southward. At noon this vessel was about 90 miles NW by W of the centre. The *Yiksang* and *Porpoise*, off the coast of Luzon to the West of *Bolinão*, had rising barometer, moderate to strong SW breezes, squally weather with thunder and lightning. They were just over 250 miles SSW of the centre.

On the 11th at noon the centre was in 21°30', 119°15'. The depression had increased much in intensity during the previous 24 hours and at the centre there was now a pressure of at least 0.5 inch below the normal.

The following are the noon observations for the 11th June:--

COAST STATIONS.

Bolinão,	S	300	29.77	+	.13	SE	2	o.
South Cape,	ENE	90	.66	+	.07	ESE	4	or.
Anping,	NE	90	.63	+	.05	NNE	3	o. WSW swell.
Fisher Island,.....	N	120	.66	+	.03	NNE	6	omg.
Hoihow,	W	520	.76		.00	var.	1	b.
Hongkong,	W	250	.73	+	.03	WSW	1	o.
Breaker Point,	WNW	170	.70		.00	NE	3	c.
Lamoeks,	NW	150	.68		.00	NE	5	cm.
Chapel Island,	NNW	170	.65	-	.02	NNE	6	c.
Turnabout,	N	220	.76	-	.02	N	7	om.
Steep Island,	NNE	520	.87	-	.04	E/S	2	c.

VESSELS.

H.M.S. <i>Porpoise</i> ,	SSW	250	17°	0'	118°	5'	29.71	SW	4	c. N swell.
S.S. <i>Yiksang</i> ,	SSW	250	17	6	118	17	.77	SSW	5	ogrlt.
S.S. <i>Kriemhild</i> ,.....	WSW	500	17	52	111	39	.75	S	3	moderate sea.
S.S. <i>Donar</i> ,	WSW	350	20	4	112	50	.74	N	2	increasing swell.
S.S. <i>Nizam</i> ,	W	280	21	42	114	9	.69	W	4	
S.S. <i>Zafiro</i> ,	W	160	20	53	116	20	.68	NNW	4	c. high sea.
S.S. <i>Sungkiang</i> ,	SW	60	20	58	118	46	...	NW	...	r. wind and sea decreasing.
S.S. <i>Esmeralda</i>, .....	...	(7a. 22	2	118	38)	...	...	NNE	...	r. blowing a gale.
S.S. <i>Paoting</i> ,.....	NW	160	23	58	117	51	.65	NE/E	5	o.

During the evening of the 11th the barometer was steady at Hongkong with light SW to W airs and cloudy weather. At the stations on the SE coast the barometer was almost steady and the winds were chiefly light NE airs with cloudy weather. At Lamocks at 9 p.m. the barometer read 29.72 with NE 3 cloudy. At the lighthouses towards the Northern part of the Formosa Channel it was blowing from NNE a strong breeze to moderate gale, the barometer was falling and the sky clouded. In N Formosa the barometer was falling with light airs and calms at Keelung and passing showers.

At Fisher Is., Anping, Takow, and S. Cape the barometer was falling sharply. At Fisher Is. at 9 p.m. 29.61 NE 7. At Anping 29.60 NE 4. At Takow 29.59 SE 2. At S. Cape. 29.61 S 7. The sky was overcast with drizzling rain at Fisher Is., rain at Takow, showery and squally at S. Cape. At the latter station the wind had gradually veered since morning and increased in force. At Anping there was a heavy WSW swell.

On the 12th June at Takow the barometer attained the lowest reading (29.27) at 2.30 a.m. It had been falling rapidly during the past few hours. At 3 a.m. it also read 29.27 but by 4 a.m. it had risen rapidly (29.45). Unfortunately the wind and weather were not noted, the remark beside the hourly readings of the barometer being merely "Typhoon from NE". Anping had at 3 a.m. N 9 barometer 29.46 with gloomy sky. The lowest reading was at 4 a.m. 29.43 with the wind backing. At 9 a.m. the wind had backed as far as WNW 6 rain was falling and the barometer had risen to 29.74. At this time Takow had 29.74 NW 5 and rain. S. Cape had the lowest barometer reading (29.57) at 3 a.m. with SSW 8 and rain squalls. The wind gradually veered to WNW at noon and blew a fresh gale the whole time with rain squalls, barometer at 9 a.m. 29.69. At the Lamocks the lowest barometer was at 3 a.m. (29.67) with W 2 and sky partially clouded. Later the wind became SW 2. On the SE coast the barometer was almost steady with light S and SW airs and fine weather for the most part. The barometer had further fallen at Keelung (reading doubtful) and at the lighthouse stations at the N entrance to the Channel. At the former station the weather was wet and squally with a light NW air increasing to a moderate breeze at noon. Tamsui, a few miles distant from Keelung, had gentle to strong SW breeze during the middle of the day. Southerly winds were spreading quickly Northwards to the East coast where the barometer was falling considerably. In N Luzon light to moderate S and SW breezes with rising barometer prevailed.

The only vessel in the vicinity of the depression was the S.S. *Paoting*. She was at noon on the 11th in 23°58', 117°51' bound for Anping, and at midnight had a strong NNE breeze and heavy sea barometer 29.55. At 4 a.m. on the 12th she had a fresh NNW gale increasing, with heavy S sea barometer 29.46 and at this time the ship was "turned back for shelter." It is estimated that she was then within 50 miles WNW of the centre.

The *Yiksang* and *Porpoise* had the wind veering as they proceeded NWward, and during the morning they had W and NW light airs and breezes; the weather was fine but there was a heavy Northerly swell.

Observations for the 12th June at noon:—

COAST STATIONS.

Bolinao,	SSW	420	29.83	+ .06	S	2	c.
Hongkong,	WSW	450	.74	+ .01	WSW	2	b.
Breaker Point,	W	320	.69	+ .01	SW	3	c.
Lamocks,	W	270	.73	+ .05	SW	2	cm.
South Cape,	SW	90	.68	+ .03	WNW	8	omd.
Takow,	WSW	90	.75	+ .13	N	3	rg.
Anping,	W	90	.75	+ .12	WNW	3	r.
Fisher Island,	WNW	140	.73	+ .07	SW	2	cm.
Chapel Island,	WNW	220	.67	+ .02	S	3	c.
Turnabout,	NW	180	.69	— .07	WNW	3	om.
Tamsui,	NNW	120	.68	+ .01	SW	4	c.
Keelung,	NNW	120	.59	— .14?	NW	4	od.
Steep Island,	N	420	.72	— .15	SE	1	c.

VESSELS.

S.S. <i>Sungkiang</i> ,	SSW	380	17° 11'	119° 42'	29.81	S	5	
S.S. <i>Esmeralda</i> ,	SW	300	19	0	119 10	S	1	
S.S. <i>Yiksang</i> ,	SW	360	19	52	116 15	.85	W	2 c. high N swell.
H.M.S. <i>Porpoise</i> ,	WSW	290	20	22	115 38	.75	SW	2 c. "
S.S. <i>General Werder</i> , ...	WSW	360	22	26	115 23	.73	SW	1 b. high E swell.
S.S. <i>Paoting</i> ,	WNW	140	23	35	119 39	.69	SSW	3 o.
S.S. <i>Woosung</i> ,	NW	170	24	37	119 32	.65	SW	3 o.

The centre passed almost over Takow about 3 a.m. moving Eastwards and crossed Formosa during the morning. At noon it was perhaps in 23°, 122°.

During the afternoon and evening the barometer rose at the S. Formosa stations, and at Takow and Anping winds became light variable airs. At S. Cape the wind continued to blow from about W a moderate breeze during the evening. The weather improved at all these stations. At Keelung the barometer was rising with fine weather and light NW air.

The depression cannot be traced after the 12th but it probably moved NEward in the Pacific. No observations to the Eastward of Formosa are available, this portion of the Pacific being out of the regular track of vessels and this is at all times a great drawback in the investigation of typhoons passing in the neighbourhood of Formosa.

The depression appears to have been forming between the 6th and 8th and it was not until the 9th that it attained to any considerable development. The diameter of the inner area, *i.e.*, area of strong winds and a considerably diminished pressure, was at all times very small and the depression at the centre scarcely exceeded 0.5 inch. It has been already shown (comp. "Law of Storms in the Eastern Seas" by W. Doberck) that strong NE winds blow in the Formosa Channel while a typhoon is yet at a considerable distance to the SWestward and in this depression this was again noticed to be the case. At sea there was thunder and lightning to the S and SW of the centre. Takow had the greatest rainfall, 8.30 inches, which fell during the 24 hours previous to 9 a.m. on the 12th.

Detailed observations:—

COAST STATIONS.

	S. Cape.					Takow.					Anping.					Fisher Island.					
	Bar.	Temp.	Wind.	Weather	Rainfall	Bar.	Temp.	Wind	Weather	Rainfall	Bar.	Temp.	Wind	Weather	Rainfall	Bar.	Temp.	Wind	Weather	Rainfall	
11th June	3a.	29.63	78	ENE	5 or						29.61	75	NE	2 o		29.63	73	NNE	6 cmg		
	6a.	.63	78	E	4 or											.59	74	NNE	6 cmg		
	9a.	.66	79	ENE	5 o	2.53	29.65	79	NNW	1 r	0.26	.66	79	calm	ogp	0.04	.64	75	NNE	6 omg	0.00
	noon	.66	80	ESE	4 or												.66	75	NNE	6 omg	
	3p.	.59	81	SE	5 oq		.60	78	NE	4 r		.60	77	NNE	5 o		.65	73	NE	6 orq	
	6p.	.60	80	S	6 p												.59	73	NE	6 omd	
12th June	9p.	.61	79	S	7 oq		.59	77	SE	2 r		.60	76	NE	4 o		.60	73	NE	7 om	
	midt.	.59	77	S	8 rq		.47									.56	72	NE	8 omg		
	3a.	.57	76	SSW	8 rq		.27		Typhoon from NE		.46	76	N	9 g		.53	72	NNW	8 omq		
	6a.	.65	76	WSW	8 rq		.65									.59	73	NW	8 omq		
	9a.	.69	76	WNW	8 rq	4.64	.74	76	NW	5 r	8.30	.74	77	WNW	6 r	1.89	.72	75	W	4 cm	0.40
	noon	.69	78	WNW	8 od												.73	76	SW	2 cm	
	3p.	.70	78	WNW	7 o		.76	78	NE	1 g		.76	80	calm	o		.69	78	SW	3 cm	
	6p.	.71	78	W	4 o												.68	77	SSE	3 cm	
9p.	.73	78	WNW	4 eq		.77	76	NE	1 c		.79	77	S	1 c		.72	77	SSE	4 cm		
midt.	.74	78	WSW	4 c												.73	77	SSE	3 cm		

VESSELS.

S.S. SUNGKIANG.

June 10	midt.	120 miles S 9° E of Chapel Island.	29.71	NE	o	high sea.
11	2a.		.64	NE	o	"
	4a.		.56	NE		"
	6a.		.51	NE	7	" tried to heave to, but could not.
	8a.			N	9 or	"
	8.30a.		.26			"
	10a.		.29	NW/N	9	irregular sea.
	noon	20° 58' 118° 46'		NW	r	heavy rain, wind and sea decreasing.
	2p.		.56	WNW		
	4p.		.64	WNW	5	nasty sea.
	6p.		.66	WNW		
	8p.		.71	W	5 o	cross sea.
	10p.		.77	W		
	midt.		.79	SW	o	S swell.
12	noon	17° 11' 119° 42'	.81	S	5 op	moderate S sea.

S.S. ESMERALDA.

June 10	4p.	left Amoy for Manila				
	8p.		NE	5		high sea ship rolling heavily.
	midt.		NE	6		" "
11	4a.		NE	6 oq		heavy swell "
	7a.	22° 02' 118° 38'				
	8a.		NNE			blowing a gale, main trysail set, drifting WNW.
	noon		NNE	r		" thick, rainy.
	4p.		N			shift of wind to N and moderating put ship head to southward,
	7p.		NW			barometer rising gradually.
	9p.		var.			
	10p.		W			
	midt.		WSW	o		
12	noon	19° 0' 119° 10'	S	1		

S.S. YIKSANG.

June 10 noon	left Manila for Hongkong				29.75	SW	5 o	high following sea.
midt.								
11 4a.					.70	SSW	6	frequent squalls of heavy rain, thunder and lightning.
8a.					.75	SSW	5 o	
noon	17°	6'	118°	17'	.77	SSW	5	similar weather.
4p.					.73	SW	5	heavy N swell.
8p.					.80	WNW	5	"
midt.					.85	WNW	3 b	"
12 4a.					.81	NW	2	"
8a.					.85	var.	2 b	"
noon	19°	52'	116°	15'	.85	W	2	"

S.S. ZAFIRO.

June 9 noon	(16°	0'	119°	0')?	29.61	SW	4 or	
4p.					.52	SW	5 or	
8p.					.50	WNW	4	slight N swell.
midt.					.50	NNW	5 q	high confused sea.
10 4a.					.45	N	6 orq	high sea.
8a.					.52	NW/N	6	"
noon	19°	17'	117°	2'	.56	NNW	6	"
4p.					.56	NNW	5	heavy sea.
8p.					.66	NNW	3	"
11 4a.					.62	N	5 op	"
8a.					.66	N	5	"
noon	20°	53'	116°	20'	.68	N	4 c	high sea.

S.S. PAOTING.

June 10 noon	22°	55'	116°	31'	29.65	ENE	5 o	head sea.
midt.					.67	ENE	6 oq	
11 noon	23°	58'	117°	51'	.65	NE/E	5 o	
midt.					.55	NNE	6	hazy, heavy sea, ship rolling heavily.
12 4a.					.46	NNW	8	wind increasing; heavy S sea; turned back for shelter.
8a.					.67	NW/N		
noon	Ponghou harbour (Pescadores).				.69	SSW	3 o	

After the 12th of June SW winds light to moderate in force prevailed in Southern China, but the barometer was falling again on the 13th and 14th. There was, however, on the 15th a rise at the stations north of the S entrance to the Formosa Channel, but moderate S and SW breezes blew over the entire coast between Pakhoi and Foochow until the evening. At Hongkong the barometer was steady and there was a fresh SW breeze during the day. Later the wind fell light and the direction became SE for a few hours. At this time heavy rain with thunder and lightning commenced, the clouds coming from SW. Winds in the N part of the Formosa Channel had become NE 4.

On the 16th heavy rains with thunderstorms spread over the entire SE coast lasting until the 20th. There appears to have been a trough of slightly low pressure moving up from the southward, to the N of which, the wind was NE and E and in the rear SW on an average. After the passage northwards of this area of slightly diminished pressure SW winds became general over the greater part of the coast and the rains ceased.

The greatest fall for the periods stated in the table given below was received at Hongkong (23.7 inches). Pakhoi, which has rather high land to the eastward, had somewhat less. Hoihow, on the N coast of Hainan, was the exception to the general rainfall though the weather was very squally with threatening rainy appearance. The mountainous district to the southward may account for this. The fall diminished greatly in amount at the stations on the SE coast in the Formosa Channel and in Formosa, —with the exception of Fisher Island (21.6 inches) an exposed situation near the S entrance to the Channel—and appears to have ceased entirely a little to the northward of Foochow. S. Cape received a very small amount as compared with other districts:—

	Period.	ins.		Period.	ins.
Pakhoi,	June 16-19, inclusive	17.6	Fisher Island,	June 16-20, inclusive	21.6
Hoihow,	" 15-19, "	nil.	Chapel Island,	" 16-21, "	7.3
Hongkong,	" 15-19, "	23.7	Amoy,	" 16-21, "	3.9
Canton,	" 15-19, "	7.4	Ockseu,	" 16-21, "	7.2
Breaker Point,	" 16-21, "	16.4	Turnabout,	" 16-20, "	6.9
Swatow,	" 16-21, "	9.8	Middle Dog,	" 16-20, "	8.7
Lamoeks,	" 16-21, "	6.8	Foochow,	" 16-20, "	5.4
South Cape,	" 15-20, "	1.2	Tamsui,	" 16-20, "	7.0
Takow,	" 15-20, "	10.0	Keelung,	" 16-20, "	12.2
Anping,	" 15-20, "	9.3			

After the 20th June SW winds blew more or less steadily on the China Coast and in the China Sea until the 25th when there was a tendency for winds to become more easterly with falling barometer on the SE Coast. In Luzon the fall in the barometer was more marked. At Manila, the wind was NNE 1 with drizzling rain. Vessels in the northern part of the China Sea had mostly SE light and moderate breezes with the direction backing. The S. S. *Amicitia* was bound from Iloilo to Hongkong and on the evening of the 24th experienced a moderate NW breeze with wet squally weather and barometer (at midnight 29.81) falling. On the 25th she had N and NW fresh breezes, barometer at midnight 29.73. The weather was improving. There may possibly have been a depression in about 12°, 121°, but this is very uncertain.

Observations for the 25th June at noon:—

COAST STATIONS.

Manila,	29.77	— .06	NNE	1	o.
Bolinao, .....	.78	— .05	var.	2	b.
South Cape, .....	.83	— .06	NE	2	c.
Hoihow, .....	.74	— .05	ENE	3	oltq.
Hongkong, .....	.82	.00	S	1	c.
Breaker Point, .....	.82	— .01	SSE	2	c.
Lamocks, .....	.84	— .01	SSE	1	c.
Turnabout, .....	.86	— .02	SW	1	c.

VESSELS.

S.S. <i>Devamongse</i> ,	12° 13'	109° 24'	29.82	NE	2	
S.S. <i>Amicitia</i> ,	15 0	119 9	.77	N	5	
S.S. <i>Tibet</i> ,	15 44	113 2	.83	E	2	o.
Bk. <i>Nicoya</i> ,	16 47	113 13	...	var.	1	b.
S.S. <i>Memnon</i> ,	19 32	115 2	.79	SSE	3	b.
Sh. <i>Sterling</i> ,	19 48	121 27	...	ESE	5	fine.
Sh. <i>Belle of Bath</i> ,	21 34	113 58	...	E	2	b.

On the 26th June in the northern part of the China Sea and on the S Coast the wind was chiefly light E airs and breezes, the weather cloudy but fine and the barometer showed a slight rise for the most part since noon of the previous day. At Cape St. James, there was a NW gentle breeze. On the SW coast of Luzon light to fresh SE breezes prevailed with overcast skies and rising barometer.

The following information is from the log books of the *Memnon* and *Picciola*:—

S.S. MEMNON.

June 26	Noon	15° 42'	116° 2'	29.76	...	...	Light variable breeze sky overcast.
	6 p.	S 15° E	57 miles	.71	...	...	Sky densely overcast.
	8 p.	"	9.5	.71	NW	...	Moderate breeze lightning NW and SE.
	10 p.	"	19	.70	WNW	...	Wind increasing with occasional squalls.
	Midt.	"	19	.68	W	...	Incessant lightning with heavy rain and strong squalls.
27	1 a.	"	9.8	.66	W/S	...	Wind increasing, sea comparatively smooth, lightning all round.
	2 a.	"	9.8	.65	WSW	...	Squalls more frequent and heavier.
	3 a.	"	9.8	.63	SW	...	Moderate gale with very heavy squalls lasting about 15 minutes. Lightning appeared to be close to and all round the vessel, thunder one continuous roll, very little sea.
	4 a.	"	9.5	.67	SSW	...	Weather improving, squalls less frequent and severe.
	6 a.	"	19	.70	SW	...	Moderate breeze SW steady.
	8 a.	"	19	.76	SW	...	Clear weather with moderate breeze, heavy bank of clouds to N and NW.
	Noon	12° 29'	117° 14'	.76	SW	...	Fine weather with moderate breeze.

S.S. PICCIOLA.

June 26	Noon	15° 21'	118° 54'	29.74	SE	5	o.
	4 p.	...	...	.70	SE	6	orq. High wild sea.
	8 p.	...	...	.69	SE	8	orq. Increasing sea.
27	4 a.	...	...	.76	SSE	6	orq. Sea decreasing.
	Noon	13° 27'	120° 12'	...	...	...	...
	4 p.	...	...	.76	S	3	Fine.

The *Amicitia* at midnight had E 5, (barometer 29.77), the *Nicoya* NE 2, and clear weather. Both vessels were steering to the North.

The centre at noon on the 26th June may have been in about 13° $\frac{1}{2}$ 118° $\frac{3}{4}$. At 8 p.m. it was in 14° $\frac{1}{4}$ 118° moving WNWard, the *Picciola* being at the time about 90 miles to the Eastward and the *Memnon* about the same distance to the Westward of the centre. It was approaching but passing to Northward of the *Memnon*.

The following are the noon observations for the 26th:—

COAST STATIONS.

Pt. Santiago,	ENE	120	29.82	SSE	5	o.
Manila,	NE	140	.81+.04	ESE	3	cm.
Bolinao,	NNE	180	.77-.01	SE	2	c.
S. Cape,	NNE	530	.84+.01	NE	2	c.
Hoihow,	NW	650	.81+.07	ESE	3	o.
Hongkong,	NW/N	580	.84+.02	E	3	o.
Breaker Pt.,	NNW	600	.85+.03	NE	1	c.
Lamocks,	N/W	600	.86+.02	ENE	1	c.
Turnabout,	N	700	.87+.01	WSW	1	c.

VESSELS.

S.S. <i>Aglai</i> a,	10° 49'	109° 10'	WSW	580	29.79	N	3	b.
S.S. <i>Kiel</i> ,	14 27	110 12	W/N	500		N	2	
S.S. <i>Lightning</i> ,	15 29	112 43	WNW	380	.84	SW	2	b.
S.S. <i>Picciola</i> ,	15 21	118 54	N	120	.74	SE	5	o.
S.S. <i>Memnon</i> ,	15 42	116 2	NW	210	.76	var.	2	o.
Bq. <i>Nicoya</i> ,	17 10	114 20	NW	330		N	2	clear.
S.S. <i>Amicitia</i> ,	17 44	117 14	NNW	270	.74	calm		b.
Sh. <i>Sterling</i> ,	19 20	118 38	N	350		ESE		c. fine.
S.S. <i>Thibet</i> ,	19 50	113 44	NW	480	.81	NNE	2	o.
S.S. <i>Esmeralda</i> ,	22 39	115 15	NNW	550		ENE	3	fine.

At the stations in S. China on the 27th June fine weather and light E breezes chiefly prevailed, the barometer being almost steady. In SW Luzon the barometer had risen somewhat since the previous day and the weather was fine with light to moderate SE breezes. The *Memnon* now had a moderate SW breeze and fine weather, and the *Picciola* light S breezes barometer at 4 p. 29.76, weather fine. In the district of the China Sea to the south of Hongkong several vessels had E to NE moderate breezes. The barque *Nicoya* and ship *Sterling* had squally showery weather. To the East of Annam light variable airs and calms prevailed. The *Kiel* and *Electra* had light N breezes and the barometer had fallen slightly since the previous day.

There was a distinct cyclonic circulation of winds around the centre of the China Sea, but not well marked on the western side, and possibly the central area of depression may have been in about 15°, 116°. No ship log has been received within 200 miles of this position.

Observations for 27th June at noon:—

Pt. Santiago,	29.83+.01	ESE	4	c.
Manila, .....	.81 .00	SE	2	b.
Bolinao, .....	.80+.03	S	2	c.
S. Cape, .....	.84 .00	NE	2	c.
Hoihow, .....	.81 .00	ENE	2	c.
Hongkong, .....	.83-.01	E	3	o.
Breaker Pt., .....	.82-.03	NE	2	om.
Lamocks, .....	.86 .00	calm		c.
Turnabout, .....	.85 .02	var.	1	om.

VESSELS.

S.S. <i>Lightning</i> ,	11° 52'	110° 43'	29.79	SW	3	b.
S.S. <i>Memnon</i> ,	12 29	117 14	.76	SW	4	fine.
S.S. <i>Picciola</i> ,	13 27	120 12 (4p.	.76	S	3)	fine.
S.S. <i>Rio</i> ,	15 25	110 11	.78	SE	1	
S.S. <i>Electra</i> ,	15 30	113 0	.86	N	3	
S.S. <i>Aglai</i> a,	15 3	110 22	.76	calm	...	b.
S.S. <i>Holstein</i> ,	16 41	110 23	.80	var.	...	fine.
Bq. <i>Nicoya</i> ,	18 47	113 50	...	E	4	q.
Sh. <i>Sterling</i> ,	19 6	116 41	...	ENE	4	p. heavy showers.
S.S. <i>Devanongse</i> ,	20 13	112 34	.82	NE	4	b.
S.S. <i>Amicitia</i> ,	20 26	115 44	.77	ESE	3	o.

On the 28th June the barometer had fallen slightly in S. China since the previous day. Light E iars and breeze prevailed with cloudy and in some cases showery weather. At Hongkong the weather was showery with thunder and lightning. During the two previous days c-str and c-cum clouds had been observed coming from N, the lower clouds were from E and ESE. In Luzon there was a slight increase of pressure with light variable airs and breezes and fine weather. To the East of Cochin China several vessels had light S airs and calms with fine weather. To the SE of Hainan moderate to strong NE breezes with squally weather prevailed. West of the Bashee Channel light to moderate ESE breezes. The centre may possibly have been in about 16°, 112½°. This is, however, very uncertain. During the evening of the 28th the wind at Hoihow backed to NE 3, and heavy clouds were passing over from the SE. The barometer remained steady. The *Activ*, a few miles W of Hoihow, had a fresh E breeze with steady barometer. At Hongkong the barometer was steady and light E airs with showery weather prevailed. On the 29th at noon the barometer (29.72) at Haiphong showed a fall of 0.09 since the previous day, the sky was cloudy with a gentle SE breeze. The barometer had fallen slightly at Hoihow with moderate E breeze and clear sky. There was a light SW breeze at Cape St. James.

Possibly the depression moved Westward about a hundred miles to the south of the entrance to the Gulf of Tongking.

Observations for noon on the 28th June:—

COAST OBSERVATIONS.

Bolinao, .....	.29.82 + .02	SSW	2	c.
South Cape,.....	.82 - .02	NNE	2	c.
Hoihow, .....	.79 - .02	ENE	3	b.
Hongkong,.....	.83 .00	E	2	o.
Breaker Point, .....	.83 + .01	ENE	1	op.
Lamoeks, .....	.86 .00	ENE	1	c.
Turnabout, .....	.87 + .02	calm	...	c.

VESSELS.

S.S. <i>Dardanus</i> ,	8° 30'	108° 59'	29.75	calm	...	
S.S. <i>Lennox</i> ,	10 11	107 18	...	SE	1	b.
S.S. <i>Mongkut</i> ,	10 28	108 8	.76	S	1	fine.
S.S. <i>Scerre</i> ,	10 54	110 41	...	SSW	1	o.
S.S. <i>Holstein</i> ,	12 44	109 31	.77	calm	...	
S.S. <i>Aglaia</i> ,	18 20	111 30	.75	NE	4	q. NE swell.
S.S. <i>Kiel</i> ,	19 17	112 47	...	NE	5	
S.S. <i>Elektra</i> ,.....	19 32	113 34	...	NE	6	
S.S. <i>Activ</i> ,	20 28	107 40	.83	E	2	
S.S. <i>Alvine</i> ,	20 21	110 55	.76	ENE	3	
S.S. <i>Sungkiang</i> ,	21 12	119 3	.83	ESE	4	
S.S. <i>Esmeralda</i> ,	21 16	118 57	.80	SE	2	
Sh. <i>Sterling</i> ,	20 53	115 16	...	E	...	fine.

At noon on the 29th the barometer at Hongkong showed the same reading as at noon on the previous day and was in fact rising for two or three hours about this time instead of showing the usual daily fall. At 2 p. it read the same as at 10 a. which, allowing for daily variation, shows a distinct rise of 0.04 inches. The barometer did not commence to fall until late in the evening. The wind was from about ESE during the morning hours of force 2. At 10 a. it was E 4. About 12.30 p. the wind suddenly flew round to SSE in a sharp squall of wind and rain, but it backed to E/N at 4 p. force 4 and continued from about that direction for the remainder of the evening. The lower clouds came from SE and some higher clouds from SSE. The mean temperature for the day was 79°. At Victoria Peak the direction of the wind was from SE 4 to 5 the whole day. At Macao light SSW breezes blew during the middle of the day and towards evening a light E breeze. The weather was showery during the day; cloudy in the evening. On the whole the barometer was falling slightly. At Hoihow fine weather prevailed. The sky was clear the whole day and the wind from E force 4, lightning was observed to the S during the evening. The barometer showed a slight fall since the previous day, but it read the same at 3 p. as at 9 a. (29.76) and was thus rising at this time. Allowing for daily variation the rise between 9 a. and 3 p. would be about 0.05 inch. On the SE coast the barometer was almost steady, perhaps slightly rising and the wind which was chiefly light NE airs and breezes in the morning became more Easterly towards evening. The weather was fine generally with detached clouds.

Vessels in China Sea West of Bolinao had moderate SSE breezes. The *Esmeralda* reported a high SW swell. To the East of Annam the weather was fine with light variable airs. The *Aglaia* and the *Alvine*, a few miles to the SSW of Hongkong, had a strong ESE breeze with rain and a rough sea. The *Presto*, which left Hongkong for the SWard at 6 a., had a strong S breeze and squally weather with high S sea and SE swell. The *Activ* left Hoihow for Hongkong about 2 a.m. She experienced a gentle to moderate ENE breeze during the morning hours. A heavy bank of clouds was noticed in the SE and towards noon she had a SE swell. The barometer (4 a. 29.77, 10 a. 29.82) was not falling at this time.

During the evening the *Canton* and *Taichow*, which left Hongkong bound East in the afternoon, had E and ESE gentle to moderate breezes with overcast showery weather and a heavy S swell. The *Presto* had the barometer (at 8 p. 29.75, midnight 29.71) falling during the evening and the direction of the wind S 5 at 4 p. had become E 5 at 8 p. and E 7 at midnight. At the latter hour the weather was thick with rain and there was a tremendously high sea from E. The *Activ* had now the barometer falling and the wind had backed from E 5 during the afternoon to ENE 6 at night. There was a heavy swell from SSE at midnight.

The following are the observations for June 29th at noon:—

COAST STATIONS.

Bolinao, .....	.29.83 + .01	E	1	c.
South Cape, .....	.85 + .03	NNE	1	c.
Hoihow, .....	.76 - .03	E	4	b.
Haiphong, .....	.72 - .09	SE	3	o.
Hongkong, .....	.83 .00	E	4	o.
Breaker Point, .....	.84 + .01	NNE	2	c.
Lamoeks, .....	.86 .00	NE	1	c.
Turnabout, .....	.88 + .01	N	2	c.

VESSELS.

S.S. <i>Dardanus</i> ,	12° 3'	111° 28'	29.77	SSE	2	fine.
S.S. <i>Lennox</i> ,	13 22	109 42	.78	var.	2	clear smooth sea.
S.S. <i>Sverre</i> ,	13 43	112 38	...	S	1	b.
S.S. <i>Mongkut</i> ,	14 21	110 16	.78	var.	1	fine.
S.S. <i>Esmeralda</i> ,	16 54	119 36	...	S	...	
S.S. <i>Sungkiang</i> ,	17 6	119 33	.80	SSE	4	
S.S. <i>Activ</i> ,	? (20 45	111 30)	.80	NE/E	4	SE swell.
S.S. <i>Alwine</i> ,	21 57	113 46	.76	ESE	7	
S.S. <i>Aglacia</i> ,	21 57	113 52	.81	ESE	6	r. rough sea.
S.S. <i>Presto</i> ,	? (21 50	113 35)	.83	S	6	oqr. high S sea.

Taking all the information into consideration it seems that a very small area of low pressure entered the coast from the southward about 60 miles to the WSW of Hongkong on the 29th June at noon. It appears that the cyclone which followed next day was formed in the rear of this small area of squally and wet weather. But all the ships that reported squally weather had it from SE. There are no data on the other side of the centre, so there may not really have been any low surrounded by closed isobars.

During the early morning hours of June 30th the barometer was falling (at 4 a. 29.71) at Hongkong the direction of the wind being ENE force 4. At 1 a.m. the sky was clear, at 4 a. partially clouded. At 4.30 a. the direction veered very suddenly to SSE in a heavy squall of wind and rain, the barometer rose 0.05 in. in a few minutes (at 5 a. 29.77) and the temperature fell 7°. From this time the wind gradually backed (at 9 a. E 4), the force diminishing from 6 to 4. The barometer was falling. A few minutes before 10 a. the wind again suddenly veered from E to SSE in another squall of wind and rain—but less severe than at 4.30 a.—and the barometer rose quickly for a short time. Thereafter it fell until 7 p. when it commenced to rise. The wind after 10 a.m. was from between SE and SSE and it increased from force 5 at 1 p. to 7 at 7 p., the weather being wet and squally the whole time. The lower clouds came from SSE all day. After midnight the wind moderated and the direction became S force 4 at 1 a. on the 1st July with rising barometer (1 a. 29.75) and showery weather. At Victoria Peak on the 30th June the direction of the wind was SE from 7 a. to 4 p. increasing in force from 5 at the former to 7 at the latter hour. At 7 p. it was SSE 7, at 10 p. SW 7 between 10 a. and 10 p. no rain fell. On the morning of 1st July the wind was SW 6, and the weather rainy.

At Macao the barometer on the 30th June was falling rather rapidly during the day, but rose again in the evening. At 4 a. there was a light E breeze. Towards midday the direction veered to SSE the force increasing to 5 at 4 p. At 10 p. it was S 5. At 4 a. on the 1st July it had moderated to force 2. The weather was wet and squally.

At Canton light ESE airs with sky partially clouded prevailed during the morning hours of the 30th with slightly falling barometer. Between 3 p. and 9 p. the fall became rapid and the wind which was SE 5 at the former hour had backed and was E 6 at 9 p. The sky had become overcast and it was squally. On July 1st at 3 a. the wind was still E 6 with wet squally weather and the barometer was on the point of rising. At 9 a. the wind was S 3 the weather rainy and the barometer had risen.

At Hoihow on the 30th the barometer had fallen since the previous night but between 9 a. and 3 p. it was rising. A gentle to moderate NW breeze prevailed during the day. At 5.45 p. the wind shifted to WSW with a light rain squall. At 9 p.m. it was SE 2. The weather was very fine all day with the exception of the slight squall above mentioned,

On the SE coast on June 30th the barometer showed a slight fall since the previous day. Light variable airs, chiefly Easterly, and calms prevailed with weather cloudy but fine.

Vessels in the China Sea to the SE of Hainan on June 30th had light and gentle S and SSW breezes and fine weather, but towards evening the weather became showery and the wind slightly increased in force. The *Lennox* reported a confused sea. The *Bantam* left Hongkong for the South at 5 p.m. and at midnight experienced a strong S breeze overcast sky and high sea. The *Presto* NE of Hainan had a fresh NE breeze during the early morning and later a moderate gale from N by E. The weather was wet and squally. At noon in Hainan Straits she had a light SW breeze with fine weather. Later as she proceeded Westward she had a fresh SW breeze. The centre was at noon on June 30th in 21° 10', 112° 20'.

The following are the noon observations for June 30th:—

COAST STATIONS.

Bolinao,	SE	530	29.82-.01	var.	2	o.
S. Cape,	E/N	470	.85-.00	NNE	2	cdt.
Hoihow,	WSW	130	.78+.02	NW	3	b.
Pakhoi,	W/N	180	.75-.08	SSE	1	c.
Canton,	NNE	130	.74-.09	ESE	3	o.
Hongkong,	ENE	120	.75-.08	SSE	5	o.
Breaker Pt.,	ENE	250	.82-.02	var.	2	b.
Lamoeks,	ENE	300	.84-.02	ENE	1	c.
Turnabout,	NE	510	.87+.01	NNE	1	cv.

VESSELS.

S.S. <i>Dardanus</i> ,	16° 3'	113° 33'	SSE	320	29.77	S	2	fine.
S.S. <i>Sverre</i> ,	16 44	113 57	SSE	290		S	1	b.
S.S. <i>Lennox</i> ,	17 27	111 23	S/W	230	.78	S	3	rough sea.
S.S. <i>Mongkut</i> ,	18 22	111 33	S/W	180	.75	SSW	3	
S.S. <i>Presto</i> ,	Hainan Straits		WSW	130	.71	SW	2	clear.
S.S. <i>Activ</i> ,	21 44	112 44	NE/N	35	.50	E/S	9	sea smoking.
S.S. <i>Canton</i> ,	23 09	117 20	ENE	300	.86	E	2	c. swell.

The log of the S.S. *Activ* shows that the centre of a small cyclone passed across St. John's harbour at 3 p. on the 30th June. The wind scarcely reached typhoon force. There was no rain to speak of till after the centre had passed. Captain Hygom, who observed the phenomena carefully as is to be seen from the log printed below, has given us the following particulars in addition. They are of great value as we had hitherto no observations of the motion of clouds above the bull's eye, where it is usually so difficult to make observations.

"Before the centre passed the clouds came from 1 point south of the wind, but not very fast. They continued from that direction during the first part of the central calm. The fleck of clear sky moved slowly about NEward. The sea calmed down perfectly with the wind for an hour and a half. The clouds came from SE in the bull's eye, then from S, and then the wind burst from the opposite quarter to where it blew from before. Another clearing in the clouds were noticed to the SE. After the calm the rain was seen to come up like a wall from about 5 miles towards W."

From this we may conclude that this little typhoon originated in the evening of the 29th June or during the following night a short distance S by W of St. John's harbour. That it was not fully established till the centre was above St. John's harbour and that it there quickly ceased to blow as the centre entered the mainland.

After entering China the depression moved NNWward.

HONGKONG.

MACAO.

Date.	Hour.	Bar. to 32° & Sea Level.	Temp.	WIND.		Weather.	Rain- fall.	Bar. to 32° & Sea Level.	Temp.	WIND.		Weather.	Rain- fall.	
				Dir.	Force.					Dir.	Force.			
June 29,...	1 a.	29.80	79	SE by E	2	c	...	...	...	...	...	...	...
	4 a.	.79	79	ESE	2	c	...	29.78	79	E	1	cr	...	
	7 a.	.82	81	E by S	2	o	...	...	...	...	...	...	...
	10 a.	.82	82	E	4	o	...	.83	85	SSW	1	c	...
	1 p.	.84	78	S by E	3	op	...	.74	81	SSW	2	cr	...
	4 p.	.78	77	E by N	3	od	...	.73	80	ESE	2	cr	...
	7 p.	.79	77	E by S	4	c	...	...	...	...	...	...	...
	10 p.	.81	77	ENE	4	od	...	.80	79	E	2	c	...
	30,...	1 a.	.76	78	ENE	3	b
		4 a.	.71	79	ENE	4	c74	79	E	2	c	...
7 a.		.76	77	E by S	4	oq	...	...	...	...	...	...	...
10 a.		.78	76	SSE	4	opq	...	.75	84	SSE	2	cqr	...
1 p.		.73	83	SE by S	5	oq	...	.69	83	SSE	4	cq	...
4 p.		.67	80	SE by S	6	opq	...	.60	81	SSE	5	oq	...
7 p.		.66	82	SSE	7	eq	...	...	...	...	...	...	...
10 p.		.70	81	SE by S	7	opq	...	.68	77	S	5	oqr	...
July 1,...	1 a.	.75	78	S	4	orq	...	...	...	...	...	...	...
	4 a.	.74	80	SSW	2	or	...	.72	79	S	2	or	...
	7 a.	.77	80	SSE	5	or	...	...	...	...	...	...	...
	10 a.	.82	80	S by E	3	or	...	.80	79	SSW	2	or	...

CANTON.

HOIHOW.

Date.	Hour.	Bar. to 32° & Sea Level.	Temp.	WIND.		Weather.	Rain- fall.	Bar. to 32° & Sea Level.	Temp.	WIND.		Weather.	Rain- fall.
				Dir.	Force.					Dir.	Force.		
June 29,...	3 a.	29.78	79	ENE	2	c	...	...	...	...	...	...	...
	9 a.	.85	80	calm	...	od	0.90	29.76	84	E	3	b	...
	3 p.	.81	77	S	1	ogr	...	.76	85	E	4	b	...
30,...	9 p.	.82	77	SE	1	c	...	.84	83	E	4	b	...
	3 a.	.74	76	SE	1	c	...	...	...	...	...	...	...
	9 a.	.78	78	E	1	c	1.14	.71	83	NW	3	b	...
	3 p.	.71	82	SE	5	o	...	.75	89	NW	4	b	...
July 1,...	9 p.	.66	77	E	6	oq	...	.83	82	SE	2	b	...
	3 a.	.67	76	E	6	r q	...	...	...	...	...	...	...
	9 a.	.78	77	S	3	r	1.07	.74	85	S	3	c	...

LOG OF S.S. "ACTIV"

Day.	Hour.	Lat. or Course and Dist.	Long.	Barometer corrected.	WIND.		Weather.	REMARKS.
					Dir.	Force.		
June 28,...	Midt.	Outside	Hoihow	29.80	E	4	...	
29,...	4 a.	ENE	15 miles	.77	...	3	...	
	8 a.	...	33 "	.81	ENE	2	...	Heavy bank of clouds to SE.
	10 a.	NE $\frac{1}{2}$ E	16 "	.82	NE/E	4	...	
	Noon	NE	16 "	.80	...	4	...	Swell from SE.
	2 p.	...	16 "	.78	E	5	...	"
	4 p.	...	16 "	.75	...	5	...	"
	6 p.	...	15 "	.76	...	5	...	"
	8 p.	ENE	15 "	.77	ENE	6	...	"
	10 p.	NE/E $\frac{1}{2}$ E	13 "	.77	...	6	...	"
	Midt.	NE/E	12 "	.75	...	6	...	Heavy swell from SSE.
30,...	2 a.	...	10 "	.74	...	6	...	
	4 a.	SE	4 "	.67	E	7	r q l	Rain squalls with perfectly clear intervals and heavy bank to SE. Lightning.
	6 a.	West Coast of		.68	...	8	...	
	8 a.	21° 47'	112° 47'	.70	...	7	...	
	10 a.	...	...	.66	...	7	...	At 11 a. changed anchorage.
	Noon	21° 44'	112° 44'	.50	E by S	9	...	
	1 p.	...	...	.45	...	...	...	Sea smoking.
	1½ p.	...	...	.35	...	...	...
	2 p.	...	...	.31	...	9	...	A little less wind.
	2½ p.	...	...	.27	ESE	7	...	A speck of clear sky.
	3 p.	...	...	.26	...	2	...	Not much wind, fine rain.
	3½ p.	...	...	.27	S	1	...	"
	4 p.	21° 40'	112° 41'	.29	W by S	7	...	Wind increasing fast. Changed anchorage.
	4½ p.	...	...	.30	...	9	r ²	Heavy rain.
	5 p.	...	...	.40	...	11	...	"
	5½ p.	...	...	.47	W	11	...	"
	6 p.	...	...	.55	...	9	...	"
	6½ p.	...	...	.61	SW	6	...	"
	7 p.	...	...	.63	...	5	r l	Lightning.
	7½ p.	...	...	.65	...	3	r	Less rain.
	8 p.	...	...	.67	...	3	r ²	Heavy rain.
	9 p.	...	...	.68	SSW	5	...	"
	11 p.	...	...	.75	...	5	...	"
	Midt.	...	...	.74	...	3	...	"
July 1,...	2 a.	...	...	.74	...	3	r l	Rain and lightning.
	4 a.	Left St. John's		.70	...	4	...	
	8 a.	From Wizard			...			
		ENE | 13 miles		.79	...	5	r	Rain.
	Noon	Sharp Island		.80	...	2	o	Dry but cloudy.
	3 p.	Arrived at Hongkong.			...			

JULY.

During the first half of the month of July the weather on the China Coast and in the China Sea was fine. On the Coast between Hainan and Shanghai the general direction of the wind between the 1st and 15th was chiefly SEasterly. In the Southern part of the China Sea the SW monsoon was blowing steadily but not very strongly. About the 15th it increased in strength and moved further north to about 15° latitude with wet and squally weather and the winds on the China Coast became somewhat more Southerly. On the 17th the barometer rose in China particularly on the E Coast and gradients were established for E winds on the Coast and in the N part of the China Sea. South of 15° latitude fresh W and SW winds were blowing and at the time there appears to have been a trough of low pressure across the China Sea in about 15° to 16° latitude. The barometer was falling rather sharply in Luzon. At Manila there was a gentle SW breeze and overcast weather.

The central area of depression appears to have been in about 16°, 114° almost stationary but perhaps moving a little towards WNW.

Observations for 17th July at noon:—

COAST STATIONS.

Manila,	29.77 - .07	SW	3	om.
Bolinao, .....	.74 - .04	SSE	1	c.
Hoihow, .....	.73 + .04	NE	3	b.
South Cape, .....	.74 - .02	NNE	2	c.
Hongkong, .....	.76 .00	E	3	o.
Breaker Point, .....	.77 + .02	NE	2	c.
Lamocks, .....	.80 + .03	ENE	2	c.
Swatow, .....	.80 + .03	ENE	2	c.
Fisher Island, .....	.77 - .01	NNW	3	cv.
Amoy, .....	.81 + .02	NE	1	b.
Turnabout, .....	.82 + .02	NNE	4	cm.
Steep Island, .....	.86 + .05	SSE	3	cv.
North Saddle, .....	.82 + .06	SE	4	c.

VESSELS.

S.S. <i>Sikh</i> ,	4° 49'	106° 39'	29.78	SE	2	fine.
S.S. <i>Cheang Chem</i> ,	10 1	110 1	.70	SW	6	oqlr.
S.S. <i>N. S. de Loreto</i> ,	11 28	120 12	...	W	5	
S.S. <i>Namyong</i> ,	11 29	110 29	.73	SW/W	7	
Sh. <i>J. D. Bischoff</i> ,	14 50	114 39	.65	var.	2	oqr.
Sh. <i>Carl Friedrich</i> ,	14 48	113 15	.63	W	4	o.
S.S. <i>Michael Jebsen</i> ,	14 43	110 11	.70	W	4	og.
Bq. <i>Heinrich</i> ,	15 11	113 31	...	WNW	5	qr.
Bq. <i>Vagabond</i> ,	17 27	114 48	.65	E/N	6	p. rising sea.
S.S. <i>Gravator</i> ,	19 1	113 55	.65	E	3	c.
S.S. <i>Chowfa</i> ,	19 3	112 0	.69	ENE	5	c.
S.S. <i>Activ</i> ,	19 6	108 16	.73	ENE	1	c.
S.S. <i>Memnon</i> ,	19 57	115 9	.68	SE	5	clear.
S.S. <i>Kowshing</i> ,	20 39	118 49	.76	E	4	c.
S.S. <i>Zafiro</i> ,	22 39	115 49	.75	E	3	orq.

On the 18th July the barometer had on the whole fallen slightly on the S and SE Coasts but had risen on the East Coast. Winds over these districts were light to moderate E breezes on the S coast, fresh NE breezes on the SE coast, and light SE breezes on the East coast. In the latter district the weather was fine. On the SE and S coasts cloudy weather prevailed with drizzling rain at some stations. In Luzon the barometer had risen slightly with light S winds and cloudy skies. At Cape St. James there was a strong SW breeze and squally weather. Vessels south of Hongkong and in the N part of the middle of the China Sea had strong E to NE breezes and squally weather. West of Bolinao the *Kowshing* and the *Memnon* had strong SSW and SSE breezes respectively with squally weather and showers in the case of the *Kowshing*. The *Michael Jebsen*, to the S of Hainan, had a moderate N gale while the *Cheang Chew* to the East of Annam had a fresh WNW gale with rain squalls and high sea. The *Sikh* to the East of Cochin China had SW 5 and the wind veering to W with falling barometer as she progressed northwards.

At noon on the 18th July the centre was in about 16°, 113° and shortly afterwards it re-curved.

It thus appears that the origin of the depression which subsequently developed into a typhoon may be traced to a spot with squally and wet weather in the midst of a district with rather low barometer in the China Sea round which light variable winds following the coast lines gyrated against the sun.

Observations for the 18th July at noon:—

COAST STATIONS.

Manila,	ESE	400	29.79 + .02	S	1	o.
Bolinao,	E	350	.75 + .01	S	2	o.
Hoihow,	NW	300	.73 .00	ENE	3	c.
Hongkong,	N/E	400	.75 - .01	E	3	c.
South Cape,	NE	550	.77 + .03	NE	4	og.
Breaker Point,	NNE	450	.75 - .01	E	5	om.
Lamocks, .....	...	...	.75 - .05	NE	5	omd.
Fisher Island,	NE	550	.72 - .05	SSE	1	cm.
Amoy,	NNE	600	.78 - .03	NE	4	c.
Turnabout,	NE	700	.81 - .01	NE	5	cm.
Steep Island,	NNE	950	.87 + .01	SSE	2	cv.
North Saddle,	NNE	950	.85 + .03	SE	2	c.

VESSELS.

S.S. <i>Sikh</i> ,	8° 15'	109° 9'	SW	500	29.88	SW	5	o.
„ <i>Namyong</i> ,	10 30	107 50	SW	450	.79	WSW	4	q.
„ <i>Cheang Chem</i> ,	12 55	109 48	SW	300	.67	WNW	8	q. high sea.
„ <i>N. S. de Loreto</i> ,	13 30	118 19	SE	300	...	WNW	6	o.
„ <i>Kowshing</i> ,	16 20	119 39	E	350	.75	SSW	6	oqr.
Sh. <i>Carl Friedrich</i> ,	16 26	113 8	NW	50	.54	NE	6	oq.
S.S. <i>Memnon</i> ,	16 38	116 13	E/N	150	.63	SSE	6	q.
Sh. <i>J. D. Bischoff</i> ,	17 16	114 45	NE	100	.62	ENE	5	oqr.
Bq. <i>Heinrich</i> ,	17 36	114 21	NNE	120	...	E/N	4	q. heavy sea.
S.S. <i>Michael Jebsen</i> ,	17 24	111 7	NW	150	.63	N	7	
Bq. <i>Vagabond</i> ,	19 57	114 20	NNE	250	...	NE/E	5	
„ <i>Nicoya</i> ,	20 23	114 26	NNE	275	.77	E	5	op. moderate sea.

On the 19th July, at noon, the barometer had fallen about 0.07 inch since noon of the previous day on the S Coast, less so on the SE Coast. In Hoihow and Hongkong the wind was a NE gentle to moderate breeze and the weather showery with thunder and lightning in the afternoon at Hoihow. On the SE Coast light to moderate NE breezes prevailed with cloudy and, in some cases, showery weather. At S. Cape (Formosa) there was a slight fall in the barometer with NNE 3 and cloudy sky. On the East Coast pressure had given way considerably and light SE breezes prevailed with fine weather. In Luzon the barometer showed a slight rise with overcast sky and light to moderate S and SW breezes. At Cape St. James it was overcast and there was a strong SW breeze. The sailing vessels *J. D. Bischoff* and *Heinrich*, N of the centre, in about 20°, 114° had NE and ENE strong breezes increasing in force and backing towards evening with heavy rain squalls and irregular sea.

The barometer was falling quickly (*J. D. Bischoff* 29.45 at midnight 19th NE 7 backing and increasing). The centre was at noon moving about NE by N and approaching those vessels. The Barquentine *Vagabond* at noon about 50 miles S of Hongkong had the wind backing to NE during the evening and increasing to a fresh gale with hard squalls and a fast falling barometer. Her commander, suspecting a typhoon, took down the royal yards. The *Michael Jebsen* NW of the centre had the barometer falling (8 p. 29.56) the wind backing to NNE and increasing to a fresh gale with very high cross sea. The *Nicoya* and *Carl Friedrich* were about 100 miles WSW of the centre. The latter had a fresh WNW breeze increasing and backing with rain squalls, a threatening appearance to NE and a very high cross sea. The vessel was hove to at 4 p. At midnight, 19th July, the barometer read 29.53 and had ceased falling, wind W 5. The *Nicoya* noted the wind as a fresh NW gale at noon 19th. Fresh W breezes blew on the Coast of Annam. East of Cochinchina fresh SW breezes. N of *Palawan* the *Memnon* had strong SW breezes with rain squalls and high sea. She was about 350' SE of the centre. The *N. S. de Loreto* also SSE of the centre distant about 250 miles had a strong NW breeze according to the log book but this appears to be wrong probably SW should have been written. West of the Bashee Channel the *Zafiro* NE by E of the centre had SE 4 with heavy rain. She was steering S/E and towards evening the wind became S 3 with heavy S swell rain squalls and lightning to SW.

The centre was, at noon on the 19th July, in 18°15', 113°45' moving NE by N and the depression was evidently increasing in intensity.

Observations for noon of July 19th:—

COAST STATIONS.

Bolinao,	ESE	360	29.76 + .01	S	2	o.
Hoihow,	NW	250	.69 - .04	NE	3	clt.
Hongkong,	N	250	.68 - .07	NE	4	o.
South Cape,	NE/E	450	.75 - .02	NNE	3	c.
Fisher Island,	NE	450	.75 + .03	NW	2	c.
Breaker Point,	NNE	340	.72 - .03	ENE	5	gmd.
Lamoeks,	NNE	380	.74 - .01	NE	4	mr.
Amoy,	NE/N	450	.76 - .02	NE	1	c.
Turnabout,	NE	600	.79 - .02	ENE	2	c.
Steep Island,	NE	900	.81 - .06	SE	2	cm.
North Saddle,	NE	940	.78 - .07	SE	2	bm.

VESSELS.

S.S. <i>Namyong</i> ,	7° 21'	106° 29'	SW/S	800	29.88	SW	4	
" <i>Camelot</i> ,	8 35	108 4	SW/S	700	...	SW	5	orl. increasing sea.
" <i>Sikh</i> ,	11 10	111 33	SSW	450	.81	W	5	
" <i>Memnon</i> ,	13 42	117 21	SE/S	350	.76	SSW	6	orq. high sea.
" <i>Sungkiang</i> ,	14 30	120 16	SE	430	.76	SW	5	q.
" <i>N. S. de Loreto</i> ,	14 45	116 15	SSE	250	...	?NW	6	o.
" <i>Cheang Chen</i> ,	16 5	108 42	WSW	330	.62	WNW	4	fine sultry.
Sh. <i>Carl Friedrich</i> ,	17 31	112 22	WSW	100	.56	WNW	5	rq. cross sea.
Bq. <i>Nicoya</i> ,	17 30	112 20	WSW	100	...	NW	8	rq.
S.S. <i>Michael Jebsen</i> ,	19 44	112 34	NW/N	120	.60	NNE	7	increasing sea.
Sh. <i>J. D. Bischoff</i> ,	19 49	113 57	N	100	.57	NE	6	o.
Bq. <i>Heinrich</i> ,	19 50	114 20	NNE	100	...	ENE	4	heavy cross sea.
S.S. <i>Alvine</i> ,	20 21	110 55	NW	220	.62	NE	6	
" <i>Zafiro</i> ,	21 11	118 51	NE/E	330	.74	SE	4	or. choppy sea.
Bq. <i>Vagabond</i> ,	21 26	114 1	N	200	.65	ENE	6	rq. hard rain squalls.
S.S. <i>Chusan</i> ,	21 45	113 30	N	230	.67	NE	3	orq.
" <i>Activ</i> ,	?(22 0	113 30)	N	240	.67	NE	3	orq.
" <i>Gaelic</i> ,	24 24	118 52	NE	460	.82	NE	3	op. sultry.

During the evening of the 19th July, the barometer at Hongkong was falling fast (at 8 p. 29.62). The wind was a fresh to strong ENE breeze, there was occasional drizzling rain and the clouds were of the R-cum type from ENE. At Victoria Peak the wind was NE 6, the direction having backed from E since the morning. At Hoihow the barometer was falling slightly during the evening with NE 3 detached clouds and thunder and lightning, but no rain fell. In S Formosa the barometer was falling (S. Cape 9 p. 29.72), the wind was ESE 2 with cloudy sky. On the SE coast, the barometer was falling moderately fast in the S part of the district with ENE and NE 4 and occasional rain showers. In the north part the barometer fell less quickly, the ENE wind was somewhat lighter in force, and the weather fine. On the E coast the barometer was falling slightly with SE light breezes and fine weather. At Bolinao, the barometer was steady (at 6 p. 29.72) with light S and SSE breezes and overcast weather. The clouds came from SSW.

On July 20th, during the morning hours, the barometer continued to fall at Hongkong and the wind backed through NE to N force 3. The weather was overcast, and, between 3 and 4.30 a., a slight thunderstorm passed East of the Colony appearing in the NE and disappearing in the SE. The direction of the lower clouds had backed with the wind. The lowest reading of the barometer occurred at 3 p. (29.42 actual, 29.45 corrected for daily variation). At the time it was almost calm, the anemograph only recording a velocity of 6 miles between 2.30 and 3.30 p. the direction being N by W. The latter, however, rapidly backed to WNW and increased to a velocity of 23 miles per hour at 8 p.

(barometer 29.49 actual). Later it backed still further and the velocity decreased, at midnight WSW 9 miles per hour, (barometer 29.50 actual). The direction of the lower clouds also backed from NE at 1 p. to N at midnight.

The weather during the afternoon and evening had a threatening appearance, but with the exception of a few spots of light rain occasionally and a slight shower about 7 p., no rain fell. The atmosphere was unusually clear during the latter part of the day and distant objects were very distinctly seen. At Victoria Peak, the direction of the wind, which had been NE 5, backed to NW 3 between 4 p. and 7 p., and at 10 p. it was also NW 3. The mean temperature for the 20th July was 80°.1, this being 1°.4 lower than the mean of 5 years.

Considering that the centre was at noon only 100 miles to the SE of the Colony the light winds recorded may appear remarkable, but the high land to the northward has at all times a great effect in diminishing the strength of N winds in the Colony and it frequently happens that a moderate N gale is blowing at sea a short distance to the Southward when only light to moderate breezes are experienced in the Colony.

At Hoihow, the barometer was falling, there was a light SE breeze during the morning, but the direction veered to SW 4 just after noon and became NW 3 in the evening. The weather was fine and lightning was seen at night. At Canton, the barometer was falling during the day. The wind was ESE 2 at 3 a. backing to NE 2 at 9 p. with detached clouds. At 3 p. it was E 6 with overcast sky and passing showers and towards evening WSW 2, detached clouds. The strong E breeze at 3 p. does not agree with the bearing of the centre of the typhoon at that time. The direction is probably influenced to a great extent by the situation of the observing station.

In Southern Formosa moderate SSE breezes prevailed chiefly on the 20th with showery weather and falling barometer.

In Luzon cloudy weather with moderate to fresh SW breezes prevailed and the barometer was inclined to fall a little. At Bolinao, there was a light SE breeze the lower clouds coming from the same direction. On the SE coast, during the morning hours of the 20th July, moderate to strong E and NE breezes blew with drizzling rain and showers in the South part, and in the North part light and gentle NE breezes with cloudy but fine weather. The barometer was falling rapidly in the whole district. The weather towards evening on this part of the coast will be described in detail later on.

The weather experienced by vessels during the morning hours of July 20th was as follows:—

The *Chi Yuen* off Amoy and NE of the centre had ENE 4 with thick drizzling rain and falling barometer (4 a. 29.69, 8 a. 29.65). The *Glengyle* off Swatow had the wind variable and squally force 4 with rain squalls and a moderate S and SW sea. Towards noon the wind settled down at ENE and increased to force 6 with gloomy sky. The *Oceana* in about the same position had at 4 a. NE 7 increasing and vivid lightning was observed to the SE and SW. The *Ningpo* bound for Hongkong and about half way between Swatow and the former port had SE 3 up to 5 a. (barometer 29.54 falling) with squally wet weather and lightning to SW. There was a SE and later a S swell. About 6 a. the wind backed to NNE force 2 to 3. This vessel was at first NNE and later N of the centre. The *Gaelic* approaching Hongkong from the Eastward had ESE 4, barometer (4 a. 29.58) falling, heavy rain squalls, rough sea and SE swell.

On the morning of the 20th July, the wind veered to SSE and SE force 5 at Lamocks, and two or three vessels at the time between that station and Hongkong also had the wind SE and variable and squally weather just before they entered the area of strong winds.

The *Michael Jebson*, WNW of the centre and approaching Hongkong, had at 4 a. N by E 7 (barometer 29.48), at 8 a. N by W 8 (barometer 29.48) with very high NNE sea, at 6 a. the atmosphere was noted as "very clear." Thereafter the wind and sea decreased at noon N by W 6 with barometer inclined to rise. The *J. D. Bischoff*, W of the centre, had a strong N backing gale at 4 a. (barometer 29.45), at 8 a. NNW 9 (barometer 29.48). The barque *Heinrich*, SW of the centre, had at noon a fresh WNW gale with heavy squalls and high sea. The barque *Vagabond* had run to the SW since the previous day and was to the WSW of the centre during the morning. She experienced at 4 a. a strong WNW gale backing and decreasing with heavy squalls. The top gallant masts were taken down at 4 a. West of Bolinao, the *Sungkiang* and *Zafiro*, SE of the centre had strong SW and S breezes with heavy cross sea and squally showery weather. East of Annam S to W moderate to strong breezes prevailed. The centre at noon on July 20th was situated in 21° 0', 115° 45', moving NE ward.

The following are the noon observations for July 20th:—

COAST STATIONS.

Bolinao,	SE	370	29.75	— .01	SSE	2	o.
Hoihow,	WSW	330	.60	— .09	SE	3	c.
Hongkong,	NW	100	.47	— .21	N	3	o.
Canton,	NW	190	.51	— .13	ENE	4	cg.
Breaker Point,	N/E	110	.48	— .14	E	7	omgr.
Swatow,	N/E	150	.49	— .16	NE	4	oqr.
Lamocks,	NE/N	190	.57	— .17	ESE	3	omr.
S. Cape,	E/N	300	.66	— .09	SSE	4	cp.

COAST STATIONS,

Takow,	ENE	300	.65	-.13	SE	8?	g.
Anping,	ENE	300	.62	-.13	SSE	3	opq.
Fisher Island,	NE	280	.62	-.13	SE	3	omr.
Chapel Island,	NE/N	260	.58?	-.14	E	3	omr.
Amoy,	NE/N	270	.63	-.13	NE	2	or.
Turnabout,	NE/N	370	.67	-.12	NNE	3	c.
Middle Dog,	NE/N	410	.62	-.12	N	1	c.
Foochow,	NE/N	420	.66	-.10	var.	1	c.
Tamsui,	NE	380	.69	-.06	NW	1	b.
Keelung,	NE	400	.66	-.11	NE	2	c.
Steep Island,	NE/N	670	.68	-.13	SSE	1	c.
North Saddle,	NE/N	700	.65	-.13	SSE	2	bm.

VESSELS.

S.S. <i>Memnon</i> ,	10° 54'	118° 2'	S/E	600	29.78	SW	6	fine.
" <i>Camelot</i> ,	12 9	110 52	SSW	600		WSW	6	fine clear mod. sea.
" <i>Sikh</i> ,	15 10	113 27	SSW	390	.68	S	3	fine.
Bk. <i>Nicoya</i> ,	16 12	111 18	SW	390		S	or.	
S.S. <i>Sungkiang</i> ,	17 35	118 11	SSE	250	.56	SW	6	or. heavy beam sea.
" <i>N. S. de Loreto</i> ,	17 44	115 28	S/W	200		WNW	6	o.
" <i>Zafiro</i> ,	17 51	119 49	SE	310	.68	S	5	o. cross sea.
Sh. <i>Carl Friedrich</i> ,	18 19	112 34	SW	260	.58	W/S	3	cross sea.
Bk. <i>Heinrich</i> ,	19 37	114 21	SW	120		WNW	8	q. increasing sea.
S.S. <i>Cheang Chew</i> ,	19 22	107 45	WSW	480	.56	SW	6	
Bk. <i>Vagabond</i> ,	20 10	113 22	WSW	140	.37?	WNW	8	
Sh. <i>J. D. Bischoff</i> ,	20 5	113 16	WSW	150	.52	NW	6	rq.
S.S. <i>Michael Jensen</i> ,	21 29	113 20	WNW	130	.48	N/W	6	decreasing sea.
" <i>Alwine</i> ,	21 35	112 44	WNW	160	.50	N	5	swell.
" <i>Charters Tower</i> ,	22 18	114 40	NNW	90	.46	NE	5	qr.
" <i>Ningpo</i> ,	22 25	114 50	NNW	90	.43	NE	4	orq. S. swell.
" <i>Oceana</i> ,	22 42	116 34	NNE	100	.49	NNE	8	orq. confused sea.
" <i>Glengyle</i> ,	22 56	116 41	NNE	120	.55	ENE	6	g. increasing wind.
" <i>City of Rio de Janeiro</i> ,	23 21	117 40	NE	170	.55	SE	6	orq.
" <i>Kilmoon</i> ,	23 57	118 15	NE	200	.58	NE	5	orq.
" <i>Chi Yuen</i> ,	off Amoy		NE/N	220	.67	E	4	od.
" <i>Electra</i> ,	25 54	120 31	NE/N	400	.63	E	2	
" <i>Benlarig</i> ,	26 30	120 30	NE/N	420	.66	ENE	2	
" <i>Continental</i> ,	26 20	120 35	NE/N	410	.69	NE	2	high NE swell.

The *Glengyle* and the *Oceana* were off the coast in the vicinity of Breaker Point at noon on 20th July the centre of the typhoon being at that time about 100 miles SSW of their position. The former vessel had a strong ENE increasing breeze with barometer falling sharply and a gloomy threatening appearance. At 12.30 p.m. her commander seeing indications of an approaching typhoon made for Swatow and there at the outer anchorage rode out the storm. The *Oceana* noted the wind at noon as a fresh NNE gale with rapidly falling barometer and confused sea. This vessel was hove to just after 4 p. and during the evening experienced a strong N backing to NW gale with heavy rain squalls. The lowest reading of the barometer was at 9 p. (29.21). The typhoon passed, perhaps, 50 miles E of her about that time it having advanced towards her position during the afternoon. This vessel was the only one at sea in the vicinity of the centre during the evening of the 20th, and during the passage of the typhoon across the Formosa Channel no vessel encountered the full force of it. Vessels lying at the Coast Ports remained at anchor, warnings having been received from the Hongkong Observatory, and those at sea quickly sought shelter. Some vessels from Japan bound to Hongkong ran into bad weather on the 21st in the northern part of the Channel.

For determining the track of the typhoon in this part of its course the observations at the light stations and Coast Ports around the Channel are fortunately sufficient.

At 6 p.m. on July 20th the centre was situated in 22° 10', 117° 05' and at midnight in 22° 52', 117° 40'.

During the evening of the 20th July NE gales with rain squalls were felt at Breaker Point, Swatow and Lamocks with quickly falling barometer. In the northern part of the Formosa Channel the wind was from E and ENE force 2 to 3, and the weather cloudy. At Fisher Island and the SW coast of Formosa the wind was SE 3 to 4 with overcast sky, passing showers and lightning. The barometer was falling moderately fast. At Lamocks the wind had backed and was at 9 p. N 9, the barometer at the time was falling very rapidly. By midnight the wind had increased to N 10 and the barometer (29.05) had fallen 0.2 inch since 9 p. There were very heavy squalls of wind and rain. At 1 a. July 21st the barometer read 28.95 the wind being N 11, at 2 a. the same reading of the barometer and similar wind and weather. At 2.30 a. the lowest reading of the barometer (28.93) was recorded and the wind backed to NW 11. At 3 a. the barometer (28.99) had risen a little, the wind continuing at NW of storm force with continuous squalls of wind and rain. The barometer thereafter rose quickly (6 a. 29.17) and the wind backed to WNW but was still of force 10. The centre passed about 30 miles to the Eastward of this station at 2.30 a. July 21st.

At Swatow 37 miles to the Westward of Lamocks at 2 a. July 21st the wind was N of force 5 only, the barometer 29.27 (lowest reading). The same reading of the barometer was registered at 3 a. but the wind had backed and was NW 4. After this time the barometer commenced to rise. The

weather was gloomy with slight rain. These are the observations made at the Custom House. On board the *Fokien* at anchor in the river the wind direction was noted as NW/W, the barometer reading 29.29 (lowest reading) at which point it remained until 5 a. when the wind was observed as NW/W 8 with frequent heavy squalls. After 5 a. the wind quickly moderated with rising barometer.

By reference to the log of the *Glengyle* at anchor about 4 miles to the Eastward of Swatow Custom House, it will be seen that a whole NE backing to NW gale was experienced during the evening of the 20th and early morning of July 21st with furious squalls and much rain. The lowest reading of the barometer was 29.18 at 5 a. July 21st.

Probably the force of wind was over estimated on board the *Glengyle* though it must be remarked that the gradient from Swatow Eastward to Lamocks was extremely steep during this time corresponding to a gradient of 0.13 in 15 miles at 2.30 a. July 21st.

The lowest reading of the barometer at Breaker Point was at 9 p. July 20th (barometer 29.56), the wind being at the time NNE 8 with rain squalls. The centre was then about 60 miles to the ESE of the station. The same wind and weather is noted at midnight but the barometer showed then a rise of 0.02 inch since 9 p. By 3 a. July 21st the wind had backed to W 6 (barometer 29.30). Thereafter the barometer rose quickly and the weather improved.

The rainfall measured for the 24 hours ending July 21st at 9 a. was, at Lamocks 6.70, Breaker Point 2.85, and Swatow 1.69 inches.

The typhoon was advancing in a NE by N direction between midnight of July 20th and 6 a. of July 21st almost directly upon Chapel Island. At that station the wind had increased from NE 4 at 9 p. July 20th to NE 7 at midnight (barometer 29.41 midnight). The weather was wet and gloomy. Thereafter the wind continued to increase in force preserving the same direction and the barometer to fall quickly. At 5 a. July 21st the wind veered to ENE force 10 (barometer 29.18) the centre of the typhoon bearing at the time S by W 50 miles. At 6 a. the wind direction backed to NE. At 7 a. it was NNE 11 which direction it maintained until 11 a. the greatest force being registered at 9 a. and 10 a. as 11 to 12. The lowest barometer reading occurred at 9 a. (29.13) the centre of the typhoon then bearing SSE 40 miles. The rainfall for the previous 24 hours measured at 9 a. July 21st was 4.96 inches.

On July 21st at 6 a. at Amoy there was strong NE wind and wet squally weather (barometer 29.33). At the lighthouse stations in the north part of the Channel there was a moderate ENE increasing breeze with a threatening appearance and in some cases drizzling rain and the barometer falling.

At Fisher Island the barometer fell very sharply after 9 p. of July 20th and the wind which had been ESE 6 at 9 p. veered to SE at 1 a. July 21st and increased to force 8, the centre bearing WSW 100 miles at the latter hour. The weather was wet and squally and so continued. The wind direction continued practically steady in direction but increasing in force, at noon it was SE 10, centre of typhoon bearing W 30 miles distant. The barometer continued to fall rapidly (July 21st 6 a. 29.30, noon 29.15). The barometer at Chapel Island had risen 0.09 inch since 9 a. and read at noon July 21st 29.22, the wind at the latter hour being N 10. At Lamocks the barometer had continued to rise quickly (9 a. 29.27, noon 29.37) and the wind was at noon July 21st W 7, the weather continuing very wet and squally. The bearing of the centre was then ENE 95 miles. At Anping, on July 21st, at 3 a., the wind was SW 6 (barometer 29.50) which agrees badly with the bearing of the centre at that time, which was W/N 130 miles. At 8 a. it was S 7 (barometer 29.46), at noon SW 9 (barometer 29.36). The weather was very squally and showery. At Takow the wind during the morning hours of the 21st July was a fresh breeze to moderate gale from S and SSE. At noon S 8 with barometer reading at 6 a. 29.50, at noon 29.42 with the centre at the latter hour bearing NW 95 miles. The weather was wet and squally and lightning had been observed during the early morning. It may be mentioned that at Anping "two shocks of earthquake lasting 3 seconds N to S were felt at 11.20 a.m." At Takow the shock was also felt the time given being 11.17 a.m., duration 10 seconds. On this part of the Formosa Coast, earthquake shocks are of rather frequent occurrence. S Cape had the wind SSW increasing from force 3 at 3 a. (barometer 29.49) to 6 at noon July 21st (barometer 29.48) when the centre bore NW 145 miles. The wind had veered a little since the previous evening. The weather was showery, squally, and thunder was heard. The temperature was rather high during the early morning hours of the 21st July being at 3 a. 82°.8. At Tamsui and Keelung on the North Coast of Formosa light SE airs and breezes and cloudy but fine weather prevailed at noon on July 21st with falling barometer, and at the lighthouse stations near the northern entrance to the Channel moderate to strong ENE and NE breezes with squally weather and falling barometer. At Hongkong the barometer had risen but slightly and remained practically steady all day on July 21st. Temperature was rather high, the mean of the 24 hours being 82°.8. The wind was a moderate SSW breeze at 3 a. (barometer 29.49), but after 5 a. the wind veered to about WNW and continued this direction with force 1 to 2 until noon (barometer 29.51), during the afternoon it backed to about SW and increased a little in force, but towards evening it became calm. The weather was fine but hazy with lightning in the evening. The lower clouds came from NW in the morning but backed to W in the evening. C-cum cloud came from NW. At Victoria Peak there was a moderate W breeze all day. The bearing of the centre from Hongkong was ENE 270 miles at noon July 21st and E by N 340 miles at midnight.

In Luzon on the 21st July at noon moderate SW winds prevailed and the barometer had fallen slightly since the previous day. At noon on July 21st several vessels to the Southward of Hong-

kong had fresh W breezes and fine weather. The *Asagao*, 25 miles ENE of Lamocks, had a strong WNW breeze, rainy weather and confused sea. The *Oceana*, about 45 miles SSW of Lamocks, had also WNW 6 with confused sea. This vessel it will be noticed had allowed the typhoon to pass her on the previous evening and was now following it up keeping at a safe distance by steaming at reduced speed. The *Chi Yuen* lying at the Amoy outer anchorage had a strong NE gale during the morning of July 21st with hard squalls and rain. The *Benlarig* passed into the N entrance of the Channel during the evening of the 20th July bound for Hongkong, and at 2 a. July 21st had a fresh ESE breeze increasing. About 5 a., the wind and sea rising and the barometer falling rapidly, the vessel was hove to heading E. Later the wind increased and at noon she had a fresh NE by E gale, the barometer being steady at 29.32. At this time she must have been only about 50 miles N by E of the centre if her position as entered in the log can be relied on. The *Continental* also off Ockseu at 2 a. July 21st bound South had at 4 a. a strong ENE gale with rain squalls and high confused sea. She sustained some damage on deck and at 8 a. the cargo shifted. At 10 a. she had a "very hard gale" from ENE and the lowest reading of the barometer 29.42. At noon the vessel was taken into Haitan Bay for shelter and in consequence of a list. She was at 6 a. July 21st about NE of the centre 100 miles. The *Electra* was even closer to the centre at noon July 21st. Her position is given as 23° 44', 118° 18' and she was proceeding Southward. During the early morning hours of the 21st she had a NE increasing breeze with rapidly falling barometer (6 a. 29.55). At noon she had a strong NE gale (barometer 29.23). She was then 40 miles WNW of the centre. Thereafter the barometer rose quickly and the wind backed and decreased in force, at 6 p. NW 6, (barometer 29.39).

At 6 a.m. on July 21st the centre of the typhoon was in 23° 30', 118° 10' and until this hour as before stated, it had been advancing in a NE by N direction and appeared likely to move up the Channel, but at this time its course was deflected and it moved ENEward for a short time then Eastward and at the latter end of the day SEward. The cause of the very unusual path of this typhoon: recurvature in the China Sea in July (cases in November have occurred) and motion NEward across Formosa, was probably connected with another typhoon, which was at this time ENE of Formosa. Typhoons have a tendency to approach the tracks of their predecessors. The centre at noon on July 21st was situated in 23° 35', 118° 55'.

The following are the observations for July 21st at noon:—

COAST STATIONS.

Bolinao,	S/E	450	29.71	-.04	S	2	o.
Hoihow,	WSW	520	.59	-.01	NNW	3	c.
Hongkong,	WSW	270	.51	+.04	W	2	c.
Breaker Pt.,	WSW	140	.47	-.01	W	3	omp.
Swatow,	W/S	130	.39	-.10	NW	3	ogd.
Lamocks,	WSW	95	.37	-.20	W	7	mrq.
Chapel Island,	NW	60	.22	-.36	N	10	omd.
Amoy,	NW	80	.33	-.30	NNE	6	odg.
Ockseu,	NNE	85			NE	4	omd.
Turnabout,	NNE	130	.45	-.22	ENE	6	omq.
Middle Dog,	NNE	160	.47	-.15	NE	4	cmq.
Foochow,	N/E	150	.48	-.18	ENE	3	or.
Steep Island,	ENE	450	.66	-.02	NE	2	cv.
North Saddle,	NNE	480	.60	-.05	E/S	2	c.
Tamsui,	NE	165	.47	-.22	Calm		c.
Keelung,	NE	180	.48	-.18	ESE	2	c.
Fisher Island,	E	30	.15	-.47	SE	10	omrq.
Anping,	ESE	80	.36	-.26	SW	9	opq.
Takow,	SE/E	95	.42	-.23	S	8	rq.
S. Cape,	SE	140	.48	-.18	SW/S	6	rq.

VESSELS.

S.S. <i>Memnon</i> ,	8° 0'	116° 45'	S/W	700	29.79	SW		fine clear.
" <i>Zafro</i> ,	14 55	120 3	S/E	520	.73	SSW	3	or.
Bk. <i>Nicoya</i> ,	16 1	109 45	SW	700		SSW		orq.
S.S. <i>Sikh</i> ,	19 16	114 13	SW	360	.66	S	4	fine.
" <i>N. S. de Loreto</i> ,	19 51	114 34	SW	330	.58	W	3	c.
Sh. <i>Carl Friedrich</i> ,	19 56	113 24	SW/W	370	.56	W	3	
S.S. <i>Sungkiang</i> ,	20 4	115 57	SW/S	260	.51	SW	5	o. high sea.
" <i>Cheang Chew</i> ,	20 3	110 20	WSW	530	.53	SW	6	
" <i>Wingsang</i> ,	21 26	114 0	WSW	300	.46	W	6	b. moderate sea.
" <i>Decima</i> ,	21 36	113 38	WSW	310		WSW	5	o. moderate sea.
Bk. <i>Heinrich</i> ,	21 39	114 37	WSW	270		W	5	l. high sea.
S.S. <i>Thales</i> ,	22 30	114 45	W/S	240	.51	W	4	o. SSW swell.
" <i>Oceana</i> ,	22 28	117 3	WSW	120	.41	WNW	6	high sea.
" <i>Asagao</i> ,	23 28	117 41	W/S	70		WNW	6	or. confused sea.
" <i>Electra</i> ,	23 44	118 18	WNW	40	.23?	NE	9	
" <i>Benlarig</i> ,	24 20	119 14	N/E	55	.32	NE/E	8	moderating.
" <i>Mathilde</i> ,	25 56	120 14	NNE	160	.50	SE	5	
" <i>City of Rio Janeiro</i> ,	26 24	121 43	NNE	220	.50	ENE	5	orq.
" <i>Fushun</i> ,	27 5	121 0	NNE	240		ENE	4	q. clear.
" <i>Tsinan</i> ,	27 18	122 21	NNE	290	.58	ENE	4	fine clear.
" <i>Bengloe</i> ,	27 21	122 0	NNE	270		E	4	o.
" <i>Kilmoon</i> ,	27 37	121 32	NNE	280	.54	NE	4	

During the afternoon, between 4 and 4.30 p.m., the centre passed South of Fisher Island and probably within 10 miles of the station. The lowest reading of the barometer was 28.75 at 4.30 p.m. (it had fallen 0.4 since noon) the wind being from NE of full typhoon force with heavy squalls and torrents of rain. By referring to the observations printed elsewhere it will be seen how quickly the wind direction changed. It had been steady at SE up to 2.30 p.m. but had increased in violence from force 9 at 11 a.m. to force 11 at 2.30 p.m. At 3 p.m. it was ESE 11, 3.30 p.m. E 12, 4 p.m. NE 12, 4.30 p.m. NE 12, 5 p.m. N 12 at which direction it remained till after 9 p.m. though the force of course decreased. The typhoon was moving away from the station in a SEasterly direction.

From the Fisher Island and Anping observations alone the centre can be very accurately determined and at 6 p.m. 21st July was situated in $23^{\circ} 20'$, $119^{\circ} 40'$. At the latter station the barometer had been falling very rapidly since noon and the wind direction had backed from SW to S and increased to force 10. At 6 p.m. the barometer read 28.98, it had fallen 0.38 since noon. There was very heavy rain and squalls. At Takow the barometer had fallen from 29.42 at noon to 29.23 at 6 p.m. and from the observations made on H.M.S. *Firebrand*, which was at anchor in Takow harbour it is seen that the wind remained steady in direction from SSW but increasing in force. The weather had been very wet and squally the whole day. At 6 p.m. SSW 8 was observed on the *Firebrand*. At the Custom House at 3 p.m. the wind is entered as WSW of force 10. The wind forces observed at the Custom House for the previous day and up to this time as compared with the adjacent stations are doubtless over estimated. This is seen from the wind observations at S Cape and Anping together with those of the *Firebrand* for the 20th. Moreover had it not been for presence of the *Firebrand* at Takow, the wind observations would not have been put on record as although frequent observations of the barometer were made at the Custom House, no observations of wind were recorded between 9 p.m. of the 21st and 9 a.m. of the 22nd between which hours the centre of the typhoon passed over the port.

At S Cape the barometer had fallen 0.14 since noon and at 6 p.m. read 29.34. The wind had veered since the former hour and increased in force, it was now from SW of force 7, the weather being squally, showery and gloomy.

On the other side of the Channel on July 21st at 6 p. Lamooks, Swatow and Breaker Point had light to gentle W & SW breezes with overcast weather barometer 29.43 at the latter station and Lamooks. The *Fokien* near Breaker Point having left Swatow for Hongkong about noon reported "moderate W to SW winds with rain and heavy cross swell to port." The barometer was rising. At Chapel Island there was a moderate NNW gale, barometer 29.29 and cloudy weather. The *Benlarig* had at 8 p.m. a strong W gale with increasing sea. At 6 p.m. "brilliant yellow sunset" was noted. At the lighthouse stations in the N part of the Channel the wind was backing and increasing somewhat in force, the weather being cloudy and squally. Turnabout and Middle Dog both had the barometer reading at 6 p.m. 29.37 this being the lowest recorded and wind being NE 6 and ENE 6 respectively. At Ockseu it was NNE 5. The *Mathilde* close to Ockseu at 8 p.m. experienced a fresh NNE gale and high sea, barometer 29.35 (lowest).

Since 6 p.m. the barometer at Anping had been falling very rapidly the wind remaining Southerly of force 10 the heavy squalls being of full typhoon force. At 9 p.m. the barometer attained its lowest point and read 28.62 the wind at the time being somewhat less strong. The centre passed W of the port distant about 10 miles at this time. At 9.15 p.m. the wind backed to SE for 5 minutes in a very heavy squall. At 9.30 p.m. the direction was again South and the barometer had risen 0.10 since 9 p.m. At 10 p.m. it had backed to ESE and was of force 10. At 10.30 p.m. the same wind. At 11 and 11.30 p.m. it was NE of force 8. Mr. STRANGMAN, the observer, has a note "11.15 p.m.-0.15 a.m. wind lessened in force, a lull compared with what preceded and followed." At 11 p.m. the barometer read 29.17 having risen no less than 0.55 inch since 9 p.m. At this time the rise was checked for 1 hour, the reading being 29.16 at 11.30 p.m. and 29.17 at midnight. At the latter hour the wind had backed to NNW a strong gale. It was overcast and squally, but the heavy rain had ceased. Mr. STRANGMAN adds: "Enormous amount of damage to life and property ashore and afloat, the shipping suffering severely. Three big Amoy junks being blown into a sweet potatoe field. The sea rose 2 feet above the highest water known here for some time."

At Takow at 6 p.m. July 21st the barometer reading was 29.24, the wind being from SSW of force 8 with heavy rain squalls. The barometer was falling very rapidly and the wind increasing in force the direction remaining constant at SSW according to the observations on board the *Firebrand*. The Custom House observations give the wind at 9 p.m. as WSW force 10. The force at that hour agrees with the *Firebrand* observations, but the directions are 4 points asunder. The reading of the barometer was 29.02, a fall of 0.22 since 6 p.m. Between 9 and 10 p.m. the barometer fell 0.29 according to the Custom House observations and 0.35 by the *Firebrand* readings, the readings being 28.73 and 28.675 respectively. The latter was the lowest reading recorded on the *Firebrand*, but the Custom House observations were made every quarter of an hour and we have from them the lowest reading at 10.45 p.m. 28.69. At 10 p.m. the wind was from SSW of force 10 to 12. On the *Firebrand* an aneroid was used and up to 9 p.m. the readings agree very well with those of the Custom House where a standard mercurial barometer is used. The aneroid of the *Firebrand* appears to have become deranged and read too high after the passage of the centre. The readings of the Customs House barometer are therefore afterwards alone used.

The following remarks are from the register of the *Firebrand* :—

- 6.00 p.m. Very heavy squalls, with heavy rain.
- 8.00 p.m. Tremendously violent squalls, with heavy rain.
- 10.00 p.m. Blowing a hurricane.
- 10.30 p.m. Calm, barometer commenced to rise.
- 10.50 p.m. Blowing tremendously from NNW.
- 11.00 p.m. Blowing WNW 10 to 12 with much rain.
- Midnight. Blowing very hard from WNW.

At 11 p.m. the barometer read 28.96, it had risen 0.27 in a quarter of an hour. At midnight it read 29.22 or 0.53 higher than at 10.45 p.m. The wind was at midnight from WNW of force 8 to 10.

The centre passed therefore over Takow at 10.45 p.m. The exact duration of the central calm we do not know unless we assume from the *Firebrand* observations that it fell calm at 10.30 p.m. exactly in which case it must have been of about 20 minutes duration and would correspond to a diameter of 4 miles, the rate of motion at the time being about 12 miles per hour. The state of the sky was not recorded unfortunately and we therefore do not know whether there was any partial clearing of the sky during the passage of the calm centre.

Previous to striking the coast the typhoon was moving in a SEasterly direction, but it then appears to have been deflected almost at a right angle and to have moved NE for a short time and it also at once commenced to fill up rapidly. It will be seen by reference to the Anping observations that the barometer ceased rising at 11 p.m (29.17) and in fact read 0.01 lower at 11.30 p.m. (29.16). At midnight it was (29.17) and thereafter it rose, but not very quickly. The wind at 11 and 11.30 p.m. was from NE of force 8, but at midnight it was from NNW of force 9. The reading at Takow at midnight was 29.22 the wind being from WNW of force 9, and the rain squalls still continued.

At S. Cape the wind had increased in force since 6 p. July 21st. At 9 p.m. it was SW of force 8. At midnight SW 9 with rain squalls the whole evening. The barometer had in the meantime fallen from 29.34 at 6 p.m. to 29.29 at midnight.

At midnight July 21st vessels off the coast near Hongkong had moderate to fresh W and WSW breezes. At the coast stations and light houses between Breaker Point and Chapel Island gentle W breezes chiefly prevailed. At Lamocks it was SSW of force 3. The weather was cloudy but fine. From Chapel Island to the northern entrance to the channel the winds ranged from moderate N gales in the southern part of the area (the *Benlarig* had a fresh N by W gale with rain squalls) to strong NE and ENE breezes in the northern part, the weather being squally over the entire area. On the N coast of Formosa, at Tamsui at 9 p. July 21st the wind was NE of force 2 and the weather cloudy. At Keelung a few miles to the Eastward of the former station the wind is recorded as SE 3 the weather being showery and gloomy. The lowest recorded readings of the barometer occurred at this time. Neither of these stations had strong wind though at 6 p.m. the centre was only about 150 miles distant. The intervening range of mountains may account for this. At midnight July 21st the centre was situated in $22^{\circ} 53'$, $120^{\circ} 33'$. After midnight the barometer at S. Cape continued to fall, but very slowly, when the daily variation is allowed for, and attained the minimum at 6 a. July 22nd, the reading being 29.24 after which it commenced rising. The wind had, in the meantime, veered to W at 3 a., at 6 a. W the force being 10 at the latter hour. There were rain squalls at 3 a., but at 6 a. the rain had ceased. The barometer read at 9 a. 29.32, at noon 29.35 the wind direction having veered to W by N of force 9 at the latter hour and the weather being squally and showery. The rainfall for the 24 hours ending at 9 a. July 22nd was 5.30 inches. At Takow at 1 a. the wind was from W of force 8 to 12 after which hour it remained steady from the same quarter of force 9 on an average till 6 a. with continuous rain squalls the whole time. At 7 a. the wind veered to NW and continued this direction for the remainder of the day. The force is given as 7 to 8 at 7 a. At 9 a. the average force was 5, at noon 4. The weather continued squally after 7 a., but the continual rain ceased and was now intermittent. Lightning was observed at 11 a. The barometer at 9 a. read 29.38, at noon 29.43. The rainfall for the previous 24 hours measured at 9 a. July 22nd was 5.00 inches.

At Anping the barometer commenced rising again after midnight of July 21st, at 1 a. July 22nd it read 29.22, at 2 a. 29.26 and it then remained steady at 29.27 till 6 a., at 9 a. it read 29.36, at noon 29.41. The wind at 1 a. was NW force 7 thereafter it continued the same direction until 8 a. but the force increased to 10 at 3 a. After 5 a. it decreased, the force at 6 a. being 9, at 7 a. 8. At 9 a. the wind veered to NNW, and from 10 a. until noon it was from NW by N. The weather was overcast with frequent squalls the whole night but no rain fell. At 10 a. there was some clearing of the sky. The rainfall for the 24 hours ending at 9 a. July 22nd was 7.36 inches.

At Fisher Island there was still a whole gale from NW at midnight July 21st and the heavy squalls of wind and rain continued. The barometer was rising slowly. At 3 a. July 22nd it read as at midnight which, allowing for daily variation, is a slight rise and the wind was then a whole gale from WNW. At 6 a. the direction was NW but the force had decreased to a fresh gale. At 9 a. it was NNW force 8 the rain squalls had ceased and the sky was no longer overcast, some blue sky being visible. At noon there was only a strong NW breeze. The barometer read 29.30 at 6 a., 29.41 at 9 a., 29.44 at noon. The rainfall for the previous 24 hours measured at 9 a. July 22nd was 4.65 inches. At 6 a. on the 22nd light to moderate W and SW breezes were blowing on the SE coast S

of Amoy, the weather being cloudy but fine. At noon the wind in this district had become more southerly and very light. The weather was generally fine with clear sky in some places. At the northern entrance of the channel the wind had backed somewhat since midnight and at 6 a. July 22nd there blew chiefly moderate to strong N breezes, the weather was squally and showery. The barometer was rising. At noon much the same weather prevailed in this district. The only vessel's log calling for special remark is that of the *Bengloe* which was at noon in $25^{\circ} 03'$, $119^{\circ} 46'$. A fresh NNE gale with rain squalls and high cross sea was experienced, the wind having backed during the early morning hours and increased in force. The high confused sea was general in the channel all that day. At Tamsui and Keelung in Northern Formosa gentle NE breezes prevailed at 9 a. July 22nd, the weather being cloudy and at Keelung showery. Keelung had received 0.74 inches of rain during the previous 24 hours. At Bolinao (Luzon) light and gentle S breezes with squally wet weather prevailed on the afternoon of the 21st, barometer 29.66 at 4 p. but during the early morning hours of the 22nd the wind veered to SW and blew a gale with thunder and lightning and heavy rain, barometer 29.68 at 6 a. Late in the afternoon the wind veered to W, a moderate breeze, and the weather continued wet and squally. The barometer read 29.67 at 6 p. and was rising slightly. The centre on the 22nd at 6 a. was situated in about $22^{\circ} 45'$, $121^{\circ} 25'$. It must have crossed the high mountain range running North and South through Formosa, about ESE of Anping and passed out to sea again. It appears likely that it then moved a little to the S of E for some time. There was some veering of the wind at all the S Formosa stations about this hour and the lowest reading of the barometer was recorded at S Cape at 6 a., the reading being lower than those either of Takow or Anping. At noon the probable position of the centre was in $22^{\circ} 40'$, $122^{\circ} 30'$. Fresh SW monsoon was blowing at the time over the greater part of the China Sea, unfortunately no logs of vessels to the Eastward and Southward of Formosa are available and the position of the centre is laid down with reference only to the stations to the Westward of the typhoon.

The following are the observations for July 22nd at noon:—

		COAST STATIONS.							
Bolinao,	SSW	410	29.69	-.02	SW	2	o.		
Hoihow,	WSW	700	.60	+.01	ESE	2	oq.		
Hongkong,	W/S	450	.54	+.03	W	1	o.		
Breaker Point,	W	340	.51	+.04	SW	3	cm.		
Swatow,	W/N	330	.53	+.14	SSW	1	b.		
Lamoeks,	W/N	290	.52	+.15	SSW	2	c.		
Chapel Island,	WNW	260	.50	+.28	calm		c.		
Amoy,	WNW	280	.50	+.17	W	1	c.		
Ockseu,	NW/W	220	...		N	4	c.		
Turnabout,	NW	220	.50	+.05	N	6	omp.		
Middle Dog,	NW/N	240	.48	+.01	N	4	c.		
Foochow,	NW	260	.50	+.02	NE	3	cq.		
Steep Island,	N	450	.59	-.07	NNE	2	cv.		
North Saddle,	N	480	.58	-.02	ENE	4	c.		
Tamsui,	NNW	160	.42	-.05	NE	3	c.		
Keelung,	NNW	160	.43	-.05	NE	2	cp.		
Fisher Island,	WNW	180	.44	+.29	NW	6	cm.		
Anping,	W/N	130	.41	+.05	NW/N	8	c.	tremendous sea.	
Takow,	W	130	.42	.00	NW	4	orq.		
South Cape,	WSW	100	.35	-.13	W/N	9	qgd.		
		VESSELS.							
S.S. <i>Phra Chom Klao</i> ,	$11^{\circ} 39'$	$109^{\circ} 16'$	SW	1000	29.74	SSW	4	clear.	
Bk. <i>Nicoya</i> ,	15 15	109 40	SW/W	850	...	SW	...		
" <i>Kitty</i> ,	18 3	107 57	WSW	880	...	SSW	...		
S.S. <i>Decima</i> ,	18 52	111 33	WSW	650	.54	SW	5	q.	moderate sea.
" <i>Wingsang</i> ,	18 4	114 21	SW/W	530	.58	SW	5	o.	do.
" <i>Ganges</i> ,	18 15	113 0	WSW	590	.52	SW	5	o.	
" <i>Thibet</i> ,	19 39	112 19	WSW	580	.57	WSW	5	o.	SW swell.
" <i>Camelot</i> ,	20 21	113 19	WSW	520	...	SW	2	o.	moderate sea.
" <i>Electra</i> ,	22 19	114 55	W	430	.53	W	2		
" <i>Esmeralda</i> ,	22 19	115 13	W	420	...	var.	2		SW swell.
" <i>Yungping</i> ,	22 20	115 14	W	420	...	calm.	...		fine swell.
" <i>Taisang</i> ,	22 25	115 20 ?	W	420	.47	WSW	4	c.	
" <i>Fushun</i> ,	23 58	117 58	WNW	270	...	var.	2		confused sea.
" <i>Benlarig</i> ,	23 57	118 48	WNW	230	.42	W	3		heavy S sea.
" <i>Tsinan</i> ,	24 6	118 26	WNW	260	.48	W	2		fine.
" <i>Oceana</i> ,	24 20	118 54	WNW	230	.57	NNW	4	o.	NE swell.
" <i>Bengloe</i> ,	25 3	119 46	NW	210	...	NNE	3	q.	
" <i>Asagao</i> ,	25 23	119 42	NW/N	230	...	NNE	5	o.	
" <i>Lennox</i> ,	26 38	121 24	NNW	260	.47	NE	5		dull threatening.
" <i>Canton</i> ,	27 34	121 36	N/W	300	.62	NE	4		fine S swell.
" <i>City of Rio Janeiro</i> ,	28 49	126 8	NNE	420	.53	ENE	3		

The average isobars, wind forces and directions from noon on the 20th to noon on the 22nd are represented in Fig. 1. The following table exhibits the distance in miles from the centre in different directions at which different barometric pressures were registered:—

	29.20	29.30	29.40	29.50		29.20	29.30	29.40	29.50
N	25	50	100	200	S	35	60	100	150
NE	30	50	90	160	SW	35	70	120	220
E	40	70	100	150	W	40	70	160	290
SE	40	70	110	150	NW	30	55	130	270

It should be remarked that the above are average results as pressure decreased near the centre till it struck the coast of Formosa.

The average angles between the direction of the wind and the radius are shown in the following table. The first column shows the bearing from the centre. The first line the distances in miles between which the angles were obtained:—

	0-50	50-100	100-150	150-250	>250
NNE	59°	48°	36°	+42°	+29°
ENE .....	...	60	67	79	27
ESE	54	46	66	78	...
SSE .....	...	68	...	78	42
SSW .....	...	67	...	66	+18
WSW	50	31	22	+9	-3
WNW	59	51	50	-5	-33
NNW	49	60	40	+61	+83
Mean.....	53	49	44	39	6

A negative angle indicates anti-cyclonic motion. It is seen that at a great distance from the centre the wind blew nearly straight towards it, while near the centre the wind direction was 59° away from the centre. On an average it was 69° in front of the centre and 22° behind the centre. The diagram shows clearly that the wind was blowing almost straight into the typhoon behind the centre. This was known to be the case with typhoons passing Hongkong and moving westward. It is now proved also for typhoons moving eastward. On an average (within 250 miles) the wind formed an angle of 45° with the radius. But in the right hand semi-circle the angle was nearly a point greater than in the left hand semi-circle. All these results bear out FERREL's opinion, that it is the prevailing wind that causes the typhoon to proceed, and that the wind direction round the centre is the result of a combination of the cyclonic motion and the motion of the centre. Therefore the incurvature is more uniform round the centre for strong winds than farther from the centre where the winds are light.

The forces of the wind in different directions and distances from the centre are shown in the following table:—

Miles.	NNE	ENE	ESE	SSE	SSW	WSW	WNW	NNW
30	10	10	10	...	9	10	9	10
75	6	8	9	8	8	7	7	8
125	5	5	7	7	7	5	6	6
200	3	4	4	5	5	3	3	5

This shows that the wind was strongest in the right hand semi-circle, where the cyclonic and progressive motion acted in approximately the same direction, and the amount of the difference between the wind velocities agrees near enough with the speed of the centre.

The wind force in a typhoon in the Formosa Channel whose centre usually makes westward is strongest to the N of the centre *i. e.* in the right hand, the dangerous semi-circle. In this typhoon the strongest wind was to the S as the centre moved eastward.

It was densely overcast within from 200 to 250 miles of the centre. Rain commenced to the N of the centre within 200 miles, to the E within 250 miles, to the S within 150 miles, and to the W within 180 miles. Heavy cross seas were logged within 200 miles of the centre on all sides of it, so that the sea got up before the wind rose to a fresh breeze, thus giving early warning on board the vessels at sea. A gradient of 0.01 inch in 15 nautical miles corresponded to force 4, 0.02 to force 6, 0.03 to force 7, 0.04 to force 8, 0.06 to force 9, 0.15 to force 10, 0.25 to force 11 or 12. The steepest gradient 0.30 in 15 miles occurred at Fisher Island between 2 p. and 3.30 p. on the 21st July accompanied by full typhoon force. It is evident that the wind forces were to a great extent underestimated, as frequently happens when a beginner observes in a typhoon for the first time. However many of the observers were old hands, and it must be remembered that the wind blows in tremendous squalls in a typhoon along tracks on both sides of which the wind is not felt so much. The comparatively low forces recorded may therefore be due to chance at least to some extent.

During the afternoon and evening of the 22nd the wind gradually decreased in force in Southern Formosa and the barometer continued rising. The weather at S Cape and Takow was squally and showery and lightning was noted during the evening. At Anping the weather had improved greatly, towards evening the sky having cleared. At S Cape at 9 p. the wind was from W by N force 3 barometer 29.49. At Takow NNW 3 barometer 29.52. At Anping NE 4 barometer 29.48. At Fisher Island N 4 barometer 29.51 and fine weather. On the SE coast light SE airs and breezes chiefly prevailed, the weather being fine and the barometer still rising. In Northern Formosa there were light NE breezes, fine weather and the barometer was rising, at Tamsui 29.58, at Takow 29.54. At the lighthouse stations at the Northern entrance to the channel the wind was from NNE and NE gentle to moderate breezes with fine weather and rising barometer. Some vessels at the time in that part of the channel experienced the same wind and weather.

The typhoon had apparently moved to the Eastward since noon of July 22nd.

1892.	Hour.	H.M.S. "FIREBRAND" AT TAKOW.						S. CAPE.					OCKSEU.						
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force					Dir.	Force					Dir.	Force		
July 20	1 a.
	2
	3	29.69	78	SE/S	3	c g	79	NE	1	c v
	4	29.73	...	s	1	cr
	5
	667	78	SE/E	2	c	78	...	1	b c
	7
	8	.70	...	s	1	oc p
	968	83	SSE	2	b c	1.18	...	82	NNE	1
	10
	11
	Midn.66	81	S/E	2	c p	83	...	1	c
July 21	1 a.	.68	...	SE	3	oc p	
	2	.65	...	SE	3	oc p	
	3	.6159	84	SSE	2	c	77	ESE	1	o m r	...	
	4	.62	...	SE/S	3	
	5	.61	
	6	.6159	81	S/E	2	c m	77	NE	1	o	...	
	7	.61	
	8	.63	opl	
	9	.6263	78	S/W	1	om plt	77	...	2	c	...	
	10	.70	4	
	11	.67	2	op q	
	Midn.	.57	5	og r61	80	S/E	3	om plt	...	78	...	2	c v	...	
July 22	1 a.	.52	...	SE	5	q r l	
	2	.53	...	SSE	6-7	
	3	.52	649	82	S/W	3	om p	...	78	...	3	om d	...		
	4	.53	2-4	
	5	.51	2-4	q r	
	6	.50	6-749	81	SSW	4	om p	...	79	ENE	3	oud	...		
	7	.49	...	S/E	3-6		
	8	.49	3-6		
	9	.48	3-648	81	SSW	5	om p	1.92	79	NE	4	o	1.23		
	10	.48	...	S	5		
	11	.44	5		
	Midn.	.43	848	76	sw/s	6	omqgrt	...	79	...	4	om d	...		
July 22	1 a.	.40	...	SSW	4-10		
	2	.38	...	SSW	5-8		
	3	.34	5-840	76	SSW	6	omqgrt	...	80	...	4	om	...		
	4	.31	5-840		
	5	.28	7-937		
	6	.24	...	...	7-9	...	.34	76	sw	7	omqgp	...	78	NNE	5	...
	7	.18	...	...	9-10	...	.34	...	...	...	...	...	...	...	...	...
	8	.13	...	...	10-11	ocqr	.33	...	...	...	...	...	...	...	...	...
	9	.02	...	...	10	...	.33	78	sw	8	omqgr	...	78	...	6	c m
	10	28.68	...	...	10-12	...	.31	...	...	...	...	...	...	...	...	...
	11	29.13	...	WNW	10-12	...	.30	...	...	...	...	...	...	...	...	...
	Midn.	.30	...	...	8-10	ocqr	.29	77	sw	9	omqgr	...	78	N	7	om	
July 22	1 a.	.33	...	W	8-12	ocqr	...	...	...	...	...	...	...	...	...	...
	2	.34	...	...	8-10	...	.28	...	...	...	...	...	...	...	...	...
	3	.35	...	...	8-10	...	.27	77	W	9	omqgr	...	78	...	6	om
	4	.32	...	...	8-10	...	.25	...	...	...	...	...	...	...	...	...
	5	.38	...	...	8-10	...	.24	...	...	...	...	...	...	...	...	...
	6	.38	...	...	8-10	...	.24	80	W	10	omqg	...	77	...	4	c m p
	7	.39	...	NW	7-8	...	.26	...	...	...	...	...	...	...	...
	8	.42	...	...	7-8	oqpc	.29	...	...	...	...	...	...	...	...
	9	.46	...	...	2-8	ocqr	.32	81	W	9	omqgp	5.30	77	...	4	c m	
	10	.49	...	...	2-8	...	...	...	...	...	...	...	...	...	...
	11	.48	...	...	2-6	olq	...	...	...	...	...	...	...	...	...
	Midn.	.51	...	...	2-6	ocq	.35	78	W/N	9	omqgd	...	82	...	4	b c	
July 22	1 a.	.50	...	...	2-6	...	...	...	...	...	...	...	...	...	...	...
	2	.51	...	...	2-6	...	...	...	...	...	...	...	...	...	...	...
	3	.50	...	...	2-6	ocqr	.39	80	WNW	8	c m q	...	83	...	4	b c	
	4	.51	...	...	2-6	ocq	...	...	...	...	...	...	...	...	...
	5	...	...	...	2-6	...	...	...	...	...	...	...	...	...
	6	.56	...	...	2-6	...	.47	78	WNW	5	c m	...	83	NNE	3	b c
	7	...	...	...	2-6	c q	...	...	...	...	...	...	...	...
	8	.58	...	...	2-6	...	...	...	...	...	...	...	...	...
	9	...	...	NNW	2-4	c q l	.49	79	W/N	3	c m p	...	80	...	2	...	
	10	.62	...	...	2-4	...	...	...	...	...	...	...	...	...
	11	...	...	...	2-4	b c q l	...	...	...	...	...	...	...	...
	Midn.	.62	...	NNE	2-6	b e q	.53	80	W/N	5	b em pl	...	78	...	2	b			

1892.	Hour.	TURNABOUT.						MIDDLE DOG.						FOOCHOW.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force					Dir.	Force					Dir.	Force		
July 20	1 a.
	2
	3	29.71	79	NE	2	o	...	29.64	78	NNE	1	b c	...	29.71	78	sw	2	b c	...
	4
	5
	6	.74	79	...	2	c64	78	N	2	b e m
	7
	8
	9	.69	81	...	2	c66	81	...	272	78	...	1
	10
	11
July 21	Noon	.67	84	NNE	3	e62	81	...	1	b e	
	1 p.	
	2	
	3	.63	82	E	3	o58	83	NE	160	89	NE	1	b e	...
	4	
	5	
	6	.65	80	Variable	2	o g p59	81	E	1	
	7	
	8	
	9	.64	78	E	3	e59	81	ENE	163	77	sw	1	o	...
	10	
11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
July 22	Midt.	.61	80	E	3	o58	80	...	1	b e l	
	1 a.	
	2	
	3	.53	80	ENE	4	o56	80	...	2	e55	78	E	2	e	...
	4	
	5	
	6	29.50	79	ENE	5	o48	80	...	2	e	
	7	.48	...	ENE	6	o	
	8	.50	...	ENE	6	o	
	9	.49	81	ENE	6	o	0.12	.49	81	NE	3	e52	80	NE	3	o r	0.66
	10	.50	...	ENE	6	o m p	
11	.48	...	ENE	6	g m p	...	...	...	...	...	...	...	...	...	...	...	...
July 22	Noon	.45	81	ENE	6	o m q	...	.47	80	...	4	e q	...	...	...	...	...
	1 p.	.43	...	ENE	7	o m	...	...	...	...	...	...	...	...	...	...	...
	2	.42	...	NE	7	o m	...	...	...	...	...	...	...	...	...	...	...
	3	.42	80	NE	7	o m q41	80	ENE	4-5	e q45	78	E	4	o r	...
	4	.39	...	ENE	6	g m	
	5	.38	...	NE	6	g m	
	6	.37	80	NE	7	o m	...	.37	79	...	5-6	e q	...	...	...	...	...
	7	.36	...	NNE	7	o m u q	...	...	...	...	...	...	...	...	...	...	...
	8	.36	...	NNE	7	e m	...	...	...	...	...	...	...	...	...	...	...
	9	.38	79	NNE	7	o m q p39	79	...	5-6	e q49	75	...	3	o	...
	10	.38	...	NNE	7	e m	
11	.38	...	NNE	7	b e m	...	...	...	...	...	...	...	...	...	...	...	...
July 22	Midt.	.38	79	NNE	7	o m	...	.39	79	...	5-6	e q	...	...	...	...	...
	1 a.	.37	...	NNE	7	b e m	...	...	...	...	...	...	...	...	...	...	...
	2	.38	...	NNE	7	b e m	...	...	...	...	...	...	...	...	...	...	...
	3	.38	80	NNE	7	b e m37	79	NE	5-6	o q45	79	NE	3	o r	...
	4	.39	...	NNE	8	b e m	
	5	.41	...	NNE	7	e m	...	...	...	...	...	...	...	...	...	...	...
	6	.43	78	NNE	7	c m u p	...	.38	79	N	5	o q	...	...	...	...	...
	7	.44	...	N	7	o m	...	...	...	...	...	...	...	...	...	...	...
	8	.47	...	N	7	o m	...	...	...	...	...	...	...	...	...	...	...
	9	.48	79	NNE	7	g m p	0.08	.44	80	N	5	e	0.68	.50	84	...	3	e	0.74
	10	.49	...	NNW	6	g m p	
11	.50	...	N	6	c m p	...	...	...	...	...	...	...	...	...	...	...
July 22	Noon	.50	80	N	6	o m p	...	.48	81	...	4	e	...	...	...	...	...
	1 p.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	.50	81	...	6	e p46	81	NNE	4	e50	91	...	3	b	...
	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	6	.50	80	NE	5	b	...	.46	80	...	4	e	...	...	...	...	...
	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	9	.56	79	...	4	b49	80	...	3	e59	80	SE	1	b	...
	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Midt.	.57	79	NNW	3	b	...	.50	78	NNW	2	e	...	...	...	...	...

1892.	Hour.	TAMSUI.						KEELUNG.						HONGKONG.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force					Dir.	Force					Dir.	Force		
July 20	1 a.	...	...	...	...	...	...	...	...	...	...	...	29.58	79	NE	4	c	...
	2	...	...	...	...	...	...	...	...	...	...	...	.55	79	NE/N	3	...	...
	3	...	...	...	...	...	...	...	...	...	...	...	.55	80	NE/N	3	...	...
	4	...	...	...	...	...	...	...	...	...	...	...	.52	80	NNE	3	o l t	0.02
	5	...	...	...	...	...	...	...	...	...	...	...	.51	79	NE/N	3	...	0.12
	6	...	...	...	...	...	...	...	...	...	...	...	.50	78	NNE	2	...	0.11
	7	...	...	...	...	...	...	...	...	...	...	...	.50	77	N	3	o	...
	8	...	...	...	...	...	...	...	...	...	...	...	.52	79	N	4	...	...
	9	29.70	86	SE	1	b c	...	29.69	92	NE	2	c51	81	N/E	3
	10	...	...	...	...	...	...	...	...	...	...	...	.49	82	...	2	o	...
	11	...	...	...	...	...	...	...	...	...	...	...	.48	83	N	3	...	...
July 21	Noon	...	...	...	...	...	...	...	...	...	...	...	.47	83	N	3	...	...
	1 p.	...	...	...	...	...	...	...	...	...	...	...	.46	82	N/W	2	o d	...
	2	...	...	...	...	...	...	...	...	...	...	...	.44	82	N/W	1	...	...
	3	.69	88	NW	2	b62	96	NE	2	c43	82	N/W	1
	4	...	...	...	...	...	...	...	...	...	...	...	.42	83	NNW	1	o v	...
	5	...	...	...	...	...	...	...	...	...	...	...	.43	82	NNW	2	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	.45	80	NW/W	1	...	0.01
	7	...	...	...	...	...	...	...	...	...	...	...	.48	78	W/N	3	o r	0.12
	8	...	...	...	...	...	...	...	...	...	...	...	.49	78	WNW	4	...	...
	9	.70	80	...	0	b67	84	SE	1	b51	78	...	3
	10	...	...	...	...	...	...	...	...	...	...	...	.52	79	NW	3	o	...
July 22	11	...	...	...	...	...	...	...	...	...	...	...	.51	79	W/S	2	...	...
	Midt.	...	...	...	...	...	...	...	...	...	...	...	.50	79	WSW	1	...	...
	1 a.	...	...	...	...	...	...	...	...	...	...	...	.47	80	W/S	2	o	...
	2	...	...	...	...	...	...	...	...	...	...	...	.47	80	W/S	3	...	...
	3	...	...	...	...	...	...	...	...	...	...	...	.49	79	SSW	4	...	...
	4	...	...	...	...	...	...	...	...	...	...	...	.48	80	SSW	5	o	...
	5	...	...	...	...	...	...	...	...	...	...	...	.49	80	s	5	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	.50	80	W/N	2	...	...
	7	...	...	...	...	...	...	...	...	...	...	...	.50	81	W/N	1	o	...
	8	...	...	...	...	...	...	...	...	...	...	...	.51	82	NW/W	1	...	...
	9	.50	85	SSE	2	c53	90	ESE	1	c52	83	WNW	1
July 22	10	...	...	...	...	...	...	...	...	...	...	...	.53	85	...	2	c	...
	11	...	...	...	...	...	...	...	...	...	...	...	.52	85	...	2	...	...
	Noon	...	...	...	...	...	...	...	...	...	...	...	.51	86	W	2	...	...
	1 p.	...	...	...	...	...	...	...	...	...	...	...	.50	88	SW/W	3	c	...
	2	...	...	...	...	...	...	...	...	...	...	...	.47	87	SW	4	...	...
	3	.45	90	...	043	92	ESE	2	c45	87	SW/W	2
	4	...	...	...	...	...	...	...	...	...	...	...	.44	85	WNW	2	c	...
	5	...	...	...	...	...	...	...	...	...	...	...	.45	86	W/N	2	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	.47	83	SW	2	...	...
	7	...	...	...	...	...	...	...	...	...	...	...	.49	83	SW/W	1	o	...
	8	...	...	...	...	...	...	...	...	...	...	...	.49	82	W/S	0	...	...
9	.40	85	NE	2	c	...	.38	85	SE	2-4	c g p	...	.53	82	...	0	...	...
July 22	10	...	...	...	...	...	...	...	...	...	...	...	.52	82	...	0	o l	...
	11	...	...	...	...	...	...	...	...	...	...	...	.52	81	...	0	...	...
	Midt.	...	...	...	...	...	...	...	...	...	...	...	.51	82	ESE	1	...	...
	1 a.	...	...	...	...	...	...	...	...	...	...	...	.50	80	NW/W	0	o	...
	2	...	...	...	...	...	...	...	...	...	...	...	.49	81	...	0	...	...
	3	...	...	...	...	...	...	...	...	...	...	...	.48	81	...	0	...	...
	4	...	...	...	...	...	...	...	...	...	...	...	.48	81	W/S	1	c	...
	5	...	...	...	...	...	...	...	...	...	...	...	.49	80	W/N	1	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	.52	81	...	1	...	...
	7	...	...	...	...	...	...	...	...	...	...	...	.54	83	...	1	o	...
	8	...	...	...	...	...	...	...	...	...	...	...	.54	83	...	1	...	...
9	.36	85	NE	3	c	...	.42	85	NE	3	c p	0.74	.55	85	W/S	1	...	...
July 22	10	...	...	...	...	...	...	...	...	...	...	...	.56	86	WSW	1	c	...
	11	...	...	...	...	...	...	...	...	...	...	...	.55	86	W	2	...	...
	Noon	...	...	...	...	...	...	...	...	...	...	...	.54	87	W/S	1	...	...
	1 p.	...	...	...	...	...	...	...	...	...	...	...	.52	88	SW/W	1	o	...
	2	...	...	...	...	...	...	...	...	...	...	...	.51	88	WSW	1	...	...
	3	.49	85	NE	3	c45	89	NE	2	c49	88	SW/W	2
	4	...	...	...	...	...	...	...	...	...	...	...	.51	87	SW/S	2	c	...
	5	...	...	...	...	...	...	...	...	...	...	...	.49	85	SW	2	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	.51	84	SW/W	1	...	...
	7	...	...	...	...	...	...	...	...	...	...	...	.53	83	SW/S	0	o	...
	8	...	...	...	...	...	...	...	...	...	...	...	.55	82	...	0	...	...
9	.58	79	NE	2	c	...	.54	85	NE	1	c	...	.55	82	SSW	1	...	...
July 22	10	...	...	...	...	...	...	...	...	...	...	...	.57	82	...	0	o l	...
	11	...	...	...	...	...	...	...	...	...	...	...	.57	82	...	0	...	...
	Midt.	...	...	...	...	...	...	...	...	...	...	...	.56	82	...	0	...	...

1892.	Hour.	BREAKER POINT.					SWATOW.					LAMOCKS.							
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force					Dir.	Force					Dir.	Force		
July 20	1 a.
	2
	3	29.66	78	NE	6	od	...	29.64	76	NE	2	og r	0.25	29.59	79	NE	4	or	...
	4
	5
	6	.63	79	...	658	79	NNE	4	o	...
	7
	8
	9	.56	76	E	6	e	2.00	.57	77	NE	4	r	0.65	.58	78	Vari- able	5	op	1.59
	1054	...	NE	5	og r
	1152	...	NE	5
July 21	Noon	.48	77	E	7	og r50	...	NE	557	76	ESE	2-3	om r	...
	1 p.	...	...	...	...	...	.48	...	NE	5	...	...	.50	...	...	5-6	od	...
	2	...	...	...	...	...	.46	...	NE	5	...	...	.47	...	...	6	o	...
	3	.39	77	NE	7-8	og r42	75	NE	5	og r	1.00	.45	77	ENE	7	md	...
	4	...	...	...	...	...	.39	...	NE	5	og g	...	.41	...	NE	7	mr	...
	5	...	...	...	...	...	.38	...	NE	4	...	...	.39	...	ENE	7	o	...
	6	.30	77	NNE	7-8	qr35	...	NE	7	og r37	77	NE	7-8	o	...
	7	...	...	...	...	...	.34	...	NE	7	...	...	.35	...	...	8	om	...
	8	...	...	...	...	...	.35	...	NE	7	...	...	.29	...	...	8-9	md q	...
	9	.28	77	...	8	qr33	76	NE	7	og q	0.34	.25	77	...	9	mp q	...
	10	...	...	...	...	...	.33	...	NE	6	d	...	.25	...	...	9	mp q	...
11	...	...	...	...	...	.33	...	NE	5	og	...	.13	...	...	9	mp q	...	
July 22	Midt.	.30	75	...	8	qr31	...	NNE	505	76	N	10	mr q	...
	1 a.	...	...	...	...	...	.29	...	N	4	og d	...	28.95	...	...	10-11	mr q	...
	2	...	...	...	...	...	.27	...	...	5	...	...	.95	...	...	10-11	mr q	...
	3	.30	75	W	6	or27	76	NW	4	...	0.19	.99	76	NW	10-11	mr q	...
	4	...	...	...	...	...	.29	...	...	4	og r	...	29.04	...	NW	10	mr q	...
	5	...	...	...	...	...	.29	...	...	5	og d	...	.10	...	NNW	10	mr q	...
	6	.36	75	...	5	or29	...	WNW	6	og r17	76	...	10	mr p q	...
	7	...	...	...	...	...	.32	...	WNW	5	og	...	...	...	...	...	...	...
	8	...	...	...	...	...	.35	...	NW	4	og r	...	...	...	...	...	...	...
	9	.45	77	NW	4	od	2.85	.39	77.5	...	4	or	0.16	.27	76	WSW	9	od q	6.70
	10	...	...	...	...	...	.40	...	...	2	og d	...	...	...	...	...	...	...
11	...	...	...	...	...	.42	...	...	2	...	...	...	...	...	...	...	...
July 22	Noon	.47	80	W	3	op44	2	og r37	76	W	7	or q	...
	1 p.	...	...	...	...	...	.44	...	...	2	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	.44	...	WNW	2	...	...	...	...	...	...	...	...
	3	.42	80	...	2	op39	79.5	...	1	og d	0.32	.39	77	WSW	6	o	...
	4	...	...	...	...	...	.39	...	...	1	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	.39	...	W	1	...	...	...	...	...	...	...	...
	6	.43	79	...	3	o39	...	WSW	1	og g43	77	SW	3	c	...
	7	...	...	...	...	...	.43	...	W	1	og g	...	...	...	...	...	...	...
	8	...	...	...	...	...	.43	...	W	1	og g	...	...	...	...	...	...	...
	9	.49	77	...	4	o43	80	...	1	og g	0.02	.43	77	...	3	c	...
	10	...	...	...	...	...	.49	...	...	1	og g	...	...	...	...	...	...	...
11	...	...	...	...	...	.47	...	...	1	og g	...	...	...	...	...	...	...
July 22	Midt.	.48	77	...	4	o45	1	og g42	77	SSW	3	c	...
	1 a.	...	...	...	...	...	.45	...	...	2	o	...	...	...	...	...	...	...
	2	...	...	...	...	...	.44	...	...	1	o	...	...	...	...	...	...	...
	3	.46	77	...	3	o45	78	...	1	o45	76	...	3	c	...
	4	...	...	...	...	...	.47	...	Calm	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	.47	...	...	...	...	...	...	...	...	...	...	...
	6	.49	78	...	3	e	...	.47	...	...	...	...	.45	77	WSW	2	c	...
	7	...	...	...	...	...	.47	...	WSW	1	e	...	...	...	...	...	...	...
	8	...	...	...	...	...	.49	...	WSW	1	b	...	...	...	...	...	...	...
	9	.57	82	SW	4	e51	85	W	1	b52	79	...	2	c	0.51
	10	...	...	...	...	...	.50	...	WSW	1	b	...	...	...	...	...	...	...
11	...	...	...	...	...	.51	...	...	1	b	...	...	...	...	...	...	...
July 22	Noon	.51	84	...	3	e50	...	S	1	b52	84	SSW	2	c	...
	1 p.	...	...	...	...	...	.50	...	SSW	1	b	...	...	...	...	...	...	...
	2	...	...	...	...	...	.52	...	ESE	2	b	...	...	...	...	...	...	...
	3	.48	83	...	3	e47	90	SE	2	b49	84	SE	1	c	...
	4	...	...	...	...	...	.47	...	SE	2	b	...	...	...	...	...	...	...
	5	...	...	...	...	...	.48	...	SE	2	o	...	...	...	...	...	...	...
	6	.50	81	SSW	2	e50	...	SE	2	o51	79	SSE	2	e	...
	7	...	...	...	...	...	.51	...	SSE	1	o	...	...	...	...	...	...	...
	8	...	...	...	...	...	.55	...	...	1	o	...	...	...	...	...	...	...
	9	.58	80	...	0	e54	82	...	1	b58	79	...	1	c	...
	10	...	...	...	...	...	.57	...	...	1	b	...	...	...	...	...	...	...
11	...	...	...	...	...	.58	...	...	1	c	...	...	...	...	...	...	...
Midt.	.59	80	ENE	1	e	...	.56	...	SE	2	b	...	.60	79	E	1	c	...

1892.	Hour.	CHAPEL ISLAND.						AMOY.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.		
July 20,	1 a.	...	...	...	...	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	...	...	...	...	...	...	...
	3	29.62	78	ENE	2	c	...	29.68	81	SE	1	c	...
	4	...	...	...	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...
	6	.64	77	NE	2	c	...	.65	81	NE	1	c	...
	7	...	...	...	...	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	...	...	...	...
	9	.60	76	...	4	or	...	.68	81	NE	2	or	0.06
	10	...	...	...	...	...	...	...	...	...	...	...	...
	11	...	...	...	...	...	...	...	...	...	...	...	...
	Noon	.58	76	E	3	or	...	.63	80	NE	2	or	...
	1 p.	...	...	...	...	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	...	...	...	...	...	...	...
	3	.56	75	NE	3	or	...	.55	80	ENE	2	or	...
	4	...	...	...	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...
	6	.52	76	...	4	or	...	.54	79	...	3	or	...
	7	...	...	...	...	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	...	...	...	...
	9	.44	75	...	4	og p	...	.50	78	NE	3	or	...
	10	...	...	...	...	...	...	...	...	...	...	...	...
	11	...	...	...	...	...	...	...	...	...	...	...	...
	Midt.	.41	76	NE	7	og m p	...	.50	79	SE	2	or	...
July 21,	1 a.	.39	...	...	8	og m p	...	...	...	...	...	...	...
	2	.35	...	...	9	og m p	...	...	...	...	...	...	...
	3	.22	77	...	9	og m p	...	.38	78	NE	3	or	...
	4	.22	...	...	9-10	og m p	...	...	...	...	...	...	...
	5	.18	...	ENE	10-11	og m p	...	...	...	...	...	...	...
	6	.18	77	NE	11	o m p	...	.33	78	...	3	or	...
	7	.18	...	NNE	11	o m p	...	...	...	...	...	...	...
	8	.14	...	...	11	o m r	...	...	...	...	...	...	...
	9	.13	76	...	11-12	o m r	4.96	.36	77	...	8-9	or	4.80
	10	.17	...	...	11-12	o m r	...	...	...	...	...	...	...
	11	.16	...	...	11	o m r	...	...	...	...	...	...	...
	Noon	.22	76	N	10-11	o m d	...	.36	77	NNE	6	o d	...
	1 p.	.24	...	...	10	o m p	...	...	...	...	...	...	...
	2	.24	...	NNW	10	o m p	...	...	...	...	...	...	...
	3	.24	76	NW	9	o m d	...	.37	80	N	3	o d	...
	4	.27	...	NW	7	o m	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...
	6	.29	78	NNW	7	c	...	.37	80	NE	1	c	...
	7	...	...	...	...	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	...	...	...	...
	9	.38	79	NNE	4	c	...	.41	80	SW	1	o	...
	10	...	...	...	...	...	...	...	...	...	...	...	...
	11	...	...	...	...	...	...	...	...	...	...	...	...
	Midt.	.42	80	W	3	c	...	.42	80	NE	1	b	...
July 22,	1 a.	...	...	...	...	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	...	...	...	...	...	...	...
	3	.40	79	S	2	c	...	.41	80	NE	1	o	...
	4	...	...	...	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...
	6	.40	80	SSW	1	c	...	.41	81	SW	1	c	...
	7	...	...	...	...	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	...	...	...	...
	9	.48	86	...	1	c	1.50	.50	84	W	1	c	0.45
	10	...	...	...	...	...	...	...	...	...	...	...	...
	11	...	...	...	...	...	...	...	...	...	...	...	...
	Noon	.50	84	...	0	c	...	.50	86	...	1	c	...
	1 p.	...	...	...	...	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	...	...	...	...	...	...	...
	3	.47	87	SE	2	c	...	.46	82	SSE	3	b	...
	4	...	...	...	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...
	6	.49	83	...	2	b	...	.50	83	SE	2	b	...
	7	...	...	...	...	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	...	...	...	...
	9	.58	80	E	1	b	...	.60	83	...	1	b	...
	10	...	...	...	...	...	...	...	...	...	...	...	...
	11	...	...	...	...	...	...	...	...	...	...	...	...
	Midt.	.58	79	E	1	b	...	.61	83	...	1	b	...

Direction in points and Velocity in miles per hour at S. Cape July 20th to 22nd 1892.

1892.	July 20.		July 21.		July 22.		1892.	July 20.		July 21.		July 22.	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.		Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
1 a.	E/S	11	S	18	SW/W	50	1 p.	SSE	17	SSW	30	...	50
2 "	SE	20	S/W	17	...	50	2 "	S	16	...	28	...	43
3 "	SE/S	15	...	18	WSW	53	3 "	SSE	14	...	33	WNW	46
4 "	...	13	...	24	...	51	4 "	SE/S	14	SW	40	W/N	38
5 "	SE/E	9	...	24	...	52	5 "	S/E	14	...	42	WNW	30
6 "	...	11	SSW	24	W	69	6 "	...	12	...	40	...	28
7 "	SSE	11	S/W	26	...	60	7 "	SSE	11	SW/W	42	NE/N	9
8 "	SE/S	15	SSW	30	...	56	8 "	S/E	9	SW	48	WNW	6
9 "	SSE	12	...	27	...	59	9 "	S/W	3	...	51	W/N	16
10 "	S/E	18	SW/S	28	...	57	10 "	E	10	...	49	W	13
11 "	...	24	...	27	W/N	50	11 "	SE/S	12	...	51	W/N	27
Noon.	...	14	...	31	...	49	Midt.	S/E	18	...	60	...	28

S.S. OCEANA.

1892—July 20, 4a.				NE	7 l	wind and sea increasing l in SE and SW.
noon	22° 42'	116° 34'	29.48	NNE	8	confused sea, great quantity of water on board.
4p.				NE/E		wild sea S and E swell. 4.35p hove to.
7p.			.26	NE	8 r	7p. on course slow.
8p.			.23			
9p.			.21	N	9 r	
10p.			.23	NNW	9	
11p.			.25	NW	10 rq	very heavy squalls.
midt.			.28	NW	9	
21, 4a.			.31	WNW	6	
8a.				W	6 r	heavy rain, high sea.
noon	22° 28'	117° 03'	.41	WNW	6	
4p.			.46	WNW	5	moderating.
8p.			.45	"	l	decreasing wind. l in SW.
midt.			.38	WSW	4 c	irregular sea.
22, noon	24° 20'	118° 54'	.48	NNW	4 o	high NE swell.
midt.	Turnabout.			N	4 b	moderate sea.
23, noon	25° 58'	121° 39'	.55	N	5	hazy, high N swell.

S.S. GLENGYLE.

1892—July 20, 4a.				var.	q	
8a.				"	4 qr	moderate S and SW sea.
noon	22° 56'	116° 41'	29.55	ENE	6 g	increasing wind, gloomy.
4p.			.27	ENE	10 qr	
7p.	Swatow outer anchorage.		.27	NE	10	
8p.			.26	NE/N	10	
10p.			.24	N/E	10	
midt.			.21	N	qr	furious gale with heavy squalls & continued rain.
21, 2a.			.20	NNW	10 "	
4a.			.19	NW	9 "	
5a.			.18	"	9 "	
6a.			.22	"	"	wind moderating.
8a.			.25	NW/W	7 "	
10a.			.28	WNW	"	
noon			.33	"	4 od	2 p.m. left for Hongkong.
4p.				W	5	confused sea.
8p.				SW	5	do.
midt.			.49	WSW	5	moderately high SW sea.
22, 4a.			.48	WSW	4 l	l in SE.
8a.	Arrived at Hongkong.					

S.S. CONTINENTAL.

1892—July 20, noon	Tung Yung Island.		29.69	NE	2	high NE swell.
8p.	Turnabout.		.64	ESE	4	unsteady.
midt.			.63	ENE	5 or	sea rising rapidly.
21, 2a.	Oekseu.					ship labouring heavily.
4a.			.54	"	9-10	confused sea g. q. w. o. d.
8a.			.46	"	"	carrying away loose parts, cargo shifted.
10a.			.42	lowest.	10 r	very hard gale, damage done on deck.
noon	Haitan Bay took refuge in consequence of the list.					

S.S. BENGLOE.

1892—July 21, noon	27° 21'	122° 00'		E	4 o	
8p.				E/N	6	high sea. g. q. w. o. b.
midt.				NE	6	" "
22, 4a.				NE	8	high sea. g. q. w. b.
8a.				NNE	8	" " heavy rain.
noon	25° 03'	119° 46'		"	8	squally.
4p.				"	6	clear.
8p.				"	4	hazy.
midt.				NNW	4	hazy.

S.S. *MATHILDE*.

1892—July 21,	8a.	Tung Yung.	29.50	SE	5	increasing breeze and sea.
	noon					
	3.25p.	Turnabout.				
	4p.		.41	NE	7-8	high sea, g. q. w. o. b.
	8p.	Oekseu. 4'	.35	NNE	8-9	
	midt.		.41	N	6	less breeze and sea.
22,	4a.		.47	SW	5	
	4.25a.	Chapel Island.				
	12.45p.	Lamocks.	.50	SW	4	high sea.
	5.35p.	Breaker Pt.				
	midt.		.58	SW	4	moderate sea.

S.S. *MICHAEL JEBSEN*.

1892—July 17,	noon	14° 53'	110° 11'	29.70	W	4 ol	dull and gloomy in NE.
	4p.			.64	"		
	8p.			.66	var. WNW—N—SE		squalls with lt.
	midt.			.68	N	6	
18,	4a.			.64	N	6	fine and clear.
	8a.			.68	N	7	head sea.
	noon	17° 24'	111° 07'	.68	N	7	
	4p.			.60	N/E	7	cloudy.
	8p.			.64	NE/N	7	
	midt.			.68	NNE	4	rather high sea.
19,	4a.			.60	N	5	" " "
	8a.			.62	N	7	decreasing sea.
	noon	19° 44'	112° 34'	.60	NE/N	7	increasing sea.
	4p.			.52	NNE	6	mod. sea.
	8p.			.56	NNE	7	swell from E, NNE sea increasing sea.
	midt.			.54	NNE	8	very high sea.
20,	4a.			.48	N/E	5-9	" " " from NNE.
	8a.			.48	N/W	8	6a. very clear atmosphere.
	noon	21° 29'	113° 20'	.48	N/W	6	decreasing sea.
	4p.			.46	NW	6	swell from NNE gloomy in E.
	8p.	in Hongkong.					

S.S. *GWALIOR*.

1892—July 15,	4a.			29.78	SW	5	fine and cloudy.
	8a.			.82	SW	5	overcast.
	noon	11° 36'	111° 08'	.80	SW	5	do.
	4p.			.82	SW	5	do.
	8p.	12° 48'	111° 42'	.75	SW	5	overcast and l to Nward.
	midt.			.72	SW	5	odl.
16,	4a.			.68	SW	5	heavy squalls of rain and wind, wind shifted to NNE, fell light.
					NNE	4/3	
	8a.			.70	var.	4/5	
	noon	15° 10½'	113° 12'	.67	SW/W	5	squally with rain.
	4p.			.62	SW/W	4	
	8p.			.62	W	4/3	frequent rain.
	midt.			.64	WNW	2	
17,	4a.			.79	...	0	calm and fine E'y current.
	8a.			.62	NE	2	fine and clear.
	noon	19° 01'	113° 54½'	.65	ENE	3	light rain at times.
	4p.			.60	SSE	3	fine.
	8p.			.64	E	3	fine passing clouds.
	midt.			.68	E	3	fine.
					E	4	passing showers.
					E	3	" "

SHIP *J. D. BISCHOFF*.

1892—July 18,	8a.			29.63	E	5	
	noon	17° 16'	114° 45'	.62	ENE	5	clearing gradually.
	4p.			.59	NE	7	
	8p.			.63	ENE	7	
	midt.			.60	E	7	
19,	4a.			.60	E	3	
	8a.			.59	E/N	2	
	noon	19° 49'	113° 57'	.57	NE	6	freshening.
	4p.			.46	NE		
	8p.			.53	NNE		increasing.
	midt.			.45	"		
20,	4a.			.45	N	9	
	8a.			.48	N	9	
	noon	20° 5'	113° 16'	.52	NW	7	

S.S. *BENLARIG*.

1892—July 20, noon.	26° 30'	120° 30'	29.66	ENE	2	
4p.			.61	"	3	
midt.			.52	"	4	dark cloudy sky.
	2a. Ockseu Lt.					
21, 4a.			.48	ESE	5	q. wind increasing.
	5.20 course to E to 3.25p.					
6a.			.42			
8a.			.32		7	heavy rain, sea rising rapid.
noon	24° 20'	119° 14'	.32	NE/E	8	weather moderating.
4p.			.32	NE	7	
6p.	Brilliant Yellow Sunset.					
8p.			.27	N	9	wind and sea increasing.
7p.	course to NE/E.					
midt.			.26	N/W	8	same weather q. with rain.
22, 4a.			.27	"	7	weather improving.
8a.			.35	NNW	6	weather moderating fast.
noon	23° 57'	118° 48'	.42	W	3	weather moderating, high sea from S.
4p.			.48	WSW		
8p.			.54	SW		
midt.			.53	"		swell from S.

On the 23rd at noon the wind at S Cape was still from WNW force 5, barometer 29.56 rising. At Takow the barometer read 29.58 the wind being from NNW of force 3. At Anping 29.56 was the reading of the barometer and the wind was from NNW of force 5. The weather was fine at all these stations. Light airs prevailed on the SE coast with fine weather. The barometer had risen about 0.10 inch since noon of the previous day and now read 29.62 at the Lamocks and 29.63 at Amoy. The stations on the SE coast were no longer under the influence of the typhoon. At Tamsui and Keelung light NNW and N breezes prevailed, the weather being cloudy with passing showers at the latter station. The barometer read 29.64 at Tamsui, 29.59 at Keelung. At the northern entrance to the Formosa Channel calm and light N airs prevailed with cloudy but fine weather. Farther north fresh NNW to NNE breezes prevailed at sea, the weather being fine. The *Oceana* at noon, in 25° 58', 121° 39', had barometer 29.56 a fresh N breeze with high swell from NW to NE. The *Asagao*, in 27° 41', 123° 00', had a fresh NNE breeze with passing showers, barometer steady, during the afternoon the weather was squally and a high NE sea got up. Both vessels were about NW of the centre and they were the only ones in a position to be directly affected by the disturbance at this time. In the China Sea the SW monsoon was blowing strongly.

The centre at noon on the 22rd may have been in about 23°, 125½°, but this is very uncertain no data being available for positions to the eastward of the storm's path.

The following are the observations for noon July 23rd:—

COAST STATIONS.

Bolinao,	SW/S	520	29.72 + .03	S	2	o.
Hongkong,	W/S	600	.57 + .03	E	2	o.
Breaker Point,	W	500	.60 + .09	SE	2	c.
Swatow,	W	500	.57 + .04	E	1	c.
Lamocks,	W	460	.62 + .10	SE	1	c.
Chapel Island,	W/N	400	.63 + .13	WSW	1	cm.
Amoy,	W/N	400	.63 + .13	SW	1	b.
Ockseu,	WNW	370		calm		c.
Turnabout,	NW/W	330	.61 + .11	N	1	c.
Middle Dog,	NW/W	340	.55 + .07	calm		cm.
Foochow,	NW/W	360	.56 + .06	E	1	c.
Steep Island,	NNW	450	.63 + .04	NNE	3	b.
North Saddle,	NNW	480	.59 + .01	NE	3	b.
Tamsui,	NW/W	270	.64 + .22	NNW	2	c.
Keelung,	NW/W	250	.59 + .16	N	2	cp.
Fisher Island,	W	360	.58 + .14	NNW	2	cm.
Anping,	W	300	.56 + .15	NNW	5	b. heavy sea.
Takow,	W/S	300	.58 + .17	NNW	3	c.
S. Cape,	WSW	280	.56 + .21	WNW	5	cm.

Towards evening the wind had a tendency to back at S. Cape. At midnight there was a moderate W breeze (barometer 29.62). At Takow and Anping light NW airs prevailed at 9 p. barometer 29.61 at both places. The weather was cloudy at all these stations. In Northern Formosa and at the adjacent channel stations light N airs and calms prevailed with fine weather. The barometer was almost steady. Tamsui had at 9p. 29.65, Keelung 29.63. The *Oceana* about 140 miles NNE of Keelung at midnight had a strong N breeze with squally weather.

The conditions prevailing at noon on the 24th were as follows:—

On the western side of the China Sea, below 20° Lat., strong SW monsoon prevailed and on the SE coast to the S of Amoy light to moderate E breezes prevailed. Another cyclonic circulation had been established in the China Sea to the S of Hongkong which will be dealt with later on.

In Southern Formosa light W and NW breezes and fine weather with barometer 29.65 at S. Cape, a rise of 0.09 during the previous 24 hours. At Anping 29.63, a rise of 0.07 in the same interval. In N. Formosa and at the N entrance to the channel light variable airs and fine weather with rising barometer. On the East Coast light to moderate E to N breezes and fine weather with the barometer inclined to fall in the neighbourhood of Steep Island.

The *Oceana* at noon in 27° 06', 124° 35', had a strong NNW breeze with overcast sky and drizzling rain and a high confused sea, barometer 29.52. The *Asagao* in 29° 58', 126° 03', had a strong NE breeze with rain squalls. The *Nurnberg* in 29° 37', 125° 37', had a moderate NE breeze with drizzling rain, barometer 29.48. The *Picciola* in 27° 49', 121° 26', had a light NNE breeze, clear sky and a high NE swell. The *Meefoo* had barometer 29.52, a light NE breeze with very heavy NE swell. She was at 4 p. in 28° 08', 121° 50'.

The centre of disturbance at noon on the 24th may have been in 26°, 127½°, but this is very uncertain.

On the 25th at noon the stations on the East Coast showed a fall in the barometer of nearly a tenth of an inch since noon on the previous day. Winds varied in direction from a SW gentle to moderate breeze at the N entrance to the Formosa Channel, at Wenchow WSW 2, barometer 29.47, at Steep Island NW 5, barometer 29.53, at North Saddle N 4, barometer 29.52, at Woosung NNE 4, barometer 29.50. In Northern Formosa the wind was a light WSW breeze. At Tamsui barometer 29.61. Fine weather prevailed over this district and also on the East Coast.

From the vessels in this district we have the following observations. The *Nurnberg* had the wind backing from NNW from midnight July 24th to WSW at noon July 25th of force a strong to fresh breeze. The barometer had risen during this interval and read at noon 29.54, her position then being 26° 24', 121° 24'. The weather was cloudy but fine, but had been showery during the night. The *Charters Tower* was in 27° 07', 122° 36'. She experienced a fresh W breeze with heavy confused sea, but the weather was fine. The *Verona* was in 28° 07', 123° 38' and had a fresh WNW breeze with overcast squally weather and considerable cross sea, barometer 29.50 falling. During the afternoon the wind backed and increased in force. At midnight July 23rd it blew a moderate gale from W by S with overcast squally weather and a high confused sea, barometer 29.44 (lowest). At 8 p. there was a N swell. The *Levuka* was in 28° 57', 123° 59'. The barometer read 29.40 (reading uncorrected but thought to be nearly correct) and a fresh NNW gale was blowing with squally weather, the wind had backed since early morning and the barometer had fallen 0.10 since 6 a. During the afternoon and evening the barometer rose and the wind backed to WSW and decreased to a strong breeze. The *Oceana* was at noon in 28° 40', 128° 04'. The wind had backed since noon of the previous day. At midnight July 24th she had a moderate W gale with hard squalls and the sea rising with NE swell, barometer 29.29. At 4 a. July 25th, barometer 29.24 (lowest recorded) the wind had come to SW and blew a fresh gale with hard squalls. Lightning was observed in NNE and WNW. At noon the barometer showed a rise of 0.25 since 4 a. and now read 29.49, the wind being a fresh S gale with irregular sea. Later the wind moderated and at midnight was a moderate S breeze. The *Phra Nang* was at noon in 31° 28', 131° 51'. She had a moderate SSE breeze with drizzling rain and moderate sea, barometer 29.68. The *Airlie* at noon in 31° 10', 125° 58' had a moderate NE breeze, the sky overcast and a high swell. During the evening the wind backed to NNW and increased in force to a strong breeze with overcast rainy weather and a heavy E swell. The barometer readings from this ship are unfortunately worthless, the instrument being out of order. The *Picciola* was in 30° 44', 122° 48'. She had a fresh NNE breeze with high confused sea.

The centre was at noon on the 25th in 29°, 126°. The *Oceana* and *Levuka* were both at one time comparatively near to the centre as evidenced by the wind direction changing so quickly and it is doubtful whether there was any very considerable depression at the centre and probably storm force was not attained. The path between the 22nd and 24th July is dotted as it is not absolutely certain that the centre of depression of the 25th can be connected with the typhoon which passed over Formosa on the 22nd and in any case this portion of the track is very uncertain owing to lack of observations.

During the early morning of the 26th the lighthouse stations at the mouth of the Yang-tze-kiang recorded the lowest reading of the barometer, the wind at the same time backing from N and NNE to NNW and NW, the force being from a moderate to strong breeze. The weather was overcast and gloomy with occasional showers at some stations. At North Saddle the lowest barometer reading was at 3 a. 29.45. Further South at Steep Island the lowest reading of the barometer occurred some time after 9 p. of the 25th. At 3 a. the reading was 29.49 and the wind which had been NW force 5 at 9 p. had backed to W with the same force at 3 a. Rain fell between 6 and 9 a.

At the lighthouses at the N entrance to the Formosa Channel gentle to fresh SSW breezes and fine weather prevailed with rising barometer and in N Formosa light variable airs and fine weather with rising barometer were the conditions. In South Western Japan moderate to fresh E & SE winds prevailed with rainy weather and the barometer which had been rather low during the past 24 hours was now slightly rising. Nagasaki had at 6 a. 29.64.

From the vessels in the area under the influence of the depression we have the following observations:—The *Airlie* had the wind still backing from NNW the previous evening to WSW a strong breeze with squally appearance on the early morning of the 26th. At noon the wind was a fresh SW breeze and the weather was fine. She was then in $27^{\circ} 56'$, $121^{\circ} 53'$. With the *Levuka* the wind was still a strong WSW breeze, at noon the weather being fine. The barometer read 29.65. The *Charters Tower* had at noon in $29^{\circ} 35'$, $126^{\circ} 08'$ a strong SSW breeze, barometer 29.65, but the sea was no longer confused though still high. The *Verona* during the early morning had a fresh SSW gale with overcast weather and confused sea. The direction had backed to S at noon and blew a strong breeze. The barometer was rising and then read 29.59. She was in $30^{\circ} 39'$, $127^{\circ} 14'$. The *Phra Nang* in $30^{\circ} 23'$, $128^{\circ} 31'$ had a moderate S breeze and fine weather, barometer 29.64. The *Picciola* in $34^{\circ} 35'$, $122^{\circ} 47'$ had a fresh NE breeze and squally weather with high confused sea. The *Yung-ping* a little NW of the Saddles had a fresh NW breeze and heavy NE swell. The *Richard Parsons* bound from Shanghai to Hongkong was near N Saddle at 2 p. At midnight July 26th she had a fresh SW gale and high sea.

The centre was at noon on the 26th in about $31^{\circ} 0'$, $124\frac{1}{2}^{\circ}$.

On the 27th SW winds were established at sea South of 30° lat. On the East Coast at Steep Island the wind at noon was SW 2, the weather fine and the barometer read 29.70 at 9 a. At North Saddle the wind remained at NW of force 5 until 3 a. At 9 a. it had backed to SW and was of force 4, barometer 29.63 and fine weather. The other stations at the mouth of the Yang-tze-kiang had much the same weather except that the NW wind was lighter in force and the change in direction came somewhat later and was to SE in some cases. At the Shantung Promontory winds were light NE breezes Chefoo had NE force 1, and Howki NE 3 at 9 a. The weather was fine at all these stations. At NE. Promontory lighthouse the barometer read 29.48 at 9 a. At Chefoo 29.47 both falling slightly. These barometer readings are uncorrected the errors being unknown. They apparently read too low. On the SE coast of Korea at Fusan the wind was a light to gentle SW breeze with passing showers during the afternoon. In Western Japan moderate SE veering to S winds prevailed with fair weather. At Nagasaki the barometer read 29.72 at 2 p. and was almost steady.

The following observations at noon on the 27th July are from vessels:—

Bq. <i>Levuka</i> ,	$28^{\circ} 25'$	$122^{\circ} 42'$	29.70	SW	6	b	
„ <i>Richard Parsons</i> ,	28 52	124 34		SW	8		high sea.
S.S. <i>Phra Nang</i> ,	28 38	125 22	29.70	SSW	6	b	„
„ <i>China</i> ,	31 12	181 06	29.84	SSW	5	c	
„ <i>Charters Tower</i> ,	32 34	131 01	29.76	SSE	2		fine.
„ <i>Yung Ping</i> ,	34 40	122 15		N	4		heavy. E swell.

The *China* had the wind from SSE force 5 (barometer 29.84) with moderate sea and swell on the previous midnight and the *Yung-ping* had a fresh NW breeze with rough sea at the same time. No barometer readings were entered in the log of the latter vessel.

The centre of disturbance for noon on the 27th July cannot be stated from the foregoing data with any accuracy, but the circulation of winds indicate its existence and perhaps it may have been in about $33^{\circ}\frac{1}{2}$, $125^{\circ}\frac{1}{2}$.

On the 28th according to the Japanese Weather Maps the depression was situated over the Eastern Coast of Korea. The barometer had fallen generally over Japan and rain was falling on the W and NW Coasts with strong winds veering from S & SW to W. At Itsughara in the Korean Straits the barometer at 6 a. read 29.56 with strong S wind and rainy weather. At 2 p. the barometer was rising on the W coast of Japan and the wind had veered and blew strongly from the West. On the NW coast the barometer was still falling at 2 p. and winds which had been very light in the early morning now blew strongly from directions S to W. At Fusan in SE Korea the barometer read at 9 a. 29.50 (uncorrected) it had fallen 0.19 during the previous 24 hours. The wind was SW force 2, but during the night it had been SW of force 5. The weather was gloomy with drizzling rain. During the evening the weather cleared up and the barometer rose. At Jenchuan in NW Korea the barometer read at 3 a. 29.57 (uncorrected) the wind being from N of force 2. Later in the day the barometer rose and the wind backed through NW to WSW at 3 p. the force then being 3. The weather was fine all day. At Yuensan in NE Korea the barometer at 9 a. read 29.62 (uncorrected) falling slightly. Light E airs and calms prevailed with very fine weather. Strong SW winds were blowing at sea between the East Coast of China and Western Japan. The centre of depression may possibly have been in 37° , 130° . There was at the time another area of low pressure in North Japan and the depression under notice probably moved NEward across the sea of Japan.

On the 22nd July there was a depression S of Japan of which a few details will be given later on. In this connection the log of the barque *Velocity* proceeding from Honolulu to Hongkong is given below as she encountered bad weather between the 16th and 21st of July. No readings of the barometer were entered in the log.

July 14, Noon,	.....17° 41'	144° 51'	var.	2	
15, Noon,	.....17 21	142 50	SE	2	
Midt.,	.....	...	...	...	squally.
16, Noon,	.....16 57	140 39	S	6	mist and rain.
6 p.,	.....	...	SSE	7	
Midt.,	.....	...	S	9	heavy squalls—decks flooded.
17, Noon,	.....17 00	136 40	S	7	hard squalls.
Midt.,	.....	...	SW/S	8	overcast, lightning all round.
18, Noon,	.....17 26	135 0	SW/S	6	
Midt.,	.....	...	SW	8	heavy squalls—lightning all round.
19, Noon,	.....18 08	133 54	SW/W	8	rain squalls.
4 p.,	.....	...	...	...	heavy squalls.
Midt.,	.....	...	SW	8	decks flooded.
20, Noon,	.....18 04	133 58	SW/W	8	heavy squalls.
21, Noon,	.....17 36	134 29	WSW	8	hard rain squalls.
Midt.,	.....	...	...	...	heavy squalls.
22, Noon,	.....16 11	134 48	W/S	5	

The weather prevailing during this period on the China Coast and in Luzon has been already described.

In the absence of any other data within a distance of 1000 miles of the *Velocity* and for lack of any barometric observations taken on board that vessel it is impossible to determine whether the bad weather was caused by a typhoon in the Pacific or whether the bad weather was a burst of the SW monsoon due to general low pressure to the northward of the vessel.

It is, however, not unlikely that the depression to the S of Japan first indicated by the Japanese weather maps on the night of the 21st and which subsequently passed over Central Japan was connected with the bad weather experienced by the *Velocity*. It may be that the stations in Formosa were included in the area under the influence of a typhoon in the Pacific on the 19th and two or three previous days. The winds had been chiefly N and NW though light in force.

The observations of the *Phra Chom Klao* about this time are appended together with those of the *Pathan*.

S.S. PHRA CHOM KLAO.

July 19, Noon,	.....29° 02'	129° 00'	29.70	NE/E	4	o.	high head swell.
20, "	.....30 10	132 28	.58	NE	4	o.	nasty head sea.
21, "	.....32 45	135 15	.59	NE	5	o.	rising head sea.
Midt.,	.....	...	.58	E	5	q.	
22, Noon,	.....34 00	138 03	.57	E/N	8	q. ²	heavy water on board.
Midt.,	.....	...	.62	SE	7		
23, Noon,	.....33 09	138 02	.77	SSE	4	mod ^{ns} ,	sea decreasing.

S.S. PATHAN.

July 21, Midt.,	.....	...	29.62	SSE	2		rough confused swell.
22, 4 a.,	.....	...	.67	SE	4	or.	
8 a.,	.....	...	.68	ESE	6		rough swell from S.
Noon,	.....33° 38'	136° 54'	.62	E	8		high beam sea—rollnig heavily.
4 p.,	.....	...	.47	E/S	9		do. ship's head to wind..
8 p.,	.....	...	.44	"	8	or.	rolling violently.
Midt.,	.....	...	.45	"	8		same weather.
23, 4 a.,	.....	...	.54	"	8		
8 a.,	.....	...	.59	SE	7		
Noon,	.....33 11	136 09	.77	SE/S	5		wind and sea decreasing.

The S.S. *Nürnberg*, from Hiogo to Nagasaki, had NE to N winds on the evening of the 21st and morning of the 22nd with fine weather. At midnight on the 22nd, near Nagasaki, she had a strong NNE breeze with showery weather (barometer 29.46).

On the morning of the 22nd, according to the Japanese weather maps, light to moderate N winds prevailed in Western Japan and strong NE winds in Central Japan with rainy weather. Later in the day winds had about the same direction but had increased much in force. During the evening NE and E gales and strong gales prevailed with rainy weather over Central Japan and strong N breezes in Western Japan with falling barometer. At noon on the 22nd the centre was in $31\frac{1}{2}^{\circ}$, $132\frac{1}{2}^{\circ}$. The centre of the depression had entered the S coast of Japan and was a little N of Kochi at 6 a. on the 23rd. It afterwards crossed the inland sea and NW Japan, and entered the sea of Japan during the afternoon. At 2 p. the centre was near Sakai on the NW coast.

A path from the 16th to the 21st has been dotted in merely as a rough indication of the possible track.

Between the 23rd and 24th July a small depression was formed in the China Sea to the S of Hongkong. It subsequently developed and moved towards Hainan and passed into the Gulf of Tongking. On the 26th it entered the mainland at Haiphong.

On the 23rd July E and SE light and gentle breezes blew along the S coast of China with cloudy but fine weather. In the eastern part of this district the barometer had risen 0.10 and in the western part it had fallen. In Hongkong it was rising slightly. Light W airs and calm during the early morning changed to E about 11 a. of force 3. A gentle ESE breeze continued during the remainder of the day. Clouds came up and lightning was seen in the evening. The mean temperature was as high as 82°.2. At Hoihow the barometer was falling and the weather very wet with heavy squalls from N to NW. At Pakhoi the barometer was falling and the weather cloudy with a gentle NE breeze. At Haiphong it had risen slightly with gentle NW to W breezes and overcast skies. In SW Luzon strong SSW breezes prevailed with squally and wet weather and rising barometer. At Bolinao during the previous evening the weather was squally with a fresh W breeze, but on the 23rd the wind backed to S again and became light but the weather continued squally and wet.

There were many vessels in that district of the China Sea to the E of Annam. Their logs show that a fresh SW monsoon was blowing over this area with fine weather. Gradients were rather steep for SW winds in that part of the China Sea and slight for E winds on the S coast of China. There appears to have been an area of slightly deficient pressure in about the latitude of 20° stretching eastward from Hainan.

On the 24th gentle E breezes prevailed on the S coast with a slowly rising barometer. Towards evening it began to fall again. In Hongkong it blew a moderate E or ENE breeze during the day, but it veered late in the evening and blew a fresh ESE breeze decreasing in force. The weather was squally and wet, 1.34 inch. of rain being measured during the 24 hours ending with midnight. At Victoria Peak it blew a moderate SE breeze at noon. The lower clouds came from about E by S. At Hoihow the barometer was almost steady, with a moderate NW breeze and heavy squalls of wind and rain from W to N. The rain was continuous, 2.33 inches being recorded for the 24 hours ending at 9 a. on the 24th. At Pakhoi the barometer showed a slight rise, with fine weather and a light N breeze. At Haiphong the barometer was steady, the wind a light WNW air and the sky overcast. In Western Luzon the barometer was rising. At Bolinao a light SE breeze prevailed with wet weather. The following are some of the observations:—

COAST STATIONS.

Bolinao,	29.77 + .05	SE	2	or.
Lamoeks, .....	.64 + .02	SE	2	c.
Swatow, .....	.61 + .04	E	2	c.
Breaker Point, .....	.62 + .02	E	2	cm.
Hongkong, .....	.60 + .03	E	4	opq.
Hoihow, .....	.48 .00	NW	3	orq.
Pakhoi, .....	.66 + .03	N	1	c.
Haiphong, .....	.54 .00	WNW	1	c.

VESSELS.

S.S. <i>Esmeralda</i> ,	21° 08'	118° 55'	29.60	S	2	o.	swell.
" <i>Alwine</i> ,	21 35	111 47	.44	NE	7		
" <i>Haiphong</i> ,	20 25	111 10	.47	NNE	...	q.	strong wind.
" <i>Propontis</i> ,	18 51	112 04	.51	W/S	5	o.	
" <i>Phra Chula Chom Klao</i> ,	18 24	111 25	.54	W	4		decreasing wind and sea.
" <i>Independent</i> ,	17 23	110 30	.53	W	5		high cross sea.
" <i>Rio</i> ,	15 41	110 23	.60	SW	5		heavy sea.
" <i>Taicheong</i> ,	15 15	113 05	.64	SSW	3		moderate sea.
" <i>Thibet</i> ,	13 19	109 23	.65	W	4	oq.	
" <i>Wingsang</i> ,	12 44	112 12	.67	SSW	6	c.	high sea.
" <i>Venetia</i> ,	11 00	111 01	.74	SW	5		fine.
" <i>Ganges</i> ,	09 32	109 24	.79	SW/W	6		fine.

Several other vessels south of 13° latitude, the steamers *Hupeh*, *Angers*, *Telamon*, *Salatiga*, *Strathesk*, *Decima*, *Chelydra* and the barque *Nicoya*, had fresh SW monsoon and fine weather.

Of those more immediately concerned the S.S. *Alwine* from Hongkong to Pakhoi was taken into Hui-Lung-San harbour before noon for shelter. During the early morning the NE wind was increasing from a fresh breeze to moderate gale with falling barometer. Towards evening a fresh NE gale was logged (barometer 29.46 at 8 p.). On board the S.S. *Haiphong* the following observations were taken:—

July 24, 10.30 a.,	20° 17'	110° 56'	29.47	NNE	...	heavy squalls with rain.
Noon, .....	...	...	.47	NNE	...	very heavy squalls.
1 p., .....	...	...	.41	...	...	barometer lowest.
8 p.,	21 03	112 17	.47	NE	4	high sea.
Midt.,	21 30	112 52	.50	ENE	4	do.

The barque *Kitty* in $18^{\circ} 52'$, $111^{\circ} 16'$ on the 23rd at noon had her barometer falling (29.54) and strong SW breeze. At 5 p. 29.49, at 4 a. on the 24th 29.42, at 5 a. 29.39 (lowest reading). We do not find any wind or weather recorded in the log book since the 23rd at noon. At noon on the 24th she was in $20^{\circ} 08'$, $113^{\circ} 10'$. The S.S. *Propontis* had the wind backing to SE (5), overcast (8 p. barometer 29.47). The S.S. *Phra Chula Chom Klao* had a moderate SW backing breeze at 8 p. (barometer 29.48) with showery weather. The *Independent* had much the same weather as at noon (8 p. barometer 29.50). The *Rio* had also the same as at noon but lightning was observed in the NW and NE and the sea was confused (barometer 8 p. 29.56). With the exception of the *Alwine* these vessels were all bound for Hongkong.

The centre of the small depression appears to have been in 20° , $112\frac{1}{2}^{\circ}$ at noon on the 24th.

The following observations refer to noon on the 25th:—

COAST STATIONS.

Bolinao,	29.71 - .06	SE	1	o.
Lamoeks, .....	.60 - .04	SW	2	cdp.
Swatow, .....	.59 - .02	NE	1	o.
Breaker Point, .....	.59 - .03	SSE	2	om.
Hongkong, .....	.54 - .06	W	1	o.
Hoihow, .....	.51 + .03	WSW	4	or.
Pakhoi, .....	.61 - .05	N	4	op.
Haiphong, .....	.58 + .04	W	1	od.

VESSELS.

S.S. <i>Esmeralda</i> ,	$17^{\circ} 44'$	$119^{\circ} 45'$	29.63	S	5	oqr. rough sea.
" <i>Propontis</i>, .....	...	...	.53	S	2	op.
" <i>Phra Chula Chom Klao</i> , 21	54	113 45	.52	E	4	o.
" <i>Alwine</i> ,	21 35	111 47	.44	NE/E	6	high sea.
" <i>Independent</i> ,	20 19	112 25	.47	S	3	o.
" <i>Taicheong</i> ,	19 32	113 49	.55	SSW	6	NW and W swell.
" <i>Rio</i> ,	18 57	111 44	.52	WSW	5	fine.
" <i>Hupeh</i> ,	16 14	113 31	.60	SSW	4	fine.
" <i>Venetia</i> ,	14 51	113 00	.65	WSW	3	fine—SW swell.
" <i>Angers</i> ,	12 44	111 35	.64	SW	5	fine.
" <i>Thibet</i> ,	09 49	108 41	.72	WSW	6	o. SSW sea.

In Western Luzon the barometer was falling with light to moderate S and SSW breezes and wet weather. Winds had become light and variable with cloudy, showery weather at the S coast stations to the E of Hongkong. The barometer showed a fall but at noon it began to rise again. At Hongkong the wind was SE 2 but changed about noon to W in a thunder squall. Later in the day light ESE breezes prevailed. It was showery all day. The lower clouds backed to S during the day. At Victoria Peak the wind was SSE 3 at noon. At Hoihow the wind had backed. At 9 a. it was WSW 4 with wet weather. Towards evening it was SSW 4 with heavy rain squalls and lightning. At 9 a. on the 25th 2.85 inches of rain were measured. The barometer showed a slight rise between noon on the 24th and 25th, but was almost steady on the latter day. At Pakhoi the barometer had fallen decidedly. The wind was N 4. The weather overcast and showery. At Haiphong light W/N breezes prevailed with overcast weather and light passing showers, and slowly rising barometer. Winds had backed and become more southerly to the SE of Hainan. To the E of Annam and Cochin China fresh SW breezes and mostly fine weather prevailed. Pressure appears to have given way in the extreme south.

The complete observations for the 25th copied from the log book of the S.S. *Alwine* are given below. This vessel was lying in Hui-Ling-San harbour ($21^{\circ} 35'$, $111^{\circ} 47'$).

July 25 1a.	29.50	NE 7-8 high sea.	July 25 1p.	29.44	ENE 5-6 high sea.
4a.	.42	NE 7-8 high sea.	2p.	.44	
5a.	.41	Heavy squalls with rain, wind un-	3p.	.43	NE-SE 3-7 high sea.
6a.	.40	steady, first going N and back	4p.	.42	
7a.	.41	again to E and SE.	5p.	.43	SE 4 high sea.
8a.	.42		6p.	.43	
9a.	.44	NE/E 6 high sea.	7p.	.44	SE 5 high sea.
10a.	.44		8p.	.48	SSE 5 high sea.
11a.	.45		midt.	.50	SE 5 high sea.
noon	.44				

The *Phra Chula Chom Klao* had barometer rising with the wind SSE 4 during early morning. Later it backed to E. The *Propontis* had SE 5 at this time and barometer rising. The *Independent* had the wind backing from W to S 3 and barometer falling. Lightning was seen in the W. The *Taicheong* had SW 4 at 4a. and SW 7 at 8 a., with wet, squally weather. Lowest barometer 29.53 at 8 a. During the afternoon and evening the wind backed and decreased in force. At 4 p. 29.59 S 4, at 8 p. SSE 3 with S swell and rising barometer. On board the *Rio* the lowest barometer 29.46 was read at 4 p. It rose in the evening. At midnight 29.58. Winds a.m.: SW 5 rain squalls and rough sea, p.m.: WSW 3 backing to SE 3 and sea moderating.

At noon on the 25th the centre appears to have been in $20^{\circ} 45'$, $110^{\circ} 30'$. It evidently did not increase in intensity and still remained a small depression.

The following observations refer to noon on the 26th:—

COAST STATIONS.

Lamoeks,	29.67 + .07	SE	2	c.
Swatow, .....	.64 + .05	SE	1	o.
Breaker Point, .....	.66 + .07	S	2	c.
Hongkong, .....	.64 + .10	SE	2	olt.
Hoihow, .....	.57 + .06	E	3	c.
Pakhoi, .....	.66 + .05	SSE	2	crlt.
Haiphong, .....	.38 - .20	NW	8	or.

VESSELS.

S.S. <i>Alwine</i> ,	$20^{\circ} 10'$	$110^{\circ} 41'$	29.55	S	4		high sea SE swell.
„ <i>Telamon</i> ,	19 48	112 38	.58	var.	2	o.	
„ <i>Hupeh</i> ,	19 44	113 29	.65	SSW	4	orq.	
„ <i>Venetia</i> ,	18 48	113 51	.65	SSW	4	o.	
„ <i>Yarra</i> ,	18 00	111 03	.60	SSW	3	orq.	
„ <i>Salatiga</i> ,	17 13	111 03	.63	S	2	o.	
„ <i>Angers</i> ,	16 03	113 41	.65	SSW	4	b.	
„ <i>Chelydra</i> ,	15 01	110 19		S	3	c.	
„ <i>Strathesk</i> ,	12 50	110 11		SW	6	o.	rough sea.

The above observations can be taken as showing the general conditions prevailing all day from Hoihow eastwards. In Hoihow SE 2 prevailed. A very heavy squall of wind and rain from SW accompanied by lightning was experienced at 4.30 p. At Pakhoi winds were light from SE in the morning to S in the evening with wet weather, thunder and lightning. At Hoihow 1.19 and at Pakhoi 4.60 inches of rain were measured at 9 a. on the 26th. Barometer rising at all these stations except Haiphong. From this place we have the following observations:—

July 26	7a.	29.48	WNW	4	o.
„ 26	1.30p.	.33	NW	8	or.
„ 27	7a.	.61	ESE		c.

In addition there were two vessels in the immediate neighbourhood. The *Chusan* lying at Haiphong and the *Avochie* at Hongay Bay (about 20 miles NE of Haiphong):—

S.S. AVOCHIE.

26th July, 4a.	29.45	NW	4	or ² .	(Hongay Bay).
8a.	.29				
noon	.24				Heavy squalls of wind and rain. Wind veering to E and SE blowing force 12 in squalls.
5p.	.38				
27th July, 8a.	.67	SW			(Norway Islands outside Haiphong).
noon	.67	SW			Fair and clear in $20^{\circ} 33'$, $107^{\circ} 32'$.

S.S. CHUSAN AT HAIPHONG.

26th July	10a.	29.53	NW	7	26th July	3p.	29.40	SW	8
	11.30a.	.45	NW	7		8p.	.52	SSE	7
	1p.	.38	WNW	10	27th July	noon	.58	S	2
	2.30p.	.28	W/S	10					

The *Avochie* had the wind veering, barometer (29.24) lowest and greatest force of wind with squalls of typhoon force from E to SE at noon. The *Chusan* had the lowest barometer (29.28) at 2.30 p. The wind had backed since morning, was now W/S 10.

The centre of the typhoon was at noon on the 26th July in $20^{\circ} 55'$, $106^{\circ} 58'$. It passed 5 miles south of the *Avochie* near noon and at 2.30 p. about the same distance north of Haiphong over the lowlying land forming the delta of the river. It was not of great intensity and the damage done at the town of Haiphong was of a trifling character, but during the passage across the Gulf of Tongking it must have developed somewhat. On the 24th and 25th it was but a small depression. After entering the coast it apparently moved WNWward.

On the 27th light S to SE winds and generally fine weather prevailed with rising barometer in the Gulf of Tongking and in the China Sea to the E and SE of Hainan. Much the same wind and weather prevailed on the 28th with barometer still rising. The S.S. *Kongbeng* at noon in $18^{\circ} 26'$, $111^{\circ} 30'$ experienced a severe squall from the W with heavy rain in the afternoon, but this was not connected with any cyclonic depression. At Hoihow a severe shock of earthquake (direction N to S) was felt at 3 a. There were some indications of a depression E of Luzon previous to the 31st July. In Luzon on the 29th light NW to W breezes prevailed with falling barometer. At Bolinao on the 30th winds had been chiefly WSW gentle breezes with heavy rain. At South Cape (Formosa) light NE breezes prevailed with showery weather. The barometer fell in the evening. On the 31st the

wind veered and became SSE 2 with barometer rising in the evening. At Bolinao SE 2 prevailed with improving weather and rising barometer. At Lamocks and Breaker Point the wind became SE 2 during the evening. The weather was fine and the barometer slowly falling. At Hongkong the barometer was falling with W 1 and fine weather. The barque *Velocity* on the 29th in $17^{\circ} 12'$, $131^{\circ} 0'$ had SE 5, and on the 30th in $17^{\circ} 31'$, $128^{\circ} 40'$ S 6. The following are some of the observations made at noon on the 31st July:—

COAST STATIONS.

Bolinao,	29.86 + .04	SSE	1	o.
South Cape, .....	.81 - .04	ENE	2	cp.
Lamocks, .....	.78 - .04	W	1	c.
Swatow, .....	.80 .00	SE	1	b.
Breaker Point, .....	.79 - .02	calm		c.
Hongkong, .....	.80 - .01	W	1	c.
Hoihow, .....	.79 .00	S	1	eq.

VESSELS.

S.S. <i>Memnon</i> ,	15° 14'	117° 55'	29.84	WSW	5	q.
„ <i>Esmeralda</i> ,	16 22	118 42	.83	SW	5	oqr.
Bk. <i>Velocity</i> ,	18 05	125 48		SSW	6	o.

It appears that a very small typhoon was approaching the China Coast from the SE. At noon on the 30th it is likely that it was in about 19° , 123° , and on the 31st in about 20° , $119\frac{1}{2}^{\circ}$.

AUGUST.

At noon on the 1st of August the following are some of the principal observations:—

COAST STATIONS.

Bolinao,	29.86 .00	S	2	c.
South Cape, .....	.84 + .03	SSW	4	c.
Anping, .....	.82 + .01	S	5	eq.
Fisher Island, .....	.79 - .01	SSE	4	cm.
Lamocks, .....	.78 .00	E	3	c.
Swatow, .....	.73 - .07	E	5	c.
Breaker Point, .....	.73 - .06	NE	4	cp.
Hongkong, .....	.69 - .11	N	2	ctl.
Canton, .....	.70 - .08	NNW	1	c.
Hoihow, .....	.79 .00	W	2	o.

VESSELS.

S.S. <i>Namyong</i> ,	15° 21'	113° 06'	29.85	SSW	4	o.
Sh. <i>Charger</i> ,	16 04	113 03		WSW	5	
S.S. <i>Memnon</i> ,	18 37	116 07	.75	WSW	7	q.
„ <i>Esmeralda</i> ,	19 48	116 12	.75	WSW	6	oqr. heavy swell.
„ <i>Ancona</i> ,	22 18	114 44	.69	NE	4	fine.
„ <i>Aglaiia</i> ,	23 11	117 27	.77	S	3	
„ <i>Orestes</i> ,	23 34	117 56	.78	S	3	c.
„ <i>Activ</i> ,		Hoihow.	.75	WSW	3	o.
„ <i>Alwine</i> ,		Do.	.74	WNW	4	

The centre of the typhoon, which had increased in dimensions and violence, was now in 21° , 116° , but it is somewhat doubtful whether it blew with typhoon force anywhere. The greatest force recorded was a strong gale, and the depression at the centre did not seem to exceed 0.3 inches. The S.S. *Memnon* certainly reported force 11 and had a jib carried away, but the wind force was overestimated greatly on board that vessel.

Fresh S and SE breezes with squally showery weather and rising barometer prevailed in southern Formosa. At Swatow and Lamocks E to SE gentle to fresh breezes with showers and falling barometer prevailed. At Breaker Point the wind veered from ENE 3 (a.m.) to SE 6 (midnight). The weather was wet and the barometer falling. At Hongkong it was calm in the early morning and from NW 1 chiefly during the remainder of the day. The barometer was falling. There was a slight thunderstorm at noon and some showers in the afternoon. At Victoria Peak at noon the wind was N 4. R-cum came from N with c-str. above them. At Hoihow light W breezes prevailed with steady barometer and overcast sky.

The barometer readings on board the *Namoa* were not good, the instrument having apparently become deranged during the gale:—

S.S. *NAMOA*.

August 1, 4p.	left Swatow for Hongkong.			
8p.	SE			heavy SSE swell.
midt.	SE	8		showery.
August 2, 4a.	SE	8		
8a.	WNW	8		
10a.	SW	9	q.	ship rolling heavily.
Noon	SW	9		nasty confused sea.
2p.	SW	7		
4p.	arrived in Hongkong.			

S.S. ORESTES.

August 1, Noon	23° 34'	117° 56'	29.78	S	3	c.	
midt.			.70	S	5	or.	
" 2, 5.30a.		(Lowest.)	.49	S	5		
6a.				calm			heavy S swell.
8a.	Past Pedro Blanco		.52	NNW to WNW	8		
Noon			.62	WSW	7		
2p.	Hongkong.						

S.S. AGLAIA.

August 1, Noon	23° 11'	117° 27'	29.77	S	3		
midt.			.71	SSW		qrl.	SW swell.
" 2, 4a.			.59	SE	8		high sea.
8a.			.71	WNW	8	r ² .	ship labouring.
Noon	22° 08'	114° 24'	.74	SW	7		high SE sea.
4p.				SW	6		

S.S. ESMERALDA.

August 1, 4a.			29.75				
Noon	19° 48'	116° 12'	.75	WSW	6	orq.	heavy swell.
8p.			.75				
midt.				SW	5	orq.	
" 2, 4a.			.64				
8a.				SW	8		high sea.
Noon	22° 02'	114° 39'	.73	SW	8	orq.	high sea, thick.
4p.				SW	6	or.	clearing.

S.S. HUPEH.

August 1, 6p.	left Swatow for Hongkong.						
midt.	Breaker Point.		29.69	SW	5	oqr.	
" 2, 8a.			.67	SSW	6	oq ²	heavy sea.
Noon	22° 37'	115° 54'	.67	S/W	8	o.	
4p.			.69	WSW	5	o.	
8p.			.75	WSW	4	o.	
midt.	Pedro Blanco.		.80	SW	4	o.	moderating sea.

At noon on the 2nd August the following are some of the observations collected here:—

COAST STATION.

Bolinao,	29.90 + .04	SSW	2	b.
South Cape, .....	.88 + .04	SSW	3	c.
Anping, .....	.87 + .05	S	5	c.
Fisher Island, .....	.82 + .03	S	5	cm.
Lamoeks, .....	.76 - .02	S	6	cm.
Swatow, .....	.73 .00	S/W	6	opq.
Breaker Point, .....	.73 .00	W	5	cm.
Hongkong, .....	.73 + .04	SW	6	o.
Canton, .....	.72 + .02	NW	2	oq.
Hoihow, .....	.78 - .01	ENE	2	c.

VESSELS.

Sh. <i>Charger</i> ,	18° 40'	112° 50'		SW	4		
S.S. <i>Namyong</i> ,	19 21	113 46	29.83	SSW	5	og.	
" <i>Activ</i> ,	20 27	111 12	.74	S	3	oqr.	
" <i>Alwine</i> ,	21 35	112 44	.78	SW	6		
" <i>Memnon</i> ,	21 46	114 34	.71	SW/W	7	q ² .	
" <i>Port Philip</i> ,	23 02	116 54	.71	SW	6	qr.	high sea.
" <i>Zafiro</i> ,	23 12	116 48	.72	S	5	r.	"
" <i>Kweilin</i> ,	23 27	117 17	.81	S	5	q.	"

In southern Formosa moderate S winds and fine weather prevailed with steady barometer. In the northern part of the Formosa Channel moderate to fresh S and SW winds prevailed with fine weather and rising barometer. At Lamocks the weather was squally and showery in the morning with veering wind and rising barometer. At Swatow there was ESE 1 with rain in the early morning hours. At 9 a. S 6 with oqp. and rising barometer. After 3 p. the wind decreased to SSW 3, (at 9 p.), but the weather remained gloomy and showery. At Breaker Point the weather was showery the whole day with winds SSE 5 till 9 a., and thereafter W 5 to SW 5. After 9 a. the barometer rose. At Hongkong it rose rapidly since the early morning hours with NNW 1. Towards 8 a. it backed and increased smartly in force. At 8 a: W/S 2. At 10 a: SW/W 5. At 11 a. SW/W 6. At noon: SW 6. It gradually calmed down in the afternoon. At Victoria Peak at noon: SW 5. The lower clouds backed with the wind. Between 7 a. and 1 p. there were squalls of wind and rain. At Canton the day began with calm. Light W and N breezes prevailed during the day, and then it calmed again. The weather was overcast and gloomy with rain in the afternoon. The barometer rose towards midday.

At 6 a. on the 2nd the centre of the typhoon passed a few miles to the eastward of Pedro Blanco moving northwards. The *Orestes* making for Hongkong encountered the central calm. After passing through the calm she had first NE 2 and then a fresh NW gale. At noon the centre was in $23\frac{1}{2}^{\circ}$, 115° , it having struck the coast about 9 a. Then the depression filled up quickly as usual.

On the 9th and 10th August light airs and calms prevailed over an area of which 30° , 126° may have been about the centre. The *Nürnberg* and the *Benlarig* navigating the area comprised by 28° and 32° lat. and 123° and 130° long. had similar weather with high barometer on the 9th but falling on the 10th during the latter part of the day. The same weather reigned in Japan.

On the 11th a small and insignificant depression appears to have been formed between the East Coast of China and SW Japan. For two or three days previous, S and SE light winds and fine weather had prevailed on the East Coast. The barometer was rather high and slightly rising. Similar weather prevailed in N Formosa.

The following are some of the noon observations on the 11th (the reading at Nagasaki refers to 2 p.) :—

COAST STATIONS.

Keelung,	29.85	-.09	NE	2	c.
Tamsui, .....	.94?	-.07	ENE	2	b.
Foochow, .....	.80	-.05	SE	1	c.
Steep Island, .....	.82	-.05	E/S	1	cv.
North Saddle, .....	.80	-.06	ESE	3	cv.
Woosung, .....	.74?	.00	SE	3	b.
Nagasaki, .....	.89	-.02	S	4	b.

VESSELS.

Bq. <i>Levuka</i> ,	25° 21'	121° 08'	...	E	4	b.
" <i>Richard Parsons</i> ,	26 50	120 16?	...	SSW	4	
S.S. <i>Deuteros</i> ,	26 27	122 15	29.83	NE	2	fine.
" <i>Benlarig</i> ,	27 12	121 37	...	SSW	2	b.
" <i>Oceana</i> ,	29 53	126 58	.77	E	6	o. rising sea.
" <i>Woosung</i> ,	31 49	123 07	.84	SSE	2	b.

These observations show the barometer to have been falling over the entire area, but more particularly over the southern portion. Fine weather prevailed. Towards evening the wind at the stations near the mouth of the Yangtze backed to E and rose somewhat, the barometer falling rather smartly at the same time. Steep Island had 29.78 and North Saddle 29.75 at 9 p. The *Deuteros* travelling NE had an increasing NE breeze and rising sea towards evening. The *Oceana* proceeding SW had the wind veering and increasing. At 1 p. she was hove to and did not proceed on her course till 9.30 p. At 4 p: SSE 8 with frequent heavy squalls of wind and rain and a high sea rising. At 8 p: S 7 with lightning to SSE and SW. At midnight SE 6. The glass was not read.

No proper cyclone is indicated, but the centre of the depression may have been in 29° , 126° , on the 11th, and at noon on the 12th in $31\frac{1}{2}^{\circ}$, $124\frac{1}{2}^{\circ}$, but it was ill defined and very uncertain and the track is, therefore, merely dotted for the two days.

Observations at noon on the 12th August were as follows :—

COAST STATIONS.

Keelung,	29.82	-.03	NNW	2	c.
Tamsui, .....	.89?	-.05	SSW	2	b.
Foochow, .....	.78	-.02	WSW	1	b.
Steep Island, .....	.82	.00	SW	3	cm.
North Saddle, .....	.75	-.05	SSW	3	cm.
Woosung, .....	.70	-.04	N	2	b. E swell.
Nagasaki, .....	.91	+.02	S	4	c.

VESSELS.

Bk. <i>Richard Parsons</i> ,	25° 03'	119° 34'	...	SW	4	
S.S. <i>Oceana</i> ,	28 52	125 25	29.90	S/E	5	sea moderating.
" <i>Woosung</i> ,	28 56	122 04	.81	SSW	4	b.
" <i>Deuteros</i> ,	29 07	125 49	.84	S	4	moderate sea.
" <i>Verona</i> ,	30 50	126 33	.84	SSE	7	high S sea.

In North Formosa the winds remained light and variable and the barometer rose after noon. At Steep Island gentle W breezes in the morning backing to SSW in the evening prevailed. The barometer was at 3 a. (29.72). After which it rose. North Saddle had the lowest barometer at 3 a. (29.68) and SW and S 4 blew all day. Woosung and other places near the river mouth had N 3. At Shawsishan the wind backed from NE (3a) to NNW (9a). The barometer was lowest in the morning, steady or perhaps slightly rising towards evening. In Western Japan the barometer was steady, weather fine, with S 2. The *Oceana* had S 5 all day. The *Woosung* proceeding S ran into bad weather on the evening of the 11th. Her log gives the following information :—

August 12, 2 a.,	29° 00'	122° 00'	29.64	W	8	high choppy sea from E.
3 a., .....	...	...	.65	W	8	do.
8 a., .....	...	...	.78	SW	6	fine and clear.
Noon,	28 56	122 04	.81	SSW	4	do.

The *Deuteros* steering NE had S 4 at noon on the 12th and at midnight (barometer 29.85) with choppy sea. The *Verona* on a SW course had the wind veering to S and decreasing after noon, when the weather improved.

Between the 14th and 15th August a sharp fall in the barometer took place on the S and SE coasts and in Formosa the fall being the most decisive in S Formosa and at the adjacent Channel Stations. Winds were on the 15th chiefly light SW airs and breezes on the S and SE coasts as far north as Swatow and calms prevailed in the N part of the Formosa Channel. In S Formosa light to gentle N and NW breezes prevailed and in N Formosa light E breezes. The weather was very fine in all these districts and the temperature was somewhat in excess. On the East Coast the barometer was almost steady and the weather fine with moderate SSW breezes. In Luzon the barometer had also fallen and the sky was cloudy with light N breezes in the north and light SW breezes in the south. In the China Sea light variable airs and breezes prevailed chiefly northerly to the S of Hongkong and SE of Annam the weather being fine. The observations point to a distant disturbance to the ESE of S Formosa perhaps in about 19°, 126°.

The following are the observations for the 15th August at noon:—

COAST STATIONS.

Bolinao,	29.83 - .04	S	1	c.
Aparri, .....	.76 .00	NNW	3	o.
Hongkong, .....	.88 - .04	W	1	b.
Breaker Point, .....	.83 - .09	SW	3	c.
Lamocks, .....	.85 - .08	SW	2	bv.
Swatow, .....	.84 - .08	calm	...	b.
South Cape, .....	.82 - .11	NNE	3	c.
Takow, .....	.85 - .09	NW	2	b.
Anping, .....	.84 - .08	NW/N	3	c.
Fisher Island, .....	.86 - .06	calm	...	cv.
Amoy, .....	.85 - .05	SE	1	b.
Turnabout, .....	.89 - .05	calm	...	cv.
Foochow, .....	.85 - .03	NE	1	b.
Tamsui, .....	.94 - .07	E/N	1	b.
Keelung, .....	.89 - .04	E	3	b.
Steep Island, .....	.87 + .01	S/W	4	cm.
North Saddle, .....	.81 .00	SSW	6	c.

VESSELS.

Bq. <i>Florence Treat</i> ,	11° 59'	111° 17'	...	SSW	2	
" <i>Cambusdoon</i> ,	13 50	112 37	29.84	SW	2	b.
Sh. <i>Marabout</i> ,	16 29	114 22	...	WNW	2	
S.S. <i>Taicheong</i> ,	17 50	114 7	.82	calm	...	
" <i>Kutsang</i> ,	19 14	113 45	...	calm	...	
" <i>Cicero</i> ,	20 54	114 28	.90	NE	2	fine.
Sch. <i>Santa Cruz</i> ,	21 14	118 12	...	NNW	2	fine.
S.S. <i>Lennox</i> ,	22 22	115 14	.92	WNW	2	
" <i>Verona</i> ,	22 38	115 48	.87	S	3	fine.
Bq. <i>Levuka</i> ,	24 0	118 47	...	var.	1	
S.S. <i>Phra Chom Klao</i> , ...	24 10	118 43	.81	var.	2	c.
" <i>Radnorshire</i> ,	26 26	118 43	.86	E	2	b. slight swell.

On the 16th August conditions were as follows:—The barometer had continued falling rapidly on the coast between Hongkong and Foochow, the fall amounting to about 0.1 since the previous day. In Formosa the decrease of pressures amounted to about 0.2 in the 24 hours. On the East Coast and in Luzon the barometer was almost steady. At Hongkong the weather was very fine, the sky being almost clear the whole day. During the morning some cum. was observed coming from WNW. In the afternoon a little c-str. was noticed and towards evening some cum. came from SW. The wind was from WSW light airs and breezes. The temperature was high, the mean of the 24 hours being 83°.6. At Victoria Peak the wind was from W force 4 in the morning and SW 5 during the evening. Breaker Pt. had SW 2 the whole day with partially clouded sky. Lamocks had NE 2 during the morning SW 2 veering to W 2 at night. The weather was very fine and lightning was seen at night. At S Cape the wind was NW 5 during the morning hours with cloudy sky. During the afternoon the weather became squally and showery and the wind backed to W and gradually increased to a fresh gale at 9 p. The barometer attained the lowest point at 6 p. (29.52) after which time it rose and at midnight read 29.58. At Takow the lowest recorded reading was at 9 p. (29.54). During the afternoon the wind increased in force from NW with rain. At 9 p. WNW 10 with gloomy weather is noted but this force is no doubt over estimated. Probably no more than force 8 should have been written. Anping had N 3 increasing with gloomy appearance in the morning, rain during the afternoon and NW 7 with squally weather at 9 p. (barometer 29.56). At Fisher Island the wind gradually increased from NW 5 in the morning to N 7 at 9 p. and WNW 8 at midnight, the barometer reading 29.50 at the latter hour at which time also the weather became showery with squalls. During the day the weather was fine with detached clouds. At Keelung (N Formosa) the wind was NE 4 with overcast sky at 9 a., at 3 p. it was NE 5 (barometer 29.63) with rain squalls and thunder was heard, at 9 p. SE 9 (barometer 29.39) with hard squalls of wind and rain. At Tamsui it veered from N 2 at 9 a. to NE 5 at 3 p. (barometer 29.67). At 9 p. (barometer 29.50) the direction of wind was still from NE with force 6 with very heavy squalls of wind and rain. The barometer continued to fall after

9 p. at both these stations. At Chapel Island the wind was N 2 during the morning, it veered to NNE 3 in the afternoon and became SW 3 to 4 in the evening. The weather was fine all day. The barometer read 29.67 at 9 p. and was still falling. At Ockseu the wind increased and backed during the day from NNE 3 at 6 a., N 4 at 6 p., NNW 5 at midnight. At the latter hour the barometer had fallen 0.2 inch. since noon and was still falling. The weather was fine in the morning but became overcast with drizzling rain in the evening. Turnabout had N 5 during the morning hours with fine weather. During the afternoon the wind increased in force and backed at 3 p. N 7 (barometer 29.71) at 9 p. NNW 8 (barometer 29.66), at midnight NNW 10 (barometer 29.52) and the weather became very bad with frequent squalls and rain. The centre at 9 p. was about 100 miles ESE of this station. Middle Dog had N 3 during the morning, NNE 5 at 6 p. (barometer 29.67), NNE 6 to 7 at midnight (barometer 29.54). The weather which was fine in the morning became overcast and wet during the evening. Foochow had NE 5 at 9 p. (barometer 29.71) with detached clouds. The stations on the East Coast had fine weather all day with light to moderate SE breezes. During the evening the barometer was falling a little in the southern part of this district.

Vessels in the northern part of the China Sea to the S of Hongkong had on August 16th mostly light W and WSW breezes with fine but cloudy weather. The *Cathay* and the *Frigga* both entered the Formosa Channel from the southward during the evening and had the wind increasing to a moderate W breeze with rough sea and NE swell with falling barometer as they progressed northwards. The *Hailoong*, which left Amoy for Tamsui during the afternoon, had the wind at first NE 2. During the evening the wind backed to NNW force 5 at midnight (barometer 29.53). The weather was overcast and squally with rough sea.

The *Lennox* proceeding NEward from her noon position had the wind NNE 6 increasing and backing. At midnight she had N 10 (barometer 29.49) with squalls of hurricane force and a very heavy sea. She was at this time in $25^{\circ} 0'$, $119^{\circ} 40'$ and about 90 miles WNW from the centre.

The *Singan* proceeding southward had an increasing wind from N and NNW. NNW 6 (barometer 29.53) at midnight with rain and very heavy squalls and high NE sea.

Those vessels near the northern entrance to the channel and proceeding NEward had the wind veering from NE to ESE and SE. The *Phra Chom Klao* had at midnight ESE 8 (barometer 29.67) with high cross sea. The *Belgic* NE of Formosa at noon bound for Hongkong had ESE 7 increasing at midnight (barometer 29.63) with heavy rain squalls and a rough increasing sea. The two vessels were about NE/N of the centre at this time. The *Bengloe* farther to the NE had the wind increasing to a strong SE breeze at 8 p. with heavy sea. She was bound for Hongkong.

The centre was at noon on the 16th in 22° , 123° , moving NWestward. It entered the E coast of Formosa during the evening and was at 9 p. in $24^{\circ} 5'$, $121^{\circ} 30'$.

The following are the observations for August 16th at noon:—

COAST STATIONS.

Bolinao,	SSW	400	29.83	.00	SSE	1	c.
Hongkong,	W	500	.80	-.08	WSW	2	b.
Breaker Point,	W/N	360	.79	-.04	SW	2	c.
Swatow,	W/N	380	.74	-.10	SSE	2	c.
Lamocks,	W/N	330	.79	-.06	NNE	1	c.
S. Cape,	W	120	.60	-.22	NW	6	cdq.
Takow,	WNW	150	.68	-.17	NW	6	gr.
Anping,	WNW	150	.66	-.18	NNE	3	o.
Fisher Island,	WNW	210	.64	-.22	N	5	cm.
Chapel Island,	NW/W	290	.71	-.10	NNE	3	cm.
Amoy,	NW/W	310	.76	-.09	NE	1	b.
Ockseu,	NW	260	.75	-.15	NNE	3	c.
Turnabout,	NW/N	260	.78	-.11	N	5	om.
Middle Dog,	NNW	280	.76	-.07	N	3	cm.
Foochow,	NNW	310	.79	-.06	NE	2	b.
Tamsui,	NNW	200	.71	-.23	NNE	4	o.
Keelung,	NNW	190	.71	-.18	NE	5	or.
Steep Island,	N/W	500	.87	.00	S/E	4	cm.
North Saddle,	N/W	540	.84	+.03	S/E	4	cm.

VESSELS.

Bk. <i>Cambusdoon</i> ,	$13^{\circ} 54'$	$112^{\circ} 40'$	SW	780	29.84	SW	2	b.
Sh. <i>Marabout</i> ,	17 4	114 22	SW/W	600		W	2	o.
Bk. <i>Constance</i> ,	17 28	114 0	SW/W	600		W	2	sultry.
Sch. <i>Santa Cruz</i> ,	21 46	117 10	W	350		WSW	2	
S.S. <i>Alwine</i> ,	21 57	113 46	W	570	.78	WSW	4	
„ <i>Frigga</i> ,	22 24	115 22	W	450	.79	WSW	2	o. swell.
„ <i>Cathay</i> ,	22 33	115 41	W	440	.80	var.	1	fine.
Bk. <i>Levuka</i> ,	23 30	117 55	WNW	340		NE	5	
S.S. <i>Lennox</i> ,	24 22	118 54	NW/W	280	.75	NNE	6	
„ <i>Hailoong</i> ,	24 27	118 3	NW/W	330	.74	NE	1	
„ <i>Meefoo</i> ,	25 26	119 59	NW/N	260	.75	NNE	4	or. NE swell.
„ <i>Phra Chom Klao</i> ,	26 15	121 46	NNW	290	.74	NE/E	5	
„ <i>Singan</i> ,	26 38	120 55	NNW	310	.83	N	4	o.
„ <i>Belgic</i> ,	27 35	125 5	NNE	380	.87	SE	4	c. SSE swell.
„ <i>Vorwarts</i> ,	28 0	121 37	NNW	400	.72	calm		SE swell.
„ <i>Radnorshire</i> ,	28 43	125 41	NNE	470	.88	ESE	5	increasing swell.
„ <i>Bengloe</i> ,	30 33	125 32	NNE	580	.98	S/E	5	clear.

On the 17th August the barometer continued to fall slightly at Hongkong. The wind was chiefly from WNW. About noon it backed to SW and increased to force 5 at 4 p. (barometer 29.66). It afterwards decreased to force 3 at midnight (barometer 29.70). The mean temperature of the 24 hours was 83.3 this being 2°.4, in excess of the mean of 5 years. The weather was fine with detached clouds the lower ones coming from WSW. Some c-cum was observed coming from E and above this c-str was seen. There was a solar halo. Victoria Peak had WSW 5 during the morning, SW 5 in the afternoon and evening. Breaker Point had WSW 3 in the morning increasing to WSW 5 towards evening. Weather fine till midday, then overcast with rain, thunder and lightning at night. The barometer was falling but slightly and at midnight read 29.64. At Lamocks the wind was veering from SSW 4 at 3 a. (barometer 29.60) to WSW 6 at midnight (barometer 29.60). The weather was fine in the morning but squally and wet with thunder and lightning during the evening. At S Cape the wind backed from WSW 7 at 6 a. (barometer 29.63 rising) to SW 5 at midnight (barometer 29.80). Anping at 3 a. had W 9 with rain, thunder and lightning (barometer 29.53 rising) the wind backed and decreased in force during the day. At 3 p. SSW 6 (barometer 29.67). At 9 p. SE 2 (barometer 29.72). The weather was rainy all day. Fisher Island also had the wind backing and decreasing with rising barometer at 3 a. W 9 (barometer 29.49), at midnight SSW 7 (barometer 29.66). The weather was wet and squally the whole day. At Keelung at 3 a. the barometer read 29.26 and it had risen by 9 a. (29.38). The wind at 9 a. was NE 3 at 9 p. SE 1 (barometer 29.68). In the evening the weather became fine. At Tamsui there was NE 2 at 9 a. (barometer 29.42), at 9 p. NE 2 (barometer 29.65) with fine weather. At Chapel Island the barometer was falling and the wind backing and increasing at 6 a. SSW 4 (barometer 29.58) at 6 p. SSE 7 (barometer 29.44) at midnight SSE 8 (barometer 29.47). The weather was wet all day. At Amoy the wind also backed and increased in force at 6 a. W 3 (barometer 29.60), at 6 p. SW 4 (barometer 29.51), at midnight SW 4 (barometer 29.53) with overcast sky in the morning and rain during the evening. At Ockseu the barometer was falling 6 a. (29.44) till about noon and it then remained nearly steady till 3 p. (29.38) when it commenced rising (9 p. 29.49). The wind was NNW 5 at 6 a. and it then commenced backing and increasing in force at noon WSW 5, at 3 p. SSW 7, at 6 p. S 7, at 9 p. S 9, at 10.30 p. S by E 11, at midnight SSE 8 force diminishing (barometer 29.57). There was rain the whole day and heavy squalls during the evening. This station was at noon 50 miles SSW of the centre, at 9 p. 60 miles SE of the centre. The detailed observations made at Turnabout for 17th August are appended. A NNW storm was blowing up to 8 a. when the wind commenced backing and diminishing in force, at 10.30 a. NW 9, at noon WNW 7, at 1.30 p. SW 3. It then gradually increased in force backing to S 10 at 4.30 p., SSE 11 at 5.30 p. and it continued to blow with storm force from SE until 9.30 p., afterwards diminishing in force with direction S. The lowest reading of the barometer was made at about noon (29.26.) Rain fell nearly the whole day with the exception of a few hours when the centre was within a few miles but the sky remained overcast. The centre was at noon 15 miles NNE of this station moving W by N. It was at 9 p. bearing W by N 70 miles.

At Middle Dog the barometer was falling rapidly during the morning hours and attained the lowest point at noon (29.21). After this time it commenced rising and at 3 p. read 29.23, at 9 p. 29.54. These readings appear to require a positive correction of about 0.05. The wind was from NNE 6 increasing during the morning, at noon from ENE 7. At 2.30 p. it suddenly veered to SE in a heavy squall. Later it backed to ENE again continuing to blow from that direction until 6 p. After that hour the direction became SE with force 7 to 8 during the evening. The weather was overcast, squally and showery the whole day. The centre passed between this station and Turnabout about noon. At Foochow the lowest recorded reading of the barometer was at 3 p. (29.30)—about which time the centre entered the coast a few miles to the southward—and between that hour and 9 p. (29.52) it rose. The weather was wet and squally with NE 4 in the morning, NNE 7 at 3 p. and ESE 5 at 9 p. At Wenchow the lowest reading of the barometer was at noon (29.55 uncorrected). The weather was wet and squally with wind at 9 a. NE 5 veering and increasing, at 2 p. SE 7. It remained from SE diminishing gradually in force, at 9 p. SE 2. At Steep Island the barometer was almost steady with SE 4 and fine weather.

The most important log received is that of the *Lennox* a copy of which is annexed. The centre appears to have passed almost over the vessel just before noon. She had a N backing storm during the morning hours with squalls of hurricane force, heavy rain and a confused sea mostly from the same direction as the wind. At 11.30 a. the wind suddenly veered to S and decreased to force 3. At 12.30 p. the wind increased to hurricane force from the same direction. At 2 p. there was typhoon force from SSE. At 4 p. the barometer had risen and the wind was gradually decreasing, at 8 p. S 10, at midnight SSE 8. The gentle S breeze which blew in the central area lasted one hour and the sea appears to have calmed down to some extent with the wind. The diameter of the area appears to have been about 10 miles. The wind was strongest as usual after the centre had passed and the sea though much confused had chiefly the same direction as the wind. Other vessels about NE and within 200 miles of the centre had fresh ESE veering gales. The *Bengloe* sustained some damage and the cargo shifted on account of the vessel rolling frightfully in the heavy sea. She was in considerable danger from the list she sustained and put into the Hieshans for shelter and to trim the cargo. Those SW and within 250 miles of the centre had fresh WSW backing gales towards the afternoon. The *Hailong*,

(Captain HALL), at anchor in Pinghai Bay (25° 10', 119° 10') had NW 6 with heavy rain squalls during the morning with falling barometer. She was then WSW of the centre. At 2 p. the vessel was at anchor in 25° 20', 119° 33' and had a fresh SW gale (barometer 29.30) with very violent squalls and rising barometer and during the evening the wind continued to back and at 10 p. there was a strong S gale (barometer 29.55). Vessels to the South of Hongkong had moderate SW breezes and fine weather. The centre was at 3a. on August 17th in 24° 50', 120° 55' moving NW, at noon in 25° 35', 120° 5' and moving towards W.

The following are the observations for noon on August 17th :—

COAST STATIONS.

Bolinao,	S	540	29.83	.00	var.	1	c.
Hongkong,	SW/W	280	.75	-.05	WSW	2	c.
Breaker Pt.,	SW/W	250	.64	-.15	WSW	4	cm.
Swatow,	SW/W	230	.61	-.13	WSW	2	o.
Lamocks,	SW	210	.59	-.20	SSW	6	om.
S. Cape,	S/E	220	.72	+.12	SW	6	cm.
Takow,	S	190	.70	+.02	WNW	9	rg.
Anping,	S	160	.65	-.01	SW/S	7	or.
Fisher Island,	S/W	130	.56	-.08	SW	8	orq.
Chapel Island,	SW	130	.52	-.19	S	5	omd.
Amoy,	SW/W	130	.58	-.18	W	3	o.
Ockseu,	SW/S	50	.39	-.36	WSW	5	omr.
Turnabout,	SW/S	15	.26	-.52	WNW	7	om.
Middle Dog,	N	20	.21	-.55	ENE	7	omp.
Foochow,	NW	40	.38	-.41	NE/N	5	orq.
Tamsui,	ESE	70	.51	-.21	NE	1	c.
Keelung,	ESE	90	.46	-.25	E	2	og.
Wenchow,	NNE	130	.55	-.19	SE	6	orq.
Steep Island,	NNE	320	.85	-.02	SE	4	cm.
North Saddle,	NNE	360	.82	-.02	SE	4	cm.

VESSELS.

Bq. <i>Cambusdoon</i> ,	15° 26'	112° 58'	SW/S	750	29.82	SW	4	b.
Sh. <i>Marabout</i> ,	19 18	114 6	SW	500	...	SW	4	b.
„ <i>Constance</i> ,	19 44	113 50	SW	480	...	SSW	5	fine.
S.S. <i>Alwine</i> ,	20 18	110 48	SW/W	600	.72	SW	4	
Sh. <i>Charmer</i> ,	21 24	121 29	S/E	260	...	WSW	6	c.
Bq. <i>Leruka</i> ,	21 39	118 6	SSW	260	.75	WSW	8	
Sch. <i>Santa Cruz</i> ,	22 32	116 36	SW	270	...	S	7	high sea.
S.S. <i>Meefoo</i> ,	23 2	117 2	SW	230	.61	SW	3	o. WSW swell.
„ <i>Singan</i> ,	23 52	118 0	SW	160	.54	SW	8	orq.
„ <i>Frigga</i> ,	24 9	118 32	SW	120	.52	SW	6	or. high E sea.
„ <i>Yuensang</i> ,	near Ockseu.		SW/S	70	.41	W/S	6	or.
„ <i>Lennox</i> ,	25 26	120 18	SE	17	.27	S	3	o. confused sea.
„ <i>Hailoong</i> ,	? (25 15	119 20)	SW/S	40	.30	NW/W	6	or.
„ <i>Belgic</i> ,	25 46	120 38	ENE	30	.39	SSE	7	egp. heavy sea.
„ <i>Phra Chom Klao</i> ,	26 55	122 55	ENE	170	.68	SE/E	8	o. confused sea.
„ <i>Changsha</i> ,	at Foochow.		NW	40	...	NNE	8	orq.
„ <i>Bengloe</i> ,	28 32	123 8	NE	230	.83	ESE	8	c. heavy confused sea.
„ <i>Presto</i> ,	29 57	128 14	NE/E	500	.84	S	5	q. increasing sea.
„ <i>Chingtu</i> ,	31 24	121 32	N/E	350	.89	SE	5	c.
„ <i>Radnorshire</i> ,	31 33	128 42	NE	600	.91	SE	3	moderate sea.

On the 18th August fresh S breezes decreasing with showery weather and rising barometer prevailed in S Formosa and at Fisher Island. At Hongkong the barometer was rising during the day, but very slightly. Temperature was high during the night of the 17th to 18th, but decreased towards noon when showery weather set in. The wind was WSW 3 to 4 during the morning hours, backing and decreasing in the afternoon. Lightning was seen at night. In N Formosa the barometer had risen rapidly and light to gentle variable breezes prevailed with showery weather in the evening. The barometer had risen considerably at all stations on the SE coast particularly in the N part of the district. At Swatow and the adjacent lighthouses strong SW breezes decreasing prevailed with very wet weather and much the same wind and weather prevailed at Amoy. At Chapel Island, Ockseu and Turnabout fresh SE to S veering gales were blowing during the early morning. About noon the force decreased to moderate and light breezes. The weather was wet all day. At Middle Dog there was SE 6 to 7 veering and decreasing in the afternoon with showery weather. Foochow had S 4 decreasing at 3 a. squally with rain. During the evening the weather became fine with light S air. On the East Coast moderate SE breezes prevailed with fine weather except at Wenchow and Ningpo where it was showery in the morning. The barometer was falling at the stations along the Yangtze river with moderate to light NE veering breezes and fine weather.

Vessels in the China Sea S of Hongkong had moderate to fresh S and SW winds with cloudy weather. Those in the Formosa Channel during the morning fresh to moderate SSW (in the South part) to SSE (in the North part) gales decreasing with very high sea and dirty weather. Off the East Coast and NE of Formosa there was a very high sea with chiefly strong SE breezes decreasing.

The centre at noon on August 18th was, perhaps, in about 26½°, 116° moving WNWard.

The following are the observations for the 18th August :—

COAST STATIONS.

Bolinao,	SSE	640	29.83	.00	SSW	2	c.
Hongkong,	SSW	280	.76	+ .01	S	3	o.
Breaker Point,	S/E	230	.72	+ .08	SSE	4	omd.
Swatow,	S/E	200	.71	+ .10	SW/W	4	oqr.
Lamocks,	SSE	220	.72	+ .13	SSW	6	md.
South Cape,	SE	380	.82	+ .10	S	2	c.
Takow,	SE	340	.83	+ .13	SSE	4	c.
Anping,	SE	320	.80	+ .15	S	4	o.
Fisher Island,	SE	270	.74	+ .18	SSE	5	cm.
Chapel Island,	SSE	210	.69	+ .17	SSE	4	omr.
Amoy,	SE	170	.75	+ .17	S	4	o.
Ockseu,	ESE	210	.76	+ .37	S	4	omd.
Turnabout,	ESE	230	.79	+ .53	SW	7	pq.
Middle Dog,	E/S	230	.75	+ .54	SSW	5	cmp.
Foochow,	E/S	210	.76	+ .38	SSW	2	od.
Wenchow,	ENE	270	.72	+ .18	SSE	3	or.
Steep Island,	NE	420	.85	.00	SSE	4	cm.
North Saddle,	NE	450	.81	-.01	SSE	4	cm.
Wuhu,	NNE	320	29.60	-.09	ENE	3	b.
Kiukiang,	N	180	.56	-.07	NE	3	c.
Hankow,	NNW	260	.44	-.06	NE/N	2	b.
Ichang,	NW	330	.60	-.05	...	...	b.

VESSELS.

Bq. <i>Cambusdoon</i> ,	18° 6'	113° 20'	29.80	SW	5	c.
" <i>Levuka</i> ,	21 58	117 26	...	SSW	6	o.
Sch. <i>Santa Cruz</i> ,	22 30	116 38	...	S	8	orq.
S.S. <i>Fokien</i> ,	23 52	118 4	...	SW/S	3	
" <i>Singan</i> ,	23 45	117 35	.71	SW	6	
" <i>Yuensang</i> ,	24 16	118 26	.80	SW	5	orq. high sea.
" <i>Belgie</i> ,	24 14	118 44	.75	SW	4	opq. moderate sea.
" <i>Haaloong</i> ,	25 20	119 33	.76	S/E	6	rq.
" <i>Cardiganshire</i> ,	27 6	122 6	.81	SE	6	moderating sea.
" <i>Lennox</i> ,	27 44	122 57	.84	SE	6	
" <i>Phra Cham Klao</i> ,	27 47	125 39	.85	SE/S	4	swell.
" <i>Bengloe</i> ,	28 55	122 15	...	SE	4	fine.

On the 19th August the barometer showed a further rise on the entire coast. Winds were light and variable breezes, chiefly SE, on the SE coast, moderate SE breezes on the E coast. Weather was generally fine except in the Southern part of the Formosa Channel where showers prevailed. The barometer had risen at the easternmost stations on the Yangtze, but had fallen slightly at Ichang (barometer 29.57 at noon). The wind had veered since the previous day and was now from SE light to moderate breezes at Wuhu (barometer at noon 29.66) and Kiukiang (barometer at noon 29.64). At Hankow (barometer 29.47), it was E 1 increasing to E 3 at night and veering to SE 3 on the morning of the 20th. The weather was fine at all these stations.

On the 19th August, therefore, there yet remained some indications of the late typhoon which had now become a feeble depression. The centre may have been on the 19th at noon in $28\frac{1}{2}^{\circ}$, 113° .

The average isobars, wind forces and directions from 9 p. on the 16th August to 9 p. on the 17th are shown in figure 2. The averages are in this case influenced by the circumstance that on the 16th the centre was on the east coast of Formosa, while on the 17th it was in the Formosa Channel. It entered the coast of China about 3 p.

The average angle between the wind and the radius was at 100 miles distance from the centre as follows :— 68° to the N of the centre, 50° to the W, 47° to the S, and 58° to the East. This angle was greatest in the right-hand semi-circle, the centre moved NW by Wward. At a distance of 30 miles from the centre the angle was 69° , at 75 miles 52° , at 125 miles 57° , and at 200 miles 32° . The average angle between the wind and the radius was 54° i.e. the incurvature was 36° or about 3 points.

The radius of the calm area was about 5 miles. Within 20 miles it blew more than force 7, but the observations do not agree about the greatest force. Only the *Lennox* reported full typhoon force. Between 30 miles and 50 miles from the centre it blew with force $6\frac{1}{2}$, at 75 miles from the centre with force 7, at 125 miles from the centre with same force, and at 200 miles from the centre with force 5. It is a curious fact that it blew at a distance from the centre on an average harder than nearer the centre, but such is sometimes the case when the centre is near the shore.

There was a very heavy sea to the N and NE of Formosa, with great SE swell, which evidently came from the quarter where the typhoon originated in the Pacific. It rained within 100 miles of the centre in front of the centre and within 200 miles behind the centre. That is different from cyclones in Europe where the rainy area stretches out in front of the centre. Thunder and lightning followed the centre beyond 150 miles.

LOG OF S.S. LENNOX.

1892—August 16,	4a.			29.90	NNE	1	sea smooth.
	8a.			.79	NNE	3	
	noon	24° 22'	118° 54'	.75	NNE	6	rough sea increasing.
	4p.	24 40	119 14	.65	N	7	
	8p.	24 52	119 30	.64	N	9	squalls of hurricane force.
	midt.	25 0	119 40	.49	N	10	squalls of hurricane force.
17,	4a.	25 1	119 43	.26	N	11	squalls of hurricane force, heavy rain.
	8a.	25 14	119 54	.27	N/W	11	very high confused sea mostly North.
	10a.	25 20	120 6	.27	NNW	11	very high confused sea mostly North.
	11a.	25 23	120 12		NW	11	11.30 wind veered to S and decreased.
	noon	25 26	120 18	.27	S	3	12.30 wind increased to hurricane.
	2p.	25 26	120 24		SSE	12	high broken sea.
	4p.	25 30	120 30	.45	SSE	11	high cross sea mostly South.
	8p.	25 54	120 55	.65	S	10	high cross sea mostly South.
	midt.	26 16	121 22	.71	SSE	8	high cross sea mostly South.
18,	noon	27 44	122 57	.84	SE	6	

OBSERVATIONS MADE AT TURNABOUT LIGHTHOUSE.

1892—August 16,	3p.	29.71	NNE	7	om.	1892—August 17,	0.30p.	29.27	W	4	gm.
	6p.	.67	NNE	8	qr.		1p.	.27	WSW	4	om.
	9p.	.64	NNW	8	oq.		1.30p.	.27	SW	3	gm.
	midt.	.52	NNW	10	op.		2p.	.27	SW	6	gm.
17,	1a.	.47	NNW	10	om.		2.30p.	.31	SSW	8	gmr.
	2a.	.44	N	10	omp.		3p.	.34	SSW	9	gmd.
	3a.	.38	N	10	gmr.		4p.	.41	SSW	9	omr.
	4a.	.36	NNW	10	gmp.		5p.	.40	SSE	10	gmr.
	5a.	.32	N	10	gmp.		6p.	.38	SE	11	omd.
	6a.	.35	N	9	omq.		7p.	.45	SE	11	gmr.
	7a.	.33	N	9	omp.		8p.	.48	SE	10	gmd.
	8a.	.31	N	9	gm.		9p.	.53	SE	11	gmr.
	9a.	.31	NNW	10	omp.		10p.	.60	S	11	gmd.
	10a.	.30	NNW	9	om.		11p.	.63	S	9	gmd.
	11a.	.28	NNW	8	om.		midt.	.63	S	8	gmp.
	noon	.26	WNW	7	om.						

On August 30th the barometer had risen at the stations on the East Coast and as far south as Foochow. On the SE and S coasts the barometer was almost steady, but inclined to fall on the whole and gradients had become favourable for NE winds and these blew over these districts with force two to three. In Luzon the barometer was steady with light SW breezes chiefly. Some vessels to the South of Hongkong and North of 20° lat. had moderate E and NE breezes. Others in about 17°, 114° had moderate SW breezes with overcast skies. Some in 15°, 112° light variable breezes while one vessel off the Annam Coast had a strong WNW breeze. There appears to have been a very shallow depression forming SE of Hainan. During the evening the weather at Hongkong became very wet and the wind increased to a fresh ENE breeze. At Hoihow there was a thunderstorm during the evening with ESE 4 and falling barometer.

The following are the observations for August 30th at noon :—

COAST STATIONS.

Bolinao,	29.80	-.01	SE	1	o.
Hoihow, .....	.81	+.02	ESE	3	b.
Hongkong, .....	.81	-.01	E	1	c.
South Cape, .....	.81	-.05	NE	5	cmp.
Breaker Point, .....	.80	-.01	NE	3	c.
Lamoeks, .....	.81	-.02	NE	3	c.
Chapel Island, .....	.82	+.01	E	2	c.
Turnabout, .....	.88	+.03	NNE	2	cv.
Steep Island, .....	.89	+.05	S	2	cv.

VESSELS.

S.S. <i>Taksang</i> ,	13° 4'	109° 44'	29.77	WNW	6	c.
„ <i>Moyune</i> ,	14 58	112 30	var.	var.	2	or.
„ <i>Mongkut</i> ,	15 35	110 20	.76	var.	1	b.
„ <i>Thisbe</i> ,	16 7	113 34	.74	SW	2	c.
Bk. <i>Lavinia</i> ,	16 16	113 49		SSW	3	o.
„ <i>Aron</i> ,	17 27	114 13		SSW	5	o.
„ <i>Bittern</i> ,	18 22	114 28		SW	5	od.
S.S. <i>Namyong</i> ,	20 47	113 53	.81	NE	3	
„ <i>Kowshing</i> ,	20 59	118 45	.83	E/N		oq.
„ <i>Achilles</i> ,	20 13	113 45	.76	var.	2	oq.
Sh. <i>Warrior</i> ,	22 12	115 10		E	4	fine.
S.S. <i>Glencarn</i> ,	22 54	116 37	.83	SSE	4	b.

On August 31st the barometer was still falling on the S and SE coasts particularly at Hoihow and Hongkong. Winds were moderate to fresh NE to E breezes decreasing and veering between Hoihow and Swatow with showery weather. In Luzon the barometer had risen and light to moderate S breezes prevailed with cloudy sky. Vessels in about 19°, 113° had moderate SSW breezes with very squally weather and much rain also a swell. The *Warrior* near Hongkong had a moderate E gale decreasing with heavy rain squalls during the early morning.

The centre of the small depression was in 20°, 112° moving NNWard.

Observations for August 31st at noon :—

Bolinao,	29.84 + .04	S	2	c.
Hoihow, .....	.76 - .05	NE/E	3	c.
Hongkong, .....	.75 - .06	ENE	5	o.
S. Cape, .....	.88 + .07	NE	3	o.
Breaker Point, .....	.79 - .01	E	4	omp.
Lamoeks,.....	.79 - .02	E	5	c.
Chapel Island, .....	.82 .00	E	1	c.
Turnabout, .....	.84 - .04	NE	1	cm.

VESSELS.

S.S. <i>Caermarthenshire</i> ,.....	16° 25'	111° 13'		W	4	op.	
" <i>Taksang</i> ,	16 55	110 45		var.	2	o.	
" <i>Mongkut</i> ,	19 0	112 8	29.72	S	2	o.	
Bk. <i>Aron</i> ,	18 8	115 10		SW	6	oq.	
" <i>Lavinia</i> ,	18 15	114 15		SSW	4	oqr.	
S.S. <i>Moyune</i> ,.....	19 32	113 47	.69	SSW	2	oqr.	SW swell.
Bk. <i>Bittern</i> ,	20 10	113 2		SW	3	oqr.	
S.S. <i>Activ</i> ,	20 5	110 30	.73	NNE	3	o.	
" <i>Alwine</i> ,	at Pakhoi			NE	4		
Sh. <i>Warrior</i> ,.....	21 52	114 22		E	5	q.	
Bk. <i>Bylgia</i> ,	22 16	115 24		SE	4		SE swell.
S.S. <i>Nurnberg</i> ,	22 16	114 34	.73	E	5	o.	

SEPTEMBER.

On 1st September the barometer showed a further fall on the entire coast. In Hoihow the wind had become a moderate SW breeze with rain. At Pakhoi there was a light N breeze in the morning backing to NW 2 during the evening. At Haiphong there was a light WNW breeze. At Hongkong light E airs and breezes with drizzling rain. At Canton a light SE breeze, weather showery. On the SE coast (S part) light to moderate SE and S breezes decreasing with wet weather. In S Formosa moderate S to SW breezes with heavy rain. SSW of Hongkong to 20° lat. several vessels had moderate to strong S and SW breezes with rain and very squally weather and high S sea and swell. Vessels off the coast between Hongkong and Swatow had fresh S to SSE breezes during the morning with high sea and S swell. The centre was at noon on the 1st September in about 21°, 111½°, but it was no more than a shallow depression and no station or vessel had higher wind force than a strong breeze.

The following are the noon observations for September 1st:—

COAST STATIONS.

Bolinao,	29.82 - .02	SSE	2	c.
Hoihow, .....	.70 - .06	SW/W	4	or.
Pakhoi, .....	.66 - .10	WNW	1	c.
Haiphong, .....	.64 - .06	WNW	2	c.
Hongkong, .....	.68 - .07	E/N	1	o.
Canton, .....	.67 - .08	SE	1	o.
Breaker Pt.....	.70 - .09	S	3	omp.
Swatow, .....	.70 - .09	E/S	2	ogp.
Lamoeks,.....	.73 - .06	S	1	op.
S. Cape, .....	.80 - .08	SW	2	c.
Chapel Island, .....	.73 - .09	SE	3	c.
Turnabout, .....	.77 - .07	SW	3	omr.

VESSELS.

S.S. <i>Taichiow</i> ,.....	14° 17'	110° 1'	29.74	WSW	3	or.	
" <i>Taksang</i> ,	20 3	112 47		W	4	or.	
Bq. <i>Lavinia</i> ,.....	20 40	113 55		SW	6	pq.	
Bq. <i>Aron</i> ,	20 35	114 4		WSW	5	o.	
S.S. <i>Catherine Apear</i> ,	21 14	113 52	.67	SSW	6	orq.	rough sea.
" <i>Caermarthenshire</i> ,.....	20 29	112 53	.64	SW	4	or.	
" <i>Swatow</i> ,	21 46	113 36	.69	SW	3	orq.	
Sh. <i>Warrior</i> ,	22 12	114 16		S	4	qr.	
S.S. <i>Yuensang</i> ,	22 46	116 12	.75	SW	4	op.	

On the 2nd September the barometer was still falling a little at all the stations on the S and SE coasts. At Haiphong and Pakhoi light W to N breezes prevailed with cloudy weather and rain at Pakhoi towards evening. At Hoihow there was a moderate SW breeze with showery weather. At Hongkong light E airs and breezes with very wet weather and distant thunder. At Canton a light E breeze veering and increasing to SE 5 at 3 p. decreasing and backing again during the evening. The weather was wet and gloomy. Strong S and SW breezes with high sea and wet squally weather prevailed in the China Sea to the SE of Hainan. The depression appears to have been almost stationary and the centre was perhaps at noon on September 2nd in about $21\frac{1}{2}^{\circ}$, 111° .

Observations for September 2nd at noon:—

COAST STATIONS.

Haiphong,	29.61 - .03	WNW	1	c.
Pakhoi, .....	.64 - .02	NNW	1	c.
Hoihow, .....	.67 - .03	SW/S	4	op.
Hongkong, .....	.69 + .01	ENE	1	ot.
Canton, .....	.65 - .02	ESE	3	or.
Breaker Pt.....	.69 - .01	calm.		omd.
Lamoeks,.....	.70 - .03	SW	2	c.

VESSELS.

S.S. <i>Catherine Apear</i> ,	17° 9'	113° 42'	29.69	SSW	6	orq.	high sea.
„ <i>Taichio</i> ,	17 56	111 21.	69	S	5	rqt.	
„ <i>Surat</i> ,	18 41	114 11.	71	S/W	5	orq.	high sea.
„ <i>Avochie</i> ,	20 33	111 18.	68	SW	2	o.	

On the 3rd September the barometer at Pakhoi was rising slightly with a gentle N backing breeze and wet weather at 4 p. WNW 4, at 8 p. W 4 (barometer 29.57). At Hoihow the barometer was on the point of rising and there was a moderate SW gale during the day, decreasing in the evening. Weather was showery in the morning and became fine at night. The barometer was rising slightly at Hongkong and the wind was E 1 to 2 in the morning, SSE 1 in the afternoon with rain in the early morning, cloudy during the remainder of the day. The barometer had risen and light SSE breezes prevailed with cloudy sky. Fresh SW breezes prevailed in the China Sea. The centre was perhaps in $21\frac{1}{2}^{\circ}$, $110\frac{1}{2}^{\circ}$. In this slight depression except on the 3rd September the cyclonic circulation of winds was at no time well marked. At first (29th and 30th) there appears to have been a band of slightly deficient pressure in about 17° to 19° lat. and perhaps 110° to 120° long. lying WSW to ENE and most marked in the W side where there appears to have been a slight nucleus and where it appears to have been more squally than elsewhere. On the northern side of this area NE to E moderate breezes were blowing and on the S side SW fresh breezes. On both sides of the area which appears to have been moving NNW the weather was squally. The SW winds reached the coast of S Formosa on the afternoon of the 31st but E winds still blew on the SE coast. The barometer fell quickly over the entire coast on the 1st September and the S winds had advanced to the SE coast and Hainan but pressure though low was very uniform over a large area. On the 2nd the fall in the barometer had almost ceased but there was some indication of the isobars being closed. On the 3rd September there was a distinct cyclonic circulation of wind and the centre of disturbance appears to have passed E of Pakhoi moving NNW ward. The *Activ* was lying in that port and her Captain noted the appearances as pointing to a typhoon in the neighbourhood. Probably had the area remained longer at sea it would have developed and given birth to a typhoon as the conditions had now become favourable. The lowest recorded reading of the barometer in the neighbourhood of the central area was about 29.6 and the highest force of wind a moderate gale.

The following are the observations for 3rd September at noon:—

COAST STATIONS.

Haiphong,	29.64 + .03	WNW	2	c.
Pakhoi, .....	.61 - .03	N	3	o.
Hoihow, .....	.66 - .01	SW	7	o.
Hongkong, .....	.72 + .03	E	2	c.
Canton, .....	.69 + .04	SE	2	c.
Breaker Pt.....	.73 + .04	SE	2	cm.
Lamoeks, .....	.76 + .06	SSW	1	c.

VESSELS.

S.S. <i>Surat</i> ,	14° 52'	113° 8'	29.79	SW/S	6		rough sea.
„ <i>Catherine Apear</i> ,	14 10	112 4	.75	SW/S	7		do.
„ <i>Picciola</i> ,	19 46	115 8	.73	SW	5		
„ <i>Chusan</i> ,	at Hoihow.		.64	WSW	6		
„ <i>Esmeralda</i> ,	19 4	116 54	.73	SSW		o.	swell.
„ <i>Phra Chula Chom Klao</i> , 22	10 10	114 2	.69	SE	4		fine, swell.

The following information is from the logs of the ship *Charmer* and the barque *Enos Soule*:—

SHIP *CHARMER*.

August 27, noon	24° 49'	128° 18'		SE/E	1	variable winds.
" 28, "	24 48	128 38		calm		fine, very hot.
" 29, "	25 05	129 00		"		" "
" 30, "	25 39	129 04		"		" "
" 31, "	26 04	129 26		N	3	fine, at 1 a. felt two shocks of earthquake.
midt.				N	5	e.
Sept. 1, noon				N	7	oil bags used, bare poles.
" 2, noon			28.43	NNW 8 to SW 10 or more	}	very bad cross sea, very heavy squalls.
" 2, midt.						
" 3, noon			28.33	NNE	10	
" 3, midt.				ENE	9	
" 4, noon	27 45	130 16	28.23	ENE	7	high cross sea.
" 4, midt.				E by S	8	very heavy squalls.
" 5, noon	27 19	130 06		ESE	8	rudder head found to be broken off.
" 5, midt.						Weather more moderate.
" 6, noon	26 46	129 30	29.53	ESE	7	o.

BARQUE *ENOS SOULE*.

Sept. 1, noon	20° 04'	127° 45'		WNW	4	heavy rain squalls.
" 2, "	20 12	126 42		WSW	2	E swell fine.
" 2, midt.				WSW	8	high cross sea, low glass, heavy rain squalls.
" 3, noon	21 06	126 38		W	7	heavy rain squalls.
" 3, midt.				WNW	7	" "
" 4, noon	21 00	125 25		WNW	6	" " high cross sea.
" 4, midt.				NW	6	rain squalls.
" 5, noon	20 24	125 00		WNW	5	overcast squally, high cross sea.
" 5, midt.				WSW	5	" long E swell.
" 6, noon	20 54	124 14		SW	7	high sea.
" 6, midt.				SW	8	"
" 7, noon	21 10	123 44		SW	7	"
" 7, midt.				SSW	4	sea going down.
" 8, noon	21 39	122 54		WSW	2	showery high NE swell.
" 8, midt.				NNW	2	rain squalls.

These two vessels were out in the Pacific far from the usual track of steam vessels and the information contained in their logs is very imperfect, but sufficient to indicate to some extent the tracks of several typhoons, one of which subsequently passed into the Formosa Channel.

The log of the *Charmer* appears to show that the weather experienced was caused by two typhoons and in this connection it may be remarked that a depression coming from the S entered the S coast of Central Japan on the afternoon of the 4th September and subsequently moved NNEward across NW Japan. On the 1st the *Hesperia* was at noon in 29° 42', 128° 35' and was about 200 miles NNW of the *Charmer*. She had a strong NE breeze with very high SE swell and overcast weather with falling barometer (at noon 29.78). This vessel was bound to Yokohama and on the 2nd September at noon was in 31° 26', 131° 56'. She then had ENE 6 with rain squalls and very high sea (barometer 29.76). On the 3rd she was in 33° 21', 136° 01' (barometer 29.77) and then had a strong NE increasing and veering breeze with overcast weather and moderate sea. On the 4th in 34° 44', 139° 11' (barometer 29.74) she had a strong E breeze with gloomy wet weather.

The *Enos Soule* on the 1st in 20° 04', 127° 45' had a moderate WNW breeze with heavy rain squalls. On the 2nd in 20° 12', 126° 42' a light WSW breeze and fine weather and a fresh gale from WSW at midnight with high cross sea, rain squalls and "low glass." No barometric observations were entered in the log of this vessel. The barometer fell slightly in SW Japan on the 2nd and 3rd and light and moderate E to NE breezes prevailed in the extreme S of SW Japan on those days. The depression entered the S Coast about 4 p. on September 4th. The centre was, perhaps, on the 2nd September at noon in 26½°, 130° moving northwards. A path has been dotted between the 2nd and 4th September.

The observations on board the *Charmer* cannot be altogether trusted, and the barometer readings are useless, but there appears to be little doubt judging from the wind observations recorded, taken in conjunction with those made on the *Enos Soule*, that immediately after the passage northwards of the typhoon experienced on September 2nd the *Charmer* at once came under the influence of another typhoon. The wind is noted on the evening of the 2nd as "hauling round the Compass" and on the 3rd it was from NNE force 10 veering and decreasing. The *Enos Soule* had at the latter time a moderate W gale.

The *Nürnberg* on the 3rd September in 29° 42', 128° 32' at noon had NE 5 (barometer 29.65) with cloudy weather and SE swell. Some vessels off the East Coast had light NNW breezes and fine weather with swell. On the East Coast the barometer had risen slightly during the past 24 hours

and fine weather with light variable breezes prevailed. At S. Cape, Formosa, there was a strong NW breeze (barometer 29.75) and fine weather. In N Formosa light W breezes with fine weather prevailed (barometer at Keelung 29.74).

The centre on September 3rd at noon may have been in $25\frac{1}{2}^{\circ}$ $130\frac{1}{2}^{\circ}$, but this is very uncertain.

On the 4th September the barometer was falling on the East Coast and in Formosa. In Northern Formosa light NW breezes prevailed with fine weather (barometer at Keelung 29.69). At S. Cape there was a moderate W breeze (barometer 29.66) with cloudy sky. The *Enos Soule* in $21^{\circ} 0'$, $125^{\circ} 25'$ had a strong WNW breeze with rain squalls and high cross sea. The *Charmer* had a moderate ENE gale with high cross sea in $27^{\circ} 45'$, $130^{\circ} 16'$. Off the East Coast many vessels had fresh N to NNW breezes. The weather was fine, but a swell was reported in some cases.

The *Thermopylae* in $31^{\circ} 4'$, $126^{\circ} 40'$ had a moderate NE breeze.

The position of the centre at noon on the 4th September was perhaps in 26° , $128^{\circ}\frac{1}{2}$.

The following are the noon observations for September 5th :—

COAST STATIONS.

Bolinao,	29.68	— .10	SW	1	or.
Hongkong, .....	.63	— .06	W/S	1	c.
South Cape, .....	.51	— .15	WSW	2	c.
Lamocks, .....	.61	— .11	NE	3	c.
Fisher Island, .....	.56	— .10	NNE	5	cm.
Chapel Island, .....	.60	— .10	NE	2	c.
Turnabout, .....	.65	— .08	N	4	b.
Tamsui, .....	.66	— .17	N	4	o.
Keelung, .....	.62	— .07	N/W	7	or.
Foochow, .....	.60	— .10	calm	...	c.
Wenchow, .....	.54?	— .05	NW	4	b.
Steep Island, .....	.71	— .02	N	5	cv.
North Saddle, .....	.68	— .03	NE	7	cv.

VESSELS.

Sh. <i>Charmer</i> ,	27° 19'	130° 06'	...	ESE	8	
Bq. <i>Thermopylae</i> ,	28 42	124 37	...	NE/N	8	heavy sea.
S.S. <i>Lennox</i> ,	27 37	122 22	29.58	N/W	8	high sea.
„ <i>Ancona</i> ,	27 23	122 45	.62	N/W	8	o. do.
„ <i>Aden</i> ,	26 47	120 54	.64	N	5	c. do.
„ <i>Asagao</i> ,	26 2	121 4	.59	NNE	6	b.
„ <i>Kwonglee</i> ,	25 50	119 44	...	NE	4	fine, swell.
„ <i>Paoting</i> ,	25 10	119 41	.57	N	2	fine.
„ <i>Fooksang</i> ,	24 16	118 29	.62	NNW	2	b.
„ <i>Charters Tower</i> ,	23 54	118 10	.63	NNE	3	
Bq. <i>Enos Soule</i> ,	20 24	125 0	...	WNW	5	oq. high cross sea.
S.S. <i>Sungkiang</i> ,	21 31	114 37	.61	N	5	b.
Bq. <i>Charon Wattana</i> ,	18 20	115 45	.63	NW	2	q.
S.S. <i>Memnon</i> ,	16 13	116 19	.78	SW/W	6	o.
„ <i>Borneo</i> ,	10 29	111 58	.77	WSW	5	q.

The foregoing observations show that the barometer was falling at all the Coast Stations, slightly on the East Coast but rapidly in Formosa and at the adjacent Channel Stations, also in Luzon. On the East Coast fresh to strong N breezes were blowing with fresh N gales at sea off the coast. Near the N entrance to the Formosa Channel fresh to strong N breezes prevailed. In the channel and off the SE coast winds were gentle N to NE breezes. A large number of logs have been received from vessels in the China Sea all indicating very squally weather with fresh to strong SW and W breezes to the southward of 16° latitude. In Luzon also fresh SW monsoon prevailed with squally wet weather. In N Formosa there was rain, elsewhere the weather was fine.

The *Charmer* and *Enos Soule* in the Pacific had, the former, a fresh ESE gale, the latter, a fresh WNW breeze with overcast squally weather and high cross sea. The centre on September 5th at noon was in about $26^{\circ} 15'$, $126^{\circ} 0'$.

The following are the observations for September 6th at noon :—

COAST STATIONS.

Aparri,	29.48	— .	WSW	3	c.	Chapel Island,	29.45	— .15	NW	2	c.
Bolinao, .....	.58	— .10	SW	1	o.	Amoy, .....	.48	— .14	W	3	c.
Hoihow, .....	.62	— .02	NE	2	b.	Ockseu, .....	.48	— .17	calm	...	c.
Pakhoi, .....	.67	— .01	N	5	c.	Turnabout, .....	.47	— .18	WNW	5	om.
Hongkong, .....	.56	— .07	N/W	3	b.	Middle Dog, ...	.37	— .22	NNW	4	c.
Canton, .....	.61	— .03	N	1	c.	Foochow, .....	.45	— .15	NW	3	c.
Breaker Point, .	.51	— .09	NW	3	c.	Tamsui, .....	.43	— .23	W	4	or.
Lamocks, .....	.52	— .09	NW	2	c.	Keelung, .....	.31	— .31	NW	9	p.
Swatow, .....	.50	— .12	NNW	2	c.	Wenchow, .....	.45?	— .09	NW	6	oq.
S. Cape, .....	.26	— .25	WNW	9	oq.	Steep Island, ...	.65	— .06	NE/N	6	egp.
Takow, .....	.40	— .12	NNW	10	c.	North Saddle, ...	.62	— .06	NE	8	omq.
Anping, .....	.46	— .05	N	7	o.	Woosung, .....	.65	— .03	NNE	7	eq.
Fisher Island, ...	.44	— .12	NW	5	cm.	Kiukiang, .....	.74?	.00	NE	5	c.

VESSELS.

Bk. <i>Jessonda</i> ,	7° 47'	110° 14'	29.83	WSW	6	q.	
S.S. <i>Teresa</i> ,	11 30	119 57		SW	5	oq.	
„ <i>Memnon</i> ,	12 41	117 32	.73	SW/W	9	oq.	very high sea.
„ <i>Kowshing</i> ,	near Manila		.60	SW/W		op.	strong wind.
„ <i>Menmuir</i> ,	15 29	118 53	.60	W	6	oq.	high sea.
„ <i>Torrington</i> ,	13 14	112 15	.63	WSW	4	o.	high sea.
„ <i>Borneo</i> ,	14 0	112 38	.64	NNW	5	orq.	
„ <i>Arratoon Apcar</i> ,	14 56	112 37	.66	WNW	4	opq.	
Bk. <i>Glenartney</i> ,	19 38	113 43		NNW	4	cp.	high sea.
Bk. <i>Charon Wattana</i> ,	19 42	116 3	.58	NW	4		fine.
„ <i>Enos Soule</i> ,	20 54	124 14		SW	7		high sea E swell.
S.S. <i>Paoting</i> ,	22 52	116 58	.49	NW	2	b.	
„ <i>Thales</i> ,	23 30	119 30	.45	N/W	4	b.	
„ <i>Canton</i> ,	23 0	116 45	.60?	NNE	4	b.	swell.
„ <i>Namoa</i> ,	at Amoy		.45	WNW	5	b.	
„ <i>Asagao</i> ,	26 10	121 26	.14	NNE	9	orq.	
Sh. <i>Charmer</i> ,	26 46	129 30	.53	ESE	7	o.	
S.S. <i>Kwanglee</i> ,	27 9	120 26	.60?	NW	8	orq.	
Bk. <i>Thermopylae</i> ,	27 33	123 42		NE	9	q.	
S.S. <i>Lennox</i> ,	27 50	122 14	.45	E	8		high confused sea.
„ <i>Ancona</i> ,	28 3	122 48	.36	NNE	6	q.	high cross sea.

The noon observations for the 6th September at the Coast Stations show that the barometer had fallen at all stations since the previous day. The fall had been very rapid at the Formosa and adjacent Channel Stations while on the East and South Coasts pressure had decreased but moderately fast. A considerable reduction of pressure had also taken place in Luzon. The area over which low pressure existed was therefore very large at this time. In N Formosa and at S Cape the decrease amounted to about 0.25 inch and at noon the latter station gives the lowest barometer reading. This reading however is nearly 0.2 inch lower than those of Takow and Anping and in fact for the next few days an area of low pressure lay over a district to the E of S Formosa. Strong N to NE breezes and strong gales were blowing on the East Coast and at sea off the coast. The weather was cloudy but dry except in one or two instances. The *Lennox* and *Ancona* whose logs are given in detail were hove to in about $27\frac{1}{2}^{\circ}$, $122\frac{1}{2}^{\circ}$, and on the evening of the 5th they experienced whole gales from N decreasing somewhat and veering during the morning of the 6th. The lowest readings of the barometer were taken on the morning of the 6th after which the barometer rose. In northern Formosa increasing NW gales were blowing with rain and at S Cape a strong WNW gale. On the SE coast chiefly NW light to gentle breezes. In the northern Luzon there was a gentle WSW breeze. The *Enos Soule* about 200 miles ESE of S Cape had a moderate SW gale with high sea and E swell. The *Charmer* 450 miles ENE of N Formosa had moderate ESE gale with overcast sky.

The centre was at noon on September 6th in $25^{\circ} 45'$, $123^{\circ} 15'$, moving about WSW and during the evening it advanced directly upon Tamsui and Keelung. The centre passed a little to the north of Keelung about 9.30 p. and over Tamsui, situated a few miles further west, about 10.30 p.

At 9.30 p. the barometer at Keelung read 28.46 (lowest reading), at 10 p. 28.49, at 10.30 p. 28.58, at 11 p. 28.68. Between 9 and 10 p. the wind backed from WSW to SSW and at 11 p. it had come to SE all the time blowing with typhoon force accompanied by terrific squalls and torrents of rain. At midnight typhoon force continued from SE but towards 1 a. of the 7th the force had diminished and at 1.30 a. was SE force 8 only decreasing with less heavy rain. The barque *Claro Babuyan* lying in the port dragged notwithstanding that she had four anchors down, and the rain was so thick that it was impossible to see the length of the ship.

At Tamsui the wind fell from NW 12 or full typhoon force at 9 p. to variable force 1 at 10 p. (barometer 28.69). The following is noted in the register:—"10 p. absolute calm for about half an hour, then light movement of air for about an hour." At midnight the wind burst from the opposite quarter SE with typhoon force (barometer 28.66). At 1.30 a. on the 7th it was still SE 12 but went down to SE 4 at 4 a. Heavy rain fell, but whether continuously and during the central calm is not noted.

For some observations taken at Twatutia situated about 10 miles SE by S from Tamsui we are indebted to Captain F. ASHTON and Mr. H. C. MATHIESON, A.M.I.C.E., who both noted a distinct lull in the wind between 10 p. and 11 p., Captain ASHTON says to force 3 or 4, and that there was "no rain to speak of" during this interval. Mr. MATHIESON had the lowest reading 28.80 at 10.15 p. Captain ASHTON at 11 p. 28.65 (uncorrected). The wind was about WSW 11 before the centre and about SSE after. Lightning was noted at 0.30 a. on the 7th towards the S but no thunder was heard. The central area where calm and gentle breezes prevailed appears to have had a diameter of about 25 miles. At Twatutia the river rose 16 feet putting the town 4 feet under water. At Tamsui the S.S. *Pekin* had two anchors down and was steaming towards them but dragged nevertheless. Many cargo boats and small craft were lost and many lives.

The S.S. *Asagao* was the only vessel at sea comparatively near to the centre at this time. She was at midnight about 80 miles NNW of Tamsui and had a strong N veering gale with heavy rain squalls (barometer 29.39 rising). Other vessels either remained in port or had gone into shelter, the SE coast having been warned from the Hongkong Observatory already on the 5th. After

midnight on the morning of the 7th the typhoon moved SW/W down the Formosa Channel—a most unusual course. This was due to the low pressure area lying to the E of S Formosa, round which for the next two or three days the typhoon revolved in the usual manner, keeping the low pressure area on its left hand, and also to the fact that pressure was comparatively high in central and northern China.

The tri-hourly readings made at the stations in and near the Formosa Channel from September 6th at 3 p. to September 8th at 9 a. are annexed and they sufficiently indicate the nature of the weather prevailing while the typhoon was in the Channel. The stations on the W side had increasing NW wind with falling barometer as the centre approached, and veering to about NE with rising barometer as it passed. Fisher Island and Anping on the E side had the wind backing after the early morning of the 7th as the centre moved down the Channel.

In this connection it may be mentioned that on the 6th there was a ridge of slightly higher pressure in the neighbourhood of these stations which together with Takow and S Cape appear to have been governed as regards wind direction entirely by the depression to the E of S Formosa. On the 6th NNW to NNE gales blew at Anping and Takow and a storm blew at S Cape. The latter station was not at all affected by the typhoon moving down the Channel and the wind stuck to WNW the whole time. After 3 a. on the 7th the barometer rose rapidly. This disturbance which subsequently moved NE in the Pacific, governed the wind and weather at S Cape on the 6th, and the *Charmer* on the 7th in $26^{\circ} 05'$, ($127^{\circ} 30'?$) had the barometer falling again with ESE 4 and rain squalls. On the 8th in $26^{\circ} 22'$, $125^{\circ} 29'$, the barometer was low with NE 2. This appears to have been the depression that arrived in S Japan on the 12th.

Two vessels the *Loosok* and the *Sydney* encountered the centre in the Formosa Channel during the afternoon and evening of the 7th September respectively. Their logs are printed but the positions given in the *Sydney's* log appear to be wrong, as according to these she was very near Lamocks at the time and the observations by no means agree with those taken at that station. She was probably taken out of her course by a strong current. All other ships were in port.

Off the E coast on the 7th September NE 6 and 7 prevailed with barometer 29.72 at noon at Steep Island. Vessels in the China Sea in 18° , 115° , had 29.60 NW 5 at the same time.

DATE.	Hour.	KEELUNG.						TAMSUI.						
		Bar.	Temp.	WIND.		Weather.	Rainfall.	Bar.	Temp.	WIND.		Weather.	Rainfall.	
				Dir.	Force.					Dir.	Force.			
September 6,	3 p.	26.16	80	NW	9	o r q	...	29.33	75	NW	6	o r q	...	
	6	.00	...	WNW	11	...	...	28.99	...	NW	8	o r q	...
	9	28.52	80	WSW	12	...	...	28.74	75	NW	12	o r q	...
	Midt.	...	...	SE	12	...	...	28.66	...	SE	12	o r q	...
	7,	3 a.
		6	29.26	...	SE	2
9		29.35	...	SE	4	o	10.30	.41	83	SE	4	o	5.90	
Noon		...	...	...	...	...	...	...	...	...	...	...	...
3 p.		.35	85	E	...	o d	...	.42	82	SE	3	o	...
6		...	...	...	...	...	...	...	...	...	...	...	...
8,	9	.42	86	SE	...	o d	...	.55	80	SE	2	o r	...
	Midt.	...	...	...	...	...	...	...	...	...	...	...	...
	3 a.	...	...	...	...	...	...	...	...	...	...	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	...
	9	.53	87	E	...	c	3.30	.62	83	SE	2	c	1.85	

MIDDLE DOG.

FOOCHOW.

September 6,	3 p.	29.33	82	WNW	4	c	...	29.40	85	NW	3	o	...	
	6	.33	81	NW	5	c	...	...	...	...	...	...	...
	9	.33	81	NW	7-8	c m	...	.46	84	NE	6	c	...
	Midt.	.31	76	NNW	7-8	c m q r	...	...	...	...	...	...	...
	7,	3 a.	.29	74	NNW	7-8	c m q r40	79	NE	6	c	...
		6	.29	75	NNW	7-8	o m q r
9		.37	77	NE	7-8	...	7.60	.40	71	NE	7	o r	1.	
Noon.		.37	77	NNE	6-7	...	...	...	...	...	...	...	...
3 p.		.39	78	...	6-7	...	...	.42	78	NE	7	o r	...
6		.42	77	...	6-7	c m q	...	...	...	...	...	...	...
8,	9	.48	77	...	7	c m	...	.51	78	NE	8	o	...
	Midt.	.52	76	...	6	o m r	...	...	...	...	...	...	...
	3 a.	.52	77	NNE	5	o m	...	.53	75	NE	2	o r	1.90
	6	.51	77	NE	5	...	...	...	...	...	...	...	...
	9	.56	77	NE	5	c m	1.10	.60	78	NE	2	o	...	

DATE.	Hour.	TURNABOUT.						OCKSEU.					
		Bar.	Temp.	WIND.		Weather.	Rainfall.	Bar.	Temp.	WIND.		Weather.	Rainfall.
				Dir.	Force.					Dir.	Force.		
September 6,	3 p.	29.40	82	WNW	6	g m	...	29.43	84	NNW	1	c	...
	6	.40	80	...	7	o	...	.41	83	N	2	c	...
	9	.38	80	NW	9	o g m	...	.42	81	NNW	3	c m	...
7,	Midt.	.32	74	...	10	o m d	...	.37	76	N	5	c m	...
	3 a.	.22	73	N	11	o m r	...	.31	75	N	6	o m d	...
	6	.22	75	...	11	o m r	...	.27	76	...	7	...	...
8,	9	.32	77	ENE	10	o m r	1.55	.25	74	NNE	7	o m r	0.86
	Noon.	.37	76	...	10	q m r	...	.34	75	NE	5	o m d	...
	3 p.	.34	76	...	8-10	g m q r	...	.39	76	ENE	3	o m p	...
8,	6	.41	77	NE	9	g m q r	...	.42	74	...	2	c m	...
	9	.49	76	...	8	o m r	...	.51	75	E	1	...	...
	Midt.	.52	76	...	7	...	...	.51	75	...	1	...	...
8,	3 a.	.51	74	ENE	4	o m r	...	.53	75	NNW	1	c	...
	6	.55	76	...	3	o m u	...	.55	76	...	0	...	...
	9	.57	78	NE	4	o m u	11.56	.58	79	...	0	c	0.15

CHAPEL ISLAND.						AMOY.							
September 6,	3 p.	29.41	87	NW	2	c	...	29.43	89	W	3	c	...
	6	.38	83	WSW	3	c	...	.44	87	NNE	1	c	...
	9	.46	84	...	3	c	...	.47	84	NE	1	c	...
7,	Midt.	.38	82	WNW	3	c	...	.46	84	W	2	c	...
	3 a.	.31	80	WNW	4	c	...	.41	82	NW	3	c	...
	6	.35	79	...	4	c	...	.41	81	W	3	c	...
8,	9	.40	79	WSW	6	...	0.00	.43	80	NW	2	r	0.02
	Noon	.25	73	...	7	o m r	...	.37	76	NW	4	r	...
	3 p.	.21	74	WNW	9	o m d	...	.33	75	NW	4	r	...
8,	6	.26	76	NNE	10	...	...	.37	75	NNE	3	r	...
	9	.40	76	NE	8	...	...	.45	77	NNE	2	o	...
	Midt.	.46	76	...	5	c m	...	.49	78	NNE	2	o	...
8,	3 a.	.47	76	ENE	3	c	...	.49	78	NNE	1	o	...
	6	.51	75	...	2	c	...	.52	78	NNE	1	c	...
	9	.55	79	NE	3	c	0.70	.57	80	NE	1	c	3.98

LAMOCKS.						SWATOW.							
September 6,	3 p.	29.49	86	NW	2	c	...	29.44	91	NW	2	c	...
	6	.44	82	W	1	c	...	.47	...	...	1	c	...
	9	.48	83	NNW	3	o	...	.50	82	N	3	c q	...
7,	Midt.	.46	80	...	3	...	...	.52	...	NW	2	g q	...
	3 a.	.43	79	NW	4	...	...	.50	78	...	3	c	...
	6	.44	77	...	4	c	...	.47	...	...	1	c	...
8,	9	.44	79	NNW	5	c	0.00	.46	86	...	3	b	0.00
	Noon	.43	79	NNW	5	c	...	.44	...	...	3	o	...
	3 p.	.35	74	NNW	6	o m r	...	.40	84	NNW	5	o g d q	...
8,	6	.35	71	...	7	...	...	.41	...	WNW	3	o g r	...
	9	.31	70	...	8-9	m r q	...	.45	77	NW	4	o g r q	...
	Midt.	.29	73	NE	9	c m q	...	.39	...	...	7	...	...
8,	3 a.	.41	74	E	6	c m	...	.39	75	NNE	8	...	...
	6	.48	73	NE	3	c m p	...	.49	...	ENE	4	o g	...
	9	.50	76	ENE	4	o p	1.30	.53	78	...	3-4	o g q	1.00

BREAKER POINT.						HONGKONG.							
September 6,	3 p.	29.46	88	NW	3	c	...	29.51	87	NNW	3	c	...
	6	.47	86	NW	3	c	...	.52	84	...	1	...	...
	9	.48	83	NW	4-5	c m	...	.57	80	NW by N	1	c l	...
7,	Midt.	.48	82	NW	4	c m	...	.56	79	NNW	1	c	...
	3 a.	.44	80	NW	4	c m	...	.51	79	SSE	1	b	...
	6	.44	77	NW	5	c m	...	.52	78	N	1	...	...
8,	9	.47	84	NW	4-5	c m	0.00	.55	81	N by W	1	c	0.00
	Noon	.43	84	NW	5	c m	...	.52	86	N by W	2	...	...
	3 p.	.38	84	NW	5	o m d	...	.46	88	NNW	3	...	...
8,	6	.39	77	NW	5	o m d	...	.49	85	N by W	1	...	...
	9	.41	73	NW	5	o m g d	...	.52	84	NNW	1	o	...
	Midt.	.37	73	NW	6	o m g d	...	.51	82	N by W	4	...	...
8,	3 a.	.28	74	NE	7-8	o m g	...	.49	73	NNW	3	o r	...
	6	.44	75	...	5	o m d	...	.50	72	W by N	2	...	...
	9	.50	75	...	4-5	c m d	1.75	.53	72	WNW	2	o d	0.20

DATE.	Hour.	FISHER ISLAND.						ANPING.					
		Bar.	Temp.	WIND.		Weather.	Rainfall.	Bar.	Temp.	WIND.		Weather.	Rainfall.
				Dir.	Force.					Dir.	Force.		
September 6,	3 p.	29.43	81	NNW	4	c	...	29.39	80	N	7	o	...
	6	.42	80	...	2	c g	...	...	...	...	...	...	...
	9	.43	80	...	4	c	...	.47	77	NNE	3	...	...
	Midt.	.36	81	...	6	...	...	...	...	...	...	...	...
7,	3 a.	.33	78	...	7	...	...	.39	74	NE	2	o d	...
	6	.28	77	WNW	8	o m q	...	...	...	...	...	...	...
	9	.29	74	WSW	9	o m q r	0.20	.39	79	W	4	o	0.25
	Noon	.21	74	SW	9	o m q d	...	...	...	...	...	...	...
	3 p.	.25	75	SSW	8	...	...	.38	75	SW	5	o d	...
	6	.32	74	SSE	7	o m q	...	...	...	...	...	...	...
	9	.43	75	...	6	c m	...	.49	76	SE	3	c	...
	Midt.	.48	77	...	4	...	...	...	...	...	...	...	...
8,	3 a.	.46	77	ESE	3	...	...	.49	75	calm	...	o	...
	6	.50	77	...	2	c	...	...	...	...	...	...	...
	9	.54	82	ENE	2	c	0.56	.60	81	SE	3	c	0.98

TAKOW.

SOUTH CAPE.

September 6,	3 p.	29.38	80	NNW	10	c	...	29.21	80	WNW	9	c q	...
	6	...	...	...	...	...	...	.20	79	...	10	...	...
	9	.42	77	...	9	o	...	.19	79	...	11	...	...
	Midt.	...	...	...	...	...	...	.19	78	...	11	...	...
7,	3 a.	...	...	...	...	...	...	.19	78	...	10	...	...
	6	...	...	...	...	...	...	.24	76	...	10	...	...
	9	.41	78	NW	2	c	0.00	.34	77	...	7	...	0.00
	Noon	...	...	...	...	...	...	.37	82	...	5	c	...
	3 p.	.41	78	...	2	c	...	.36	81	...	3	...	...
	6	...	...	...	...	...	...	.41	78	...	1	...	...
	9	.48	78	SSE	2	c	...	.48	75	W by N	1	...	...
	Midt.	...	...	...	...	...	...	.48	76	...	1	...	...
8,	3 a.	...	...	...	...	...	...	.48	77	...	1	...	...
	6	...	...	...	...	...	...	.48	77	...	1	...	...
	9	.55	85	NE	1	b	0.00	.53	85	...	1	...	0.00

S.S. ASAGAO.

1892—September 5, Noon	26° 02'	121° 04'	29.59	NNE	6	b.	high head sea.
8p.			.54	N	8		sultry, head sea.
6, 4a.			.35	NNW	8	or.	hove to.
Noon	26 10	121 26	.14	NNE	9	or.	ship rolling and straining.
4p.			.07	"	9	orq.	towed oil bags.
8p.			.24	NE	9	"	
Midt.			.39	N	9	"	
7, 4a.			.43	ENE	8		
8a.			.54	"	7		
Noon	26 53	120 42	.63	NE	7		

S.S. LENNOX.

1892—September 5, Noon	27° 37'	122° 22'	29.58	N by W	8		high sea.
4p.			.57	"	10	o.	high broken sea.
8p.			.52	"	10	orq.	
Midt.			.38	"	10	"	very heavy cross sea.
6, 4a.			.48	NNW	9		
8a.			.47	N	9	orq.	tremendous sea.
Noon	27 50	122 14	.45	E	8		high confused sea.
4p.			.39	"	7	o.	"
8p.			.59	"	7	or.	
Midt.			.62	ENE	5	op.	sea going down.

S.S. ANCONA.

1892—September 5, Noon	27° 23'	122° 45'	29.59	N by W	8	o.	high sea.
4p.			.48	"	8		
8p.			.41	N	9	orq.	high cross sea.
Midt.			.37	"	10	"	lost gig.
6, 4a.			.31	"	9	"	"
8a.			.32	NNE	9	"	"
Noon	28 03	122 43	.36	"	6	q.	lost cutter and starboard
4p.			.42	"	5	c.	[lifeboat.
8p.			.51	ENE	5	orq.	"
Midt.			.56	"	4	b.	"

S.S. LOOSOK.

1892—September 7,	4a.			29.33	N	3	
	8a.			.34	NW	4	
	Noon	23° 50'	118° 2'	.22	NW	5	
	1.30p.			28.98	NW	7	
	2.30p.			.76	"	8	
	3. Op.			.76	"	10	
	3.30p.			.76	"	12	
	4. Op.			.76	N	6	} 4.5p. N to ESE, S, SW } central calm lull.
	5. Op.	23 45	118 31	.77	WSW	7	
	5.30p.			.74	...		
	6.12p.	23 35	118 29	.90	...		
	7. Op.			.97	...		
	7.30p.			29.10	...		
	8. Op.	23 30	118 20	.22	...		
8,	4a.			.33	ESE	4	4.42 Chapel Island.
	8a.				"	4	

S.S. SYDNEY.

1892—September 7,	Noon	22° 33'	115° 07'	29.53	N	2	c.	fine.
	4p.	22 49	116 05	.46	NNE	3	c.	
	8p.	23 0	116 56	.43	"	4	or.	swell from SSW and W.
	8.30p.			.35	...			
	9. Op.			.35	NE	12		{ very high sea, clouds { very low from WNW.
	9.30p.			.25	...			
	9.50p.			.14	...			course to SSW.
	10.30p.			.18	WNW	12		
	11. Op.			.26	...			
	11.30p.			.30	...			
	Midt.	22 43	117 05	.29	SW	3		confused sea.
8,	2a.			.40	...			
	4a.	23 17	117 42	.39	"	3		sea still confused.
	8a.	23 54	118 14	.50	NE	1	or.	swell from NE.
	Noon	24 29	118 49	.57	"	1	c.	

South Cape Wind Direction in points and Velocity in miles per hour from 6th—8th September, 1892, inclusive.

Hour.	September 6th.		September 7th.		September 8th.		Hour.	September 6th.		September 7th.		September 8th.	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.		Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
1a.	NNW	7	WNW	66	W/N	3	1p.	WNW	62	WNW	37	NE/N	7
2a.	NW/W	8	NW/W	54	W/N	4	2p.	W/N	69	WNW	22	ENE	2
3a.	NW/W	5	WNW	61	W/N	6	3p.	WNW	60	WNW	18	S	4
4a.	W	12	WNW	54	W/N	3	4p.	WNW	60	WNW	22	WSW	3
5a.	WNW	15	NW/W	50	W/N	6	5p.	NW/W	76	W/N	21	NW/W	4
6a.	NW/W	20	NW/W	63	W/N	5	6p.	WNW	60	WNW	10	NW/W	3
7a.	NW/W	28	NW/W	36	W/N	4	7p.	WNW	61	WNW	7	N/W	3
8a.	WNW	36	NW/W	50	W/N	3	8p.	WNW	65	WNW	3	NNW	5
9a.	WNW	34	NW/W	37	W/N	2	9p.	WNW	73	W/N	2	NNW	5
10a.	NW/W	55	NW/W	35	no record	...	10p.	NW/W	60	WNW	1	NNW	6
11a.	WNW	61	WNW	35	no record	...	11p.	NW/W	63	W/N	2	NW/N	5
noon.	WNW	67	WNW	26	no record	...	midt.	WNW	75	W/N	3	NW/N	7

From the 6th at 6 p. to the 7th at 6 p. the average distances from the centre at which different barometer readings were made were as follows; 28.50: in the centre, 28.70: 20 miles, 29.20: 40 miles, 29.30: 65 miles, 29.40: 120 miles, 29.50: 220 miles. At 6 p. on the 7th the dimensions became, perceptibly smaller. Possibly the depression had been filling up ever since the centre entered the Formosa Channel, but then it was only very slowly before 6 p. on the 7th. At midnight on the 7th the distances were; 29.30: 25 miles, 29.40: 60 miles, 29.50: 180 miles. At 6 a. on the 8th they were; 29.40: 40 miles and 29.50: 80 miles. At 9 a. on the 8th the barometer read 29.50 at a distance of 60 miles from the centre.

From the 6th September at noon to the 8th at 3 a. the force of wind was 7 at a distance of 50 miles from the centre, at 100 miles it was 6, and 4 at 200 miles. It blew perhaps one figure on Beaufort's scale higher behind than at the same distance in front of the centre.

During the same period the average angle between the wind and the radius was 45°. Within 100 miles of the centre it did not change with the distance and amounted to 46°. It was most uniform in different bearings nearest the centre. Between 100 and 150 miles it was 54°, and between 150 and 250 miles it was 29°. Within 250 miles the angle depends upon the bearing of the centre. In front the wind blew across the path. Behind it blew more nearly straight into the centre. To the NNE of the centre the angle was 21°, to ENE 34°, to ESE 45°, to SSE 58°, to SSW 70°, to WSW 60°, to WNW 38° and to NNW it was 43°.

The radius of the calm centre was 12 miles at Tamsui, perhaps it was only 5 miles at 4 p. on the 7th :—

LOWEST READINGS OF THE BAROMETER SEPTEMBER 6TH TO 8TH.

Station or Vessel.	Reading.	Date and Hour.	Distance and bearing of centre.
Keelung,	28.46	September 6 9.30p.	13 miles NNW
* Tamsui,	28.66	" 6 midt.	15 " W by S
Turnabout,	29.17	" 7 4a.	35 " SE by E
§ Ockseu,	29.25	" 7 9a.	25 " ESE
§ Chapel Island,	29.21	" 7 3p.	20 " E by S
† S.S. <i>Loosoh</i> ,	28.74	" 7 5.30p.	near centre.
Fisher Island,	29.20	" 7 1p. and 1.30p.	50 miles NW by N
Lamocks,	29.19	" 7 11p.	10 " S
S.S. <i>Sydney</i> ,	29.14	" 7 9.50p.	near centre.
§ Breaker Point,	29.28	" 8 3a.	15 miles SSE
§ Hongkong,	29.50	" 8 noon.	50 " SE by E.

* No readings taken between 10p. and midnight while centre was passing over this place.

† Reading uncertain, the correction not being accurately known at the time.

§ From tri-hourly observations.

On the 6th and 7th it was densely overcast to the north of the centre within 300 miles and to the south, east and west within 100 miles. On the 8th it was overcast within 100 miles of the centre. It was raining within 200 miles to the north of the centre and within 100 miles on the other sides of the centre. The rainfall was excessive at the stations near the northern entrance to the Channel, but became comparatively small at the stations in the South of the Channel near to which the centre afterwards passed. There was a high cross sea within 300 miles of the centre.

This typhoon though not a subsidiary depression may still be considered to be one in the same sense as cyclonic storms in Great Britain are considered subsidiary to the low pressure centre near Iceland. We see the effect of this in strong NE winds to the North of Formosa, in prevailing NW winds in South Formosa, in the weakness of winds to the SE of the centre compared to those NW of the centre, while the centre was in the Formosa Channel, in the N winds encountered at a distance to the SW of the centre and in the course towards SW which the centre took and of which there is no previous case on record in the Formosa Channel. The centre was carried round a point situated SE of South Cape. From this point the low pressure subsequently approached S. Japan and in the neighbourhood of the same place, SE of S. Cape, the next typhoon appears to have originated about the 17th September, and the latter typhoon proceeded WNWward moving round a point in the China Sea which the preceding typhoon which had moved SWward had approached on the 10th September. Subsequently another typhoon originated about the 23rd September in the China Sea a short distance towards the SE of the point where the two previous typhoons had disappeared on the 11th and 20th September. The last mentioned typhoon then moved NNEward in the China Sea keeping the low pressure area on its left. The movement of all these typhoons was caused by their centres being pressed forward by winds circulating against the sun, round an area with comparatively low pressure.

The following are the observations for noon of the 8th September :—

COAST STATIONS.

Bolinao,	29.60 + .02	SW	1	or.
Hoihow, .....	.63 - .02	NW	4	c.
Hongkong, .....	.50 - .02	NW	1	o.
Canton, .....	.56 .00	NNW	1	o.
Breaker Point, .....	.48 + .05	NE	4	cmp.
Swatow, .....	.51 + .07	E	4	op.
Lamocks, .....	.51 + .08	NE	3	cm.
South Cape, .....	.51 + .14	calm		c.
Fisher Island, .....	.52 + .31	NE	2	c.
Chapel Island, .....	.55 + .30	NE	3	c.
Amoy, .....	.56 + .19	NE	1	c.
Ockseu, .....	.57 + .23	calm		ep.
Turnabout, .....	.59 + .23	NNE	3	omr.
Tamsui, .....	.60 + .18	E by N	2	or.
Keelung, .....	.54 + .18	NNE	2	c.
Middle Dog, .....	.55 + .18	NE	3	cm.
Foochow, .....	.58 + .17	NE	2	o.
Steep Island, .....	.70 - .02	NE	4	cm.
North Saddle, .....	.67 .00	NE	6	om.

VESSELS.

S.S. <i>Argyll</i> ,	10° 15'	110° 27'	29.72	WSW	6	q.	high sea.
„ <i>Taksang</i> ,	12 49	120 42		SW	7	orq.	high sea.
„ <i>Rosetta</i> ,	13 4	111 45	.72	WNW	5	o.	
Sh. <i>Santa Clara</i> ,	14 22	113 22		WSW	6	q.	
S.S. <i>Teresa</i> ,	16 10	117 57	.57	W	4		fine.
„ <i>Menmuir</i> ,	18 26	116 47	.53	NW	4	op.	
„ <i>Wingsang</i> ,	19 28	112 9	.53	WNW	3		
„ <i>Cicero</i> ,	20 7	112 26	.52	NNE	5		confused sea.
„ <i>Torrington</i> ,	20 16	114 16	.53	NNW	7	od.	high sea.
„ <i>Ethiophe</i> ,	20 45	112 56	.53	NW	5		
„ <i>Borneo</i> ,	21 12	114 9	.50	NNW	6	orq.	high sea.
Bk. <i>Enos Soule</i> ,	21 39	122 54		WSW	2	op.	NE swell.
S.S. <i>E Sang</i> ,	23 15	116 50	.50	E by N	4		
„ <i>Thales</i> ,	23 30	119 30	.57	NE	2		fine.
„ <i>Sydney</i> ,	24 29	116 29	.57	NE	1		
„ <i>Ningpo</i> ,	24 52	118 58	.56	NE	2	eq.	

The observations for noon of the 8th show that the barometer was now rising on the SE coast where light to gentle NE winds chiefly prevailed with mostly fine weather. It was showery at Swatow and Breaker Point. On the South Coast at Hongkong the barometer was almost steady, the lowest reading when corrected for daily variation occurred at noon, the actual reading at this time being 29.50. Light NW breezes prevailed with drizzling rain at intervals.

Vessels approaching Hongkong from the SSW had strong NNW breezes with rain squalls and high sea. Off the Coasts of Annam and Cochin China fresh to strong WSW breezes and squally weather prevailed and there was similar winds and weather off the W coast of S. Luzon. The centre was in 21° 45', 114° 55' at noon on the 8th September moving towards the SSW.

The following are the observations for September 9th at noon :—

COAST STATIONS.

Bolinao,	29.61 + .01	ESE	1	o.
Hoihow, .....	.64 + .01	N	4	o.
Hongkong, .....	.60 + .10	NE/E	3	o.
Breaker Point, .....	.59 + .11	NE	3	c.
Lamecks, .....	.58 + .07	NNE	1	c.
S. Cape, .....	.54 + .03	W	3	c.
Chapel Island, .....	.56 + .01	NE	2	c.
Turnabout, .....	.61 + .02	NNE	3	b.
Steep Island, .....	.59 - .11	NNW	5	cv.
North Saddle, .....	.60 - .07	N	6	cm.

VESSELS.

S.S. <i>Colonist</i> ,	12° 1'	111° 53'	29.75	SW	5		
„ <i>Argyll</i> ,	13 43	112 26	.74	SW	4		fine.
Bq. <i>Jessonda</i> ,	14 44	112 54	.68	WSW	5	o.	
S.S. <i>Pakshan</i> ,	15 51	110 42	.61	W	5	q.	
Sh. <i>Santa Clara</i> ,	16 27	113 55	...	W	4	b.	
S.S. <i>Rosetta</i> ,	17 10	113 56	.60	NW	4	opq.	
„ <i>Presto</i> ,	18 19	110 36	.53	NW	5	o.	
Sh. <i>J. Y. Robbins</i> ,	20 11	115 18	...	SW	2	p.	
S.S. <i>Swatow</i> ,	at Hoihow.		.58	NNE	4	opq.	
„ <i>Chusan</i> ,	21 26	113 45	.61	NNE	4	eq.	
„ <i>Picciola</i> ,	21 23	114 51	.58	E	5	q.	
„ <i>Aden</i> ,	22 22	114 55	.59	ENE	4		fine.

The barometer shows a considerable rise at Hongkong and at the adjacent stations on the SE coast and gentle NE breezes prevailed at the stations with cloudy weather. Further west at Hoihow moderate N breezes prevailed with squally weather. The *Presto* off the coast of S Hainan had the wind veering from NW 5 at noon to NE 5 at midnight as she progressed NEward with rough sea at the latter hour (barometer 29.65). She was to the SW of the centre at noon and to the NW at midnight. The *Picciola* at noon NE of the centre (in 21° 23', 114° 51') steering towards the SSE had a fresh E breeze veering to SE at midnight (barometer 29.62 rising) with squally weather and swell. Vessels to the E of Annam had fresh W to SW breezes. The centre was at noon on the 9th in 20° 15', 113° 05'. There was no vessel within 100 miles of this position, but the cyclonic circulation of winds is well marked.

The following gives some of the observations for noon on the 10th:—

COAST STATIONS.

Bolinao,	29.66 + .05	W	1	c.
Hoihow, .....	.64 .00	NE	4	o.
Hongkong, .....	.62 + .02	E	2	c.
Breaker Point, .....	.60 + .01	NE	3	cm.
Lamocks, .....	.60 + .02	NNE	1	b.
S. Cape, .....	.57 + .03	SSE	2	c.
Chapel Island, .....	.58 + .02	NE	2	b.
Turnabout, .....	.62 + .01	ENE	2	b.

VESSELS.

S.S. <i>Thibet</i> ,	10° 50'	110° 40'	29.68	W	6	o.
„ <i>Colonist</i> ,	15 0	113 49	.64	WSW	4	
Bq. <i>Jessonda</i> ,	16 51	113 0	.59	WSW	3	o.
S.S. <i>Argyll</i> ,	17 36	113 48	.56	SW	2	fine.
Sh. <i>Santa Clara</i> ,	17 24	114 24	...	SSW	2	b.
S.S. <i>Picciola</i> ,	18 31	117 8	.67	S	2	b.
„ <i>Kowshing</i> ,	18 15	116 51	.71	WSW		fine, swell.
„ <i>Pakshan</i> ,	18 24	111 50	.51	NNE	4	o. high sea.
„ <i>Presto</i> ,	20 8	112 39	.62	ENE	4	orq.

The barometer had risen slightly at all these stations except Hoihow. On the SE coast light NE breezes chiefly prevailed with fine weather. At Hoihow the wind had veered to NE since the previous day and light rain fell in the morning hours, but the weather became fine in the evening. The *Presto* now to the north of the centre had rain squalls with moderate ENE breeze decreasing with rising barometer. The *Pakshan* had experienced squally weather with wind veering from NW 6 on the previous midnight to NNE 4 in the morning with heavy confused sea. The barometer was lowest at 4 a. (barometer 29.47) and during the evening it was rising with wind NE 6. Vessels S and SE of the centre had light to moderate W to SSW breezes. The centre of the depression which was now very feeble was in 18° 15', 112° 30' moving SSWard.

The following observations are for noon on the 11th September:—

COAST STATIONS.

Hoihow,	29.71 + .07	NE by E	4	b.
Hongkong, .....	.69 + .07	NNW	2	b.
Bolinao, .....	.72 + .06	SSE	2	c.

VESSELS.

S.S. <i>Taicheong</i> ,	11° 32'	109° 10'	29.62	SW	5	q.
„ <i>Thibet</i> ,	14 26	112 53	.66	SW	3	c.
„ <i>Mathilde</i> ,	14 18	110 0	.64	NW	3	sea slight.
„ <i>Zafiro</i> ,	17 7	118 18	.66	SSW	3	or. W swell.
Bk. <i>Jessonda</i> ,	18 56	113 9	.75	SE	3	orq.
S.S. <i>Namyong</i> ,	18 36	111 23	.62	E	4	rq.
Sh. <i>Santa Clara</i> ,	19 24	113 56		ESE	2	b.
S.S. <i>Higo Maru</i> ,	20 15	116 16	.67	NE	2	fine.
„ <i>Pakshan</i> ,	21 2	113 17	.64	NE	4	o.
Bk. <i>Thermopylae</i> ,	22 21	114 55		ESE	2	fine.
S.S. <i>Sungkiang</i> ,	22 33	115 42	.67	E	2	fine.

The above observations indicate the depression to be still existing, perhaps in about 16½°, 111½°. The ship logs show to a certain extent a cyclonic wind circulation and the barometer had risen to the north of this position and fallen to the south of it since the previous day. On the 12th the depression had nearly disappeared.

Positions of the Centre. September 2nd to 11th 1892.

Date and Hour.	Position of Centre.		Date and Hour.	Position of Centre.	
	Latitude N.	Longitude E.		Latitude N.	Longitude E.
September 2, Noon	24° 30'	132° 30'	September 7, Noon	24° 23'	119° 20'
3, „	25 30	130 30	3p.	24 08	118 35
4, „	26 0	128 30	6p.	23 45	118 00
5, „	26 15	126 0	9p.	23 22	117 40
6, „	25 45	123 15	Midt.	23 0	117 10
3p.	25 38	122 45	8, 3a.	22 48	116 37
6p.	25 32	122 14	6a.	22 25	115 55
9p.	25 20	121 43	9a.	22 05	115 23
Midt.	25 08	121 08	Noon	21 45	114 55
7, 3a.	25 06	120 36	Midt.	21 10	114 10
6a.	25 00	120 14	9, Noon	20 15	113 05
9a.	24 48	119 50	10, „	18 15	112 30
			11, „	16 30	111 30

On the 13th September a very severe storm passed over Central Japan of which full particulars are given on the Japanese Weather Maps. As explained above the depression which lay off S. Cape on the 6th moved NE. From the 9th September pressure remained persistently low off the coast of S and SW Japan varying but little from 29.20 from the 9th to the 12th. Strong E to NE winds chiefly blew in Central and Western Japan between the 9th and 11th. Strong N breezes and fresh gales blew at the E coast of China and between Shanghai and Nagasaki with very high seas. There is no information available in the Pacific to the E of Formosa or S of Japan. On the 12th the wind backed to N in Western Japan, but continued from E in Central Japan. At noon the centre was in $30^{\circ} 30'$, $131^{\circ} 30'$. On the morning of the 13th the storm entered the S coast of Japan and passed very nearly over Kobe, where the S.S. *Camelot*, *Melbourne* and many other vessels, which have sent us observations, experienced the full force of the storm varying from N 10 to W 7. The centre then entered the Sea of Japan and in the afternoon travelled rapidly to the NE. At noon on the 13th it was in about $37\frac{1}{2}^{\circ}$, $137\frac{1}{2}^{\circ}$.

On the 13th and 14th September the barometer rose considerably on the whole coast of China particularly in the north and gradients were established for NE winds which blew strongly on the coast and in the northern part of the China Sea on the 14th and 15th, during which time fine weather prevailed. On the latter day pressure gave way slightly and on the 16th the barometer showed a general fall on the coast particularly in the neighbourhood of S Formosa. At S Cape the wind had increased in force from the NNE and the weather had become wet and squally, light NE breezes prevailed on the SE coast while moderate to fresh gales were felt in the northern part of the Formosa Channel. The weather was generally fine.

Between the 14th and 16th moderate SW breezes prevailed off the Cochin China Coast, and in S Luzon on those days, winds were chiefly light S breezes with cloudy weather and almost steady barometer.

From the observations taken on board vessels in the China Sea it is found that on the 14th and 15th there was a trough of low pressure stretching from about 14° , 110° , to about 17° , 120° on the northern side of which fresh NE breezes to moderate gales were blowing while to the south of it moderate SW breezes were blowing. This was really the remainder of the previous typhoon which may be traced after the 11th, but the centre was partially surrounded by winds that did not exceed gentle breezes in force on the 12th and 13th. On the 16th this area moved northwards and a depression was formed in it a little to SEward of S Cape and subsequently on the 17th the centre passed very nearly over that place. It will be seen from the S Cape observations for that day that the depression had no very great intensity and had not been formed long enough to develop into a typhoon such as usually arrives on that coast from the Pacific.

The following are the observations for the 16th September at noon :—

COAST STATIONS.

Bolinao,	29.77	— .02	SSW	2	o.
Hoihow, .....	.83	— .08	NE	5	c.
Hongkong, .....	.84	— .07	E	2	b.
Breaker Point, .....	.78	— .16	NE	2	cm.
Lamocks, .....	.78	— .16	NNE	3	c.
South Cape, .....	.73	— .12	NE	6	cp.
Takow, .....	.73	— .12	NW	1	c.
Anping, .....	.73	— .12	SW	2	c.
Fisher Island, .....	.72	— .15	NNE	4	cm.
Chapel Island, .....	.77	— .14	NNE	6	cm.
Turnabout, .....	.86	— .10	NNE	7	cm.
Steep Island,	30.01	— .02	NE	2	eq.

VESSELS.

S.S. <i>Phra Chom Klao</i> ,	$11^{\circ} 16'$	$109^{\circ} 6'$	29.82	SW	5	
Sh. <i>Albania</i> ,	11 42	110 10		SW	4	oq. swell.
S.S. <i>Hupei</i> ,	15 20	113 17	.75	SW	4	o. heavy sea.
„ <i>Taichow</i> ,	14 51	110 18	.75	WNW	6	r. high cross sea.
Bk. <i>Jessonda</i> ,	19 34	113 59	.83	ENE	6	high sea.
S.S. <i>Nanshan</i> ,	19 26	111 55	.86	NNE	6	heavy sea.
„ <i>Avochie</i> ,	20 26	111 6	.85	NE	5	b.
Sch. <i>Santa Cruz</i> ,	20 25	115 31	.85	NE	7	
S.S. <i>Namoa</i> ,	22 59	116 40	.80	NE	4	b. swell.
„ <i>Borneo</i> ,	23 20	117 15		NE	2	b.
„ <i>Benlarig</i> ,	23 40	117 51	.83	NNW	4	c.
„ <i>Asagao</i> ,	24 31	119 15	.79	NE	5	o.
„ <i>Bengloe</i> ,	25 2	119 38		NNE	9	o. heavy sea.

The observations made at the stations in and around the Formosa Channel are given in detail for 17th September at noon to the 19th at noon inclusive. The following are some additional observations for noon of the 17th :—

COAST STATIONS.

Bolinao,	29.73 — .04	S	2	o.
Steep Island,	30.00 — .01	NE	1	f.
North Saddle,	29.98 — .01	NE	4	omq.

VESSELS.

S.S. <i>Taichow</i> ,	10° 57'	108° 39'	29.76	SW	4	o.	high sea.
Sh. <i>Albania</i> ,	12 50	112 32	...	WSW	3	o.	
Bq. <i>Sachem</i> ,	14 20	113 17	...	WSW	6		
S.S. <i>Cheang Hock Kian</i> ,	15 25	110 0	...	WNW	5	o.	swell.
„ <i>Kong Beng</i> ,	17 59	111 14	.70	NW	4	o.	
„ <i>Hupeh</i> ,	17 59	113 41	.75	var.	2	o.	swell.
Sch. <i>Santa Cruz</i> ,	19 56	116 29	.67	WNW	rq.		high cross sea.
Bq. <i>Jessonda</i> ,	20 10	113 43	.76	NW	2		fine.
S.S. <i>Chusan</i> ,	20 28	111 27	.74	N	3	o.	
„ <i>Zafiro</i> ,	20 32	118 57	.48	NW	4	o.	cross sea.
„ <i>Kowshing</i> ,	20 42	118 48	...	NW	5	o.	moderate sea.
„ <i>Nanshan</i> ,	22 2	114 0	.72	NW	5		
„ <i>Asagao</i> ,	22 35	115 45	.60	NW	4	o.	
„ <i>Verona</i> ,	22 27	115 19	.66	NNW	4		heavy swell.
„ <i>Fushun</i> ,	23 0	116 45	...	N	4		high sea.
„ <i>Paoting</i> ,	25 6	119 12	.53	NE	10		
„ <i>Chi Yune</i> ,	25 25	119 45	.64	NE	7	opq.	

The centre was at noon on September 17th in 21° 40', 121° 15', moving NWard and at 4 p. it passed a little to the North of S Cape. The barometer reading at 4 p. was 29.21 (lowest). At noon the wind force decreased to a gentle breeze and so continued until after 3 p. the direction during the time varying between N and NE but being chiefly N. At 3 p. it commenced backing and at 4 p. was from WNW 5. At 6 p. it had come to SSW 3 and at 7 p. it was SSE increasing quickly in force with rapidly rising barometer. During the night of the 17th to 18th a fresh to strong SE gale blew at the station with wet squally weather. The diameter of the central area when near S Cape where gentle breezes prevailed was about 60 miles. The lowest readings of the barometer were taken at Takow (29.29) and Anping (29.25) at 4 p. and at Fisher Island at 5.30 p. (29.22) after which hours the barometer rose at those stations. There is some uncertainty as to the position of the centre after it passed near S Cape at 4 p. The barometer at Fisher Island was as low within 0.01 at 5.30 p. as it was at S Cape at 4 p. while Anping and Takow lying between had higher readings, moreover the wind circulation at Fisher Island, Anping and Takow do not agree well with the position of the centre. The wind during the early part of the evening was blowing round the Island of Formosa owing probably to the mountain chain which runs north and south through its centre. The Takow wind forces are over estimated. Moderate to whole NNE gales blew in the Channel during the 17th, the higher forces being registered in the northern part. The weather was overcast but dry until the evening when rain set in at some of the more southern stations. In N Formosa moderate SE breezes prevailed with showers at Keelung. Hongkong had light to gentle NNW breezes and fine weather but the sky clouded during the evening. The day, but more particularly the night, temperature was excessive as usually is the case when a typhoon is approaching the Colony from the eastward. In Luzon light to gentle S breezes prevailed with overcast sky.

On the 17th several vessels in the Channel and at the ports on the SE coast had bad weather the nature of which can be readily inferred from the observations made at the Channel stations which are printed elsewhere. Vessels in the neighbourhood of Hongkong had chiefly moderate to fresh NNW breezes. The Schooner *Santa Cruz* bound for islands in the *Pacific* left Hongkong on the 12th September. In tacking for the Balingtang Channel she encountered strong ENE breezes and heavy seas. On the afternoon of the 16th the wind backed from NE to NNE at midnight with very quickly increasing wind and sea. The upper topsails, jib and mainsail were made fast and the foresail reefed. On the morning of the 17th the wind backed slowly and there was a tremendous sea running from all points of the compass and heavy seas breaking over the ship (barometer 4 a. 29.66). The lower topsails were made fast and she was hove to on the port tack at 9 a., wind NW by N. The ship was working tremendously in the high sea. At noon on the 17th in 19° 56', 116° 29' (barometer 29.64) the wind was WNW: At 4 p. they kept her off and stood to the Eastward until 7 p. when the wind and sea again increased, so they hove to again on the port tack. At 9 p. there were heavy rain squalls from the West with short intervals and a tremendous sea from E and NW. The *Zafiro* and *Kowshing* WSW of the centre were almost together at noon in 20° 30', 119° steering about S by E. They had N to NW fresh breezes, overcast sky and heavy ESE to SE swell. The lowest reading of the barometer was at 4 p. 29.45 and the wind then commenced backing through W to SW increasing to a moderate and fresh gale with heavy rain squalls, high sea and rising barometer (at midnight 29.58). At midnight the centre was perhaps in 22° 25', 119° 20' moving a little to north of west but owing to the causes above mentioned there is some uncertainty as to this position.

On the morning of the 18th. September SE winds decreasing in force prevailed in Formosa, a strong gale at S Capé, a moderate gale at Anping and moderate breezes in N Formosa with wet weather and rising barometer. Towards noon there blew a whole SE gale at Fisher Island. In the northern part of the Channel whole NE gales veering and decreasing in force prevailed, while at the stations near Lamocks at the southern entrance to the Channel NNE to NE gales were blowing with wet squally weather.

The centre was at 6 a. on the 18th in $22^{\circ} 40'$, $118^{\circ} 20'$. At noon in $22^{\circ} 50'$, $117^{\circ} 30'$. At the latter hour the *Pekin*, *Chelydra*, *Gleneagles* and *Verona* whose logs are given in detail encountered it. They all experienced NE veering gales with high confused seas and heavy rain squalls. The *Pekin* is a very small vessel and the wind forces are probably over estimated. This is generally found in the case of small vessels. The *Pekin* was in considerable danger from the heavy seas breaking on board and it was found necessary to jettison some cargo to save the ship. The centre passed about 30 miles to the southward of Lamocks at 1.30 p. The lowest reading of the barometer was registered at 1.30 p. (29.25) but it remained steady at that reading until 3 p. The wind veered from NE 10 at 2 p. to ESE 9 at 3 p. The typhoon was at this time commencing to move in a W by S direction. At Breaker Point the lowest reading of the barometer was taken at 3 p. (29.24) the wind being then NE 8. At 6 p. the barometer had risen (29.32) and the wind had veered to SE force 6. At Hongkong wet weather set in during the morning, the wind backing from NNW and increasing in force, the direction of the lower clouds backing with the wind. At 6 p. it was from NW 5 and the lowest reading of the barometer (29.43) was taken at this time. The storm had commenced filling up. The centre at 6 p. was in $22^{\circ} 45'$, $116^{\circ} 15'$. After passing a little to the S of Breaker Point it travelled almost along the Coast line towards Hongkong. At midnight the centre was about 20 miles NE of the Colony. The wind had backed slightly since 6 p. and decreased in force and was chiefly from NW by W force 3 during the evening with continuous rain. At Macao the wind also backed during the evening to WNW 5 at 10 p. At Canton NW 5 was registered at 9 p. with rain squalls. The depression was filling up rapidly. The barometer read at midnight at Hongkong lower than that of any other station or vessel.

The following gives the whole of the information contained in the logs of the *Pekin*, *Chelydra*, *Gleneagles* and *Verona* for the 17th noon to 18th midnight :—

S.S. PEKIN.

September 17, Noon	$23^{\circ} 0'$	$116^{\circ} 42'$	N	2		
8p.			NE		op.	strong wind increasing rapidly, increasing sea.
10p.			NE	12		hove to: great quantities of water on board,
18, 1a.			NE	10		[jettisoned cargo.
7a.			NE			more cargo jettisoned.
Noon	$23 14$	$117 32$	ENE	10		
Midt.			ENE	9		
19, 4a.			var.			moderating.

S.S. CHELYDRA.

September 17, Noon	$22^{\circ} 48'$	$116^{\circ} 48'$	29.77	NE	5	
8p.			.75	"	8	orq. rolling heavily.
Midt.			.62	"	11	"
18, 4a.			.49	"	11	" high cross sea from NE to NW.
8a.			.42	"	11	"
Noon	$23 15$	$118 03$	.35	SE	9	or.
4p.			.42	"	8	" heavy cross sea.
8p.			.49	"	7	do.
Midt.			.61	NE	6	do.

S.S. GLENEAGLES.

September 17, Noon	$22^{\circ} 29'$	$115^{\circ} 11'$	29.72	NNW	5	fine.
Midt.			.50	NW	5	heavy rain, half speed.
18, 1a.				NNW		
2a.				NNE		
3a.				NE		
4a.			.36	NNE		ran to South.
8a.			.40	ENE		heavy sea.
Noon	$22 54$	$117 28$	.34	"		
Midt.			.64	SE by S	8	

S.S. VERONA.

September 17, Noon	$22^{\circ} 27'$	$115^{\circ} 19'$	29.66	NNW	4	fine, heavy increasing E to NE swell.
4p.			.53	NW by N	3	o. " " "
8p.			.52	ESE	3	" " " "
Midt.			.46	N	7	or. " " "
18, 4a.			.39	N by W	9	orq. high NE sea.
8a.			.41	NNE	7	" " "
Noon	$22 52$	$117 11$	.31	NE by N	8	" " "
4p.			.28	SE	4	" " "
8p.			.51	"	7	" high SE sea.
Midt.			.67	SE by S	8	" " "

The following gives the noon observations for September 18th taken on board some other vessels:—

Sh. <i>Albania</i> ,	15° 0'	112° 48'		SW	3	oq.	
Bk. <i>Sachem</i> ,	16 31	113 24		SW	3		
S.S. <i>Denbigshire</i> ,	17 15	113 6	29.73	NW	4	o.	swell.
„ <i>Zafiro</i> ,	16 13	119 28	.68	SSE	5	oq.	
„ <i>Kowshing</i> ,	17 37	119 21	.71	S	8		heavy sea.
„ <i>Continental</i> ,	19 5	116 36	.63	WSW	6		
Sch. <i>Santa Cruz</i> ,	20 4	117 9	.32	WSW		orq.	heavy sea.
S.S. <i>Alwine</i> ,	20 32	111 10	.65	NNW	7	q.	
„ <i>Hupeh</i> ,	20 44	113 45	.53	WNW	6		increasing sea.
Bk. <i>Jessonda</i> ,	21 10	114 24	.57	NW	5	or.	
S.S. <i>Fushun</i> ,	23 43	117 30		E	9	orq.	
„ <i>Chi Yune</i> ,	25 25	119 45	.62	E by N	6	oq.	
„ <i>Paoting</i> ,	25 17	119 24	.56	NE	8	oq.	
„ <i>Doris</i> ,	27 0	121 25	.86	NE by E	7	orq.	

The following observations for noon of the 18th September are given in addition to those given in detail in the table:—

Bolinao,	29.75 + .02	SE by S	2	od.
Steep Island,	30.04 + .04	NE	5	cg.

Vessels off the East Coast had strong NE to E breezes with high sea and swell. On the W Coast of N Luzon strong S breezes prevailed with high sea and rainy weather. In the middle of the China Sea gentle SW breezes were blowing, to the East of Hainan and South of Hongkong strong N to NW breezes. The *Continental* at noon in 19° 5', 116° 36' proceeding SSE had the wind backing from WNW 6 in the early morning to SSW 8 at 4 p. The barometer was practically steady up to that hour when it commenced rising (at 8 p. 29.69) and wind a strong gale from SW with high cross sea. The *Hupeh* and *Jessonda* about 60 miles to the south of Hongkong had, the former a moderate NW gale, the latter a strong NNW gale during the afternoon and evening. After midnight the wind became very light. The *Hupeh* had the barometer reading 29.47 at 8 p., 29.52 at midnight. The *Jessonda* had barometer 29.56 at midnight. The wind force on the *Hupeh* was over estimated probably. She was steaming against the wind. The schooner *Santa Cruz* at noon on the 18th in 20° 4', 117° 9' remained hove to on the port tack heading NW wind WSW. There were fierce squalls, a mountainous sea, the decks were covered with water fore and aft. The *Santa Cruz* is a very small vessel and felt the storm much more than a larger vessel would have done. She worked fearfully and they had to pump her every hour for about fifteen minutes. She had worked herself leaky somewhere. The wind backed in the afternoon and became SSW at midnight. Next morning the wind backed to S at 5 a. 19th (barometer 29.36 rising). They had attended to the pumps the whole morning and at last they sucked. They tried to heave her to on the starboard tack, but she would not lay steady enough on account of the heavy sea under the lee quarter, so they had to wear her round again to SW on the port tack which is, of course, the proper tack to lay to on in the left semicircle of a typhoon.

The centre passed over the Colony just after midnight, but the depression had filled very rapidly and was now extremely feeble. The barometer—which was about 0.3 inch. below the normal—was rising and read at 1 a. 19th 29.51, 2 a. 29.52, 3 a. 29.52. Temperature was low and relative humidity high at the time. The barometer was also rising at Canton and Macao. At Hongkong at 1.15 a. the wind fell calm, it having just previously been from the NW force 1. The calm lasted until 3 a. when a light air sprang up from the East (SE at 7 a.). The rain ceased from midnight to 4 a., but the sky remained overcast. The diameter of the calm area was, perhaps, 30 miles, but this is very uncertain, the gradients being so slight at the time that it is impossible to determine it accurately. After 4 a. showers fell. At Victoria Peak it blew NW 6 at 6 p. on the 18th and SE 4 at 6 a. on the 19th. At Macao the wind backed from WNW 5 at 10 p. on the 18th to WSW 3 at 4 a. on the 19th with wet weather. At Canton the wind veered from NW 3 at 3 a. (barometer 29.51 lowest) to NNE 1 at 9 a. (barometer 29.69 rising rapidly). At Hoihow the barometer was rising during the day with fresh N breezes. Strong SE breezes with wet weather blew on the S part of the SE coast, moderate NE breezes near the N entrance to the Formosa Channel.

The *Jessonda* a little to the S of Hongkong had a gentle SW breeze and high sea. The *Denbigshire* a little to the SW of the *Jessonda* gives the wind as N 2, but she was steaming northward which makes this of little account. The *Cyclops* and *Sachem* further south had light and gentle W breezes while vessels west of Bolinao had fresh SSE breezes. At noon on the 19th the schooner *Santa Cruz* in 20° 28', 117° 9' had slowly decreasing SSE wind, the sea was also decreasing, but there was a very high swell in consequence of which no more canvas could be set. The weather was overcast with passing showers and squalls with wind backing to SE and decreasing in force towards evening. Several sails were set next day and they stood to the southward but that was too late as the centre had long passed her.

The centre passed to the northward of Macao during the early morning and disappeared from observation. No doubt the depression was quickly broken up.

DATE.	Hour.	TURNABOUT.						CHAPEL ISLAND.					AMOY.						
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.					Dir.	Force.		
Sept. 17	Noon	29.65	80	NE	10	om	...	29.46	83	NNE	9	cm	...	29.58	88	NE	6	c	...
	3 p.	.58	80	...	10	omq	...	.42	83	...	10	...	...	.51	87	...	7	...	...
	6	.56	80	...	10	gm	...	.40	83	...	10	oum	...	.51	87	...	7	...	...
18	9	.56	78	...	11	om	...	.39	80	...	10	...	...	.51	85	...	7	od	...
	Midt.	.56	78	...	11	...	...	.47	78	...	9	odm	...	.51	85	...	7	or	...
	3 a.	.52	79	...	11	cm	...	.45	77	...	9	...	...	.53	81	...	6	o	...
19	6	.52	78	ENE	11	om	...	.46	77	...	8	...	...	.51	81	...	7	...	...
	9	.55	80	...	11	...	0.05	.51	79	E	8	omr	0.33	.55	81	...	6	...	0.10
	Noon	.59	79	E	10	...	...	.50	77	...	7	...	...	.57	81	...	6	...	...

DATE.	Hour.	LAMOOCKS.						SWATOW.					BREAKER POINT.						
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.					Dir.	Force.		
Sept. 17	Noon	29.53	84	NNE	4	c	...	29.51	95	N	2	og	...	29.58	93	NNE	3	cm	...
	3 p.	.48	84	...	7	cm	...	.50	...	NNW	2	...	...	.52	90	NNW	4	...	...
	6	.48	82	...	7	...	...	.48	86	...	0	...	...	.53	80	S	3	cmp	...
18	9	.48	81	...	8	mr	...	.48	...	...	0	...	...	.53	87	S	3	omd	...
	Midt.	.47	76	...	9	mrq	...	.48	...	NE	3-4	ogrq	...	.53	77	NNW	3	omd	...
	3 a.	.38	77	NE	9-10	...	...	.45	78	...	3-4	...	...	.51	76	...	3	...	...
19	6	.38	77	NNE	8-9	...	...	.46	...	NNE	2	or	...	.44	75	N	4-5	...	...
	9	.39	75	...	10	o	2.10	.47	76	NE	6	orq	1.30	.43	76	NE	6-7	omgd	1.60
	Noon	.29	77	...	11	...	...	.40	...	...	5	...	...	.39	78	...	8	...	...

DATE.	Hour.	HONGKONG.						PEAK.			CANTON.								
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Bar.	Temp.	WIND.		Weather.	Rain.		
				Dir.	Force.					Dir.	Force.			Dir.	Force.				
Sept. 17	Noon	29.67	91	N/W	2	b	NNE	5	
	3 p.	.59	90	NW/W	2	c	...	29.64	96	NW	3	...	...	N	1	b	...
	6	.58	89	NNW	3	o	...	...	...	NNW	4	...	...	NE	3	c	...
18	9	.60	88	...	3	...	...	...	...	...	...	...	...	...	...	...	...
	Midt.	.57	88	...	2	...	...	...	...	...	...	...	...	...	...	...	...
	3 a.	.53	85	...	4	...	...	...	...	...	...	...	...	...	...	...	...
19	6	.54	78	NW/N	2	od	NNW	560	82	NW	3	o	...
	9	.58	77	...	3	or	0.08	564	81	N	3	r	0.77
	Noon	.54	76	NW	2	od	5	

DATE.	Hour.	HOIHOW.						MACAO.						
		Bar.	Temp.	WIND.		Weather.	Rain.	Hour.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.						Dir.	Force.		
Sept. 17	Noon	...	...	...	...	...	...	...	...	...	...	...	...
	3 p.	29.70	84	W	3	b	...	...	...	...	...	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	...
18	9	.74	83	NNW	3	...	...	...	...	...	...	...	...
	Midt.	...	...	...	...	...	...	...	...	...	...	...	...
	3 a.	4 a.	29.55	83	NW	2	c	...
19	6	.72	81	N	5	o	...	10	.62	81	...	2	cd	...
	Noon	1 p.	.58	79	...	3
	3 p.	.61	83	NNE	4	o	...	4	.52	75	...	3	cr	...

Direction of Wind in points and Velocity in miles per hour at S. Cape. September, 17th 1a.—18th Midt.

Hour.	September 17.		September 18.		Hour.	September 17.		September 18.	
	Dir.	Vel.	Dir.	Vel.		Dir.	Vel.	Dir.	Vel.
1a.	N	31	SE	56	1p.	N	19	SE by S	39
2a.	"	26	"	50	2p.	NE by N	20	SSE	32
3a.	N by W	30	"	49	3p.	N	17	"	32
4a.	"	34	"	51	4p.	WNW	31	"	33
5a.	"	31	"	54	5p.	WSW	27	SE by S	32
6a.	N	35	SE by S	53	6p.	SSW	17	"	30
7a.	"	33	SE	47	7p.	SSE	26	SE	22
8a.	N by W	35	"	49	8p.	SE by S	41	SE by E	21
9a.	N	38	"	45	9p.	SE	44	ESE	16
10a.	"	33	SE by S	43	10p.	SE by S	47	E by S	15
11a.	WNW	33	"	34	11p.	"	52	E by N	17
Noon	ENE	18	SSE	39	Midt.	SE	48	E	16

On the 20th September the barometer was rising at all stations in China and the NE monsoon commenced spreading southward into the northern part of the China Sea. On the 21st, pressure was increasing further on the S and W and E Coasts, but was giving way slightly in Formosa and at the stations in the north part of the Channel. In Luzon the barometer was also falling. NE winds were now blowing as far south as 20° lat. to the Westward of the Bashee Channel. In the middle of the China Sea winds were light and variable, in Luzon light SW airs and breezes. On the 22nd the barometer was falling all along the China Coast particularly in the N. There was also a considerable decrease of pressure on the NW Coast of Luzon. Strong NE breezes blew on the SE coast of China and extended across the China Sea as far south as 18° where high seas and squally wet weather also prevailed. Off the Coast of SW Luzon fresh SW breezes blew. At Bolinao a gentle SSE breeze and weather becoming wet with lower clouds moving fast from the S. The observations indicate that a depression was forming in an area to the west of Bolinao on the 22nd. The *Zafiro* at 4 p. in 14° 55', 120° 0' steering NW had then a gentle SW breeze and cloudy weather. At midnight the wind became variable of force 3 with showery weather and SW swell and so continued until noon next day when the wind settled down at NNE.

The following are the observations for noon on the 22nd :—

COAST STATIONS.

Bolinao,	29.79 - .07	SSE	3	o.
Hoihow, .....	.96 - .01	NNE	4	o.
Hongkong, .....	.94 - .05	NNW	3	o.
Breaker Point, .....	.97 - .01	N	5	omp.
Lamoeks, .....	.94 - .04	NE	7	c.
South Cape, .....	.88 - .04	NE	4	c.
Fisher Island, .....	.87 - .03	NNE	7	omq.
Chapel Island, .....	.93 - .02	N	5	cm.
Turnabout,	30.01 + .02	NNE	8	o.
Steep Island, .....	.11 - .06	NNE	4	cv.

VESSELS.

S.S. <i>Picciola</i> ,	13° 36'	121° 06'		SW	5		high sea.
Bk. <i>Penshaw</i> ,	17 13	122 58		SE	3		fine.
Sch. <i>Santa Cruz</i> ,	19 18	117 45		NE		or.	high sea.
S.S. <i>Lightning</i> ,	18 41	113 31	29.87	NNE	5	b.	
" <i>Sungkiang</i> ,	19 17	116 29	.84	NNE	5	op.	moderate sea.
Sh. <i>Albania</i> ,	19 51	113 46		NE	7		high sea.
Bk. <i>Sachem</i> ,	20 17	114 39		NE	6	or.	
S.S. <i>Memnon</i> ,	21 40	114 30	.95	NNE	5	q.	

The following are the observations for noon of the 23rd September :—

COAST STATIONS.

Bolinao,	29.81 + 02	SSE	2	c.
Hoihow, .....	.93 - 03	NNE	5	c.
Hongkong, .....	.95 + 01	NNE	1	c.
Breaker Point, .....	.94 - 03	NE	5	cm.
Lamoeks, .....	.93 - 01	NE	7	c.
S. Cape, .....	.84 - 04	NE	5	cm.
Fisher Island, .....	.87 00	NNE	8	cm.
Chapel Island, .....	.92 - 01	NNE	7	c.
Turnabout,	30.03 + 02	NNE	6	g.
Steep Island, .....	.11 00	NNE	3	cv.
North Saddle, .....	.06 - 02	NNE	5	cv.
Ichang,	29.98 - 13	...		o.

VESSELS.

S.S. <i>Phra Chula Chom Klao</i> ,	12° 28'	109° 25'	29.88	N	2		
„ <i>Taksang</i> ,	15 31	118 46	...	SSW	6		high sea.
„ <i>Picciola</i> ,	15 36	118 49	.81	SW	6	orq.	swell from WNW.
„ <i>Zafiro</i> ,	17 43	117 47	.70	var.	2		N swell.
Sch. <i>Santa Cruz</i> ,	17 57	118 15	...	SE		or.	
S.S. <i>Else</i> ,	18 25	117 1	.80	ENE	4		fine, high sea.
Bq. <i>Penshaw</i> ,	18 47	122 12	.86	var.	2	o.	
S.S. <i>Triumph</i> ,	19 30	111 51	.89	NE by N	6	or.	
Sh. <i>Albania</i> ,	20 15	113 26	...	NE by E	7		heavy sea.
Bk. <i>Sachem</i> ,	20 43	113 57	...	NE	8		high sea.
S.S. <i>Achilles</i> ,	22 48	116 32	.86	NE	6	b.	
„ <i>Esang</i> ,	23 33	117 57	.92	NE by N	6	o.	

The observations for the 23rd September show that the barometer had continued falling at Hoihow and S. Cape while at the stations on the SE coast it was almost steady. On the East Coast it was inclined to fall and at the Yangtze stations there had been a considerable decrease of pressure since the previous day. That probably determined the course of this typhoon to the N. Moderate to strong NE breezes prevailed between Hoihow and Turnabout, but at some of the Channel stations there was a moderate NE gale. The weather was cloudy. In Luzon the barometer was inclined to rise slightly. At Bolinao there was a light to gentle SSE breeze with overcast sky.

The *Kowshing* which left Manila for Hongkong at 1 p. had a moderate SW breeze during the evening with falling barometer. The *Picciola* and *Taksang* in about 15½°, 119° had strong SW breezes with heavy rain and high sea and swell. The *Zafiro* at noon in 17° 43', 117° 47' (barometer 29.70) had light to gentle variable breezes with showery weather during the morning, but in the afternoon the wind became NNE 5, weather squally with heavy rain and N swell. The barometer had fallen rapidly since the previous midnight, but commenced rising again during the evening of the 23rd (at midnight 29.72). Since the previous day this vessel steering NW had passed from an area where gentle SW winds blew to one in which the winds were light and variable and the weather showery with low barometer and thence to a district where fresh NNE breezes were blowing with heavy rain and rising barometer. The *Else* was at noon on the 23rd about 60 miles NW by W of the *Zafiro*, she had then ENE 4, (barometer 29.80). She was steaming SSE and was passing into the area which the *Zafiro* had just left. At midnight the barometer (29.74) had fallen and the wind was ESE 3 rapidly veering to SSE. The schooner *Santa Cruz*, a little to the ENE of the *Zafiro*, at noon had SE wind with very heavy rain and high sea. At midnight a thunderstorm was encountered with heavy squalls of wind and rain. Some vessels about 100 miles SSW of Hongkong had moderate NE gales and high sea. The observations point to a depression in the initial stage, perhaps in 17°, 117° and about 60 miles SW of the position of the *Zafiro* at noon on the 23rd. There were no vessels at this time to the W and SW of this position, but probably there was a trough in about the latitude of 17° extending to the Westward with squally wet weather and variable winds while NE winds prevailed to the North and SW winds to the S of this area.

The following are the observations for noon on the 24th September:—

COAST STATIONS.

Bolinao,	29.82 + .01	SE by S	2	o.
Hoihow, .....	.91 - .02	NE	4	c.
Hongkong, .....	.91 - .04	calm.		o.
Breaker Point, .....	.88 - .06	NNE	3	c.
Lamocks, .....	.90 - .03	NNE	6	c.
South Cape, .....	.82 - .02	NE	4	c.
Fisher Island, .....	.81 - .06	NNE	7	cm.
Chapel Island, .....	.88 - .04	NNE	6	c.
Turnabout, .....	.95 - .08	NNE	7	om.
Steep Island,	30.07 - .04	NE	3	cv.
North Saddle, .....	.06 .00	E	3	cv.
Ichang,	29.90 - .08	SE	1	o.

VESSELS.

S.S. <i>Else</i> ,	15° 14'	119° 15'	SSE	180	29.76	SW	6	or.	high sea.
„ <i>Phra Chula Chom Klao</i> ,	15 41	110 26	WSW	450	.86	NNW	4	o.	swell.
„ <i>Kowshing</i> ,	17 36	118 4	ESE	50	.71	SW	4	or.	
Sch. <i>Santa Cruz</i> ,	17 57	117 57	E by N	40	...	SSE		or.	high cross sea.
S.S. <i>Picciola</i> ,	17 53	116 25	W by N	60	.76	NE	4		high sea and swell.
„ <i>Taksang</i> ,	18 39	116 52	NNW	70	...	NE	4		high cross sea.
Bq. <i>Penshaw</i> ,	19 0	122 16	ENE	300	...	SW	2		fine.
Sh. <i>Albania</i> ,	19 48	114 11	NW	220	...	NE	8		
Bk. <i>Sachem</i> ,	20 18	113 57	NW	260	.81	NE	6		high sea.
S.S. <i>Triumph</i> ,	21 6	112 27	NW	350	.89	NE by N	5		fine.
„ <i>Zafiro</i> ,	21 26	115 3	NNW	270	.79	NE	3		fine.
„ <i>Ancona</i> ,	22 56	116 46	N	330	.92	NNE	4	b.	

On the 24th the barometer was almost steady in Luzon with light S and SE breezes and cloudy weather. Pressure was decreasing slightly at Hoihow moderately fast on the SE coast and in the Formosa Channel. A further fall had also taken place at the Yangtze stations. Winds were NE to NNE on the China Coast, moderate breezes on the S and E coasts, strong breezes in the Formosa Channel. The weather was generally cloudy but fine.

The *Phra C. C. Klao* off the NE coast of Annam at noon on the 24th had a moderate breeze veering from NNW to NNE as she steamed northwards with overcast squally weather and N swell. The barometer was steady (at midnight 29.85). The *Elee* which had steamed SSE since the previous day now had a strong SW breeze with heavy rain and high sea and barometer rising (29.81 at midnight). The *Kowshing* steaming NW from her noon position had during the evening fresh to strong NE breezes with squally weather and high sea. At noon she had SW 4 so that between that hour and 8 p.—when the barometer was lowest (29.68)—she had passed through an intervening area where variable winds prevailed. Unfortunately no observations were recorded during the interval. The *Taksang* and *Picciola* at noon on the 24th about 100 miles NW of the *Kowshing* and proceeding to the NNW had since midnight of the 23rd also passed from a district where fresh to strong SW winds blew accompanied by heavy rain to one in which moderate NE breezes prevailed. A high cross sea was noted during the time at first from WNW afterwards from NE. The *Picciola* at midnight 24th had the barometer rising (29.80) and the wind increased to a strong NE breeze on both vessels. The barque *Penshaw* had NE 4 at midnight with S swell.

The small schooner *Santa Cruz* at noon on the 24th hove to on the starboard tack in $17^{\circ} 57'$, $117^{\circ} 57'$ under double reefed foresail had it blowing hard from the Southward and the rain pouring down in torrents. Heavy seas were breaking over the ship. One heavy sea caused a boat which was hanging in the davits on the port side, and was well lashed, to get nearly capsized in her lashings and they nearly lost her altogether. In the evening it blew with great force from the SSW.

The sailing vessels *Albania* and *Sachem* in about 20° , 114° had moderate NE gales and high sea.

The centre of the depression was at noon on the 24th in $17\frac{3}{4}^{\circ}$, $117\frac{1}{2}^{\circ}$. It had commenced to move towards NNE and had become concentrated since the previous day but at present was of insignificant dimensions.

The following are the observations for noon of September 25th:—

COAST STATIONS.

Bolinao,	29.84 + .02	S/W	1	o.
Hoihow, .....	.90 - .01	NE/E	3	b.
Hongkong, .....	.85 - .06	WSW	1	o.
Breaker Point, .....	.83 - .05	NE	4	cm.
Lamoeks, .....	.83 - .07	NNE	6	c.
South Cape, .....	.84 + .02	NE	3	cp.
Takow, .....	.81 + .01	NW	2	c.
Anping, .....	.80 .00	N	1	o.
Fisher Island, .....	.78 - .03	NNE	5	cm.
Chapel Island, .....	.82 - .06	NNE	6	c.
Turnabout, .....	.91 - .04	NNE	6	om.
Steep Island,	30.04 - .03	ENE	3	cv.
North Saddle, .....	.00 - .06	E/S	3	c.
Ichang,	29.90 .00	calm		o.

VESSELS.

Sch. <i>Santa Cruz</i> ,	SSW	70	18°	11'	118°	9'	SW	or.	high cross sea.
Bk. <i>Penshaw</i> ,	E/N	130	19	56	120	52	29.84 ? ESE	6	high cross sea.
S.S. <i>Don Juan</i> ,	N	100	21	14	118	46	.74 ESE	2	
Sh. <i>Albania</i> ,	W	190	19	18	115	26	N	3	b.
Bk. <i>Sachem</i> ,	W/N	210	19	45	115	6	N	8	high sea.
S.S. <i>Picciola</i> ,	W/N	220	19	56	115	2	.81 NNE	3	b.
„ <i>Kowshing</i> ,	WNW	200	20	51	115	33	.77 NE	6	heavy sea.
„ <i>Taksang</i> ,	WNW	280	21	3	114	14	NE	4	
„ <i>Yungping</i> ,	NW/N	240	22	50	115	59	NNE	5	fine.
„ <i>Ningpo</i> ,	NNW	240	22	54	116	26	.84 NE	4	c.
„ <i>Deuteros</i> ,	NNE	450	26	30	120	39	.96 NE	6	increasing sea.

On the 25th September at Bolinao (Luzon) the barometer was almost steady, the wind light SW to S breezes, and weather wet. The lower clouds came fast from the S. In Hongkong the barometer was falling with light airs and breezes chiefly from NW and W and clouded sky. The lower and upper (sm-cum) clouds came from N in the evening. At Victoria Peak the wind was NE 3 during the morning backing to NNW 3 in the afternoon. Pressure was decreasing moderately fast on the SE coast where moderate to strong NE to NNE breezes prevailed with cloudy weather. In S Formosa the barometer at noon showed a slight rise since the previous day but during the evening it commenced to fall rapidly at S Cape where gentle NE breezes with showery weather prevailed. Very heavy rain had fallen there between the 24th and 25th and 6.60 inches was measured at 9 a. on the latter day. On the East Coast the weather was fine with gentle E breezes and falling barometer.

On the 25th September the schooner *Santa Cruz* had the wind continuing to blow strongly from the SSW during the morning of the 25th decreasing towards evening. The barque *Penshaw* at noon in $19^{\circ} 56'$, $120^{\circ} 52'$ had the wind veering to ESE and increasing in force during the morning with high cross sea. During the afternoon the wind continued to veer and increase in force. At midnight she was hove to on the port tack under lower topsail and fore topmast stay sail, the wind at the time being a strong S gale with a high sea. The *Don Juan* at noon in $21^{\circ} 14'$, $118^{\circ} 46'$ steering S by E had the barometer falling rapidly (at 4 p. 29.66, 8 p. 29.54) with wind increasing in force from the East. At 8 p. a whole gale from E was experienced and at midnight a whole gale from W with the lowest reading of the barometer (29.38). Very heavy rain was falling between 8 p. and midnight.

Some vessels within 100 miles to the S and E of Hongkong had fresh NE breezes while the *Albania* and *Picciola* about 150 SSE of Hongkong had gentle N breezes and fine weather. The *Sachem* near those two vessels reports a fresh N gale and high sea. This force is doubtless over estimated.

The centre at noon on the 25th September was situated in 19° 30', 118° 45' and at midnight in 20° 20', 119° 30'. It was moving slowly (at about 5 to 6 miles per hour) towards NNE and had increased in intensity since the previous day.

Detailed observations for the 26th September are annexed for some of the stations in the neighbourhood of the Formosa Channel. The following are some additional observations for noon of the 26th:—

COAST STATIONS.

Bolinao,	29.87 + .03	SSE	1	o.
Hongkong, .....	.85 .00	W	2	c.
Steep Island, .....	.90 - .14	NE	2	em.
North Saddle, .....	.88 - .12	ENE	3	om.
Ichang, .....	.85 - .05	calm		o.

VESSELS.

Sch. <i>Santa Cruz</i> ,	SSW	250	17°	29'	119°	16'	SSW		c.	heavy sea.
S.S. <i>Don Juan</i> ,	SSW	200	18	41	119	36	29.79	W	3	high sea.
Bk. <i>Penshaw</i> ,	S	90	20	28	120	52	.69	SW	8	
Sh. <i>Albania</i> ,	WSW	330	19	27	115	31		calm		b.
Bk. <i>Sachem</i> ,	WSW	300	20	14	115	57		NNE	3	decreasing sea.
S.S. <i>Phra Chula Chom Klao</i> ,	W	400	21	40	113	29	.86	NNE	2	swell.
„ <i>Deuteros</i> ,	NW/W	180	23	54	118	12	.79	NNE	5	o.
„ <i>Ningpo</i> ,	NW	180	24	50	118	58	.76	NNE	4	o.

The following are the observations made at South Cape for the 26th and 27th over which place the centre passed at noon on the 26th:—

SOUTH CAPE.

Hour.	SEPTEMBER, 26.						SEPTEMBER, 27.					
	Bar.	Temp.	WIND.		Weather.	Rainfall. inches.	Bar.	Temp.	WIND.		Weather.	Rainfall. inches.
			Direction.	Velocity miles per hour.					Direction.	Velocity miles per hour.		
1 a.	...	...	NE	21	...	...	...	...	WNW	40	...	...
2	...	...	NE/E	24	...	...	...	...	...	27	...	...
3	29.75	75	ESE	21	ogmr	...	29.76	78	NW/W	32	c	...
4	...	...	ENE	9	...	...	...	...	WNW	38	...	...
5	...	...	E	15	...	...	...	...	...	29	...	...
6	.69	75	ESE	11	...	...	.79	79	...	39	...	...
7	...	...	E	23	...	...	...	...	W/N	35	...	...
8	...	...	E/S	31	...	...	...	...	WNW	33	...	...
9	.61	77	ESE	46	ogmqr	4.00	.83	80	NW/W	30	...	2.50
10	.39	...	E/S	47	...	...	...	...	...	24	...	...
11	.19	...	SE/E	59	...	...	...	...	W/N	35	...	...
Noon	.12	80	SSW	18	o m	...	.85	82	WNW	28	...	...
1 p.	.24	...	NW/W	76	...	...	...	...	W/N	23	...	...
2	.39	...	WNW	65	...	...	...	...	...	21	...	...
3	.55	75	...	47	ompq	...	.80	81	...	24	...	...
4	...	...	...	46	...	...	...	...	WNW	23	...	...
5	...	...	W/N	43	...	...	...	...	...	18	...	...
6	.67	78	...	34	...	...	.83	80	...	19	...	...
7	...	...	...	36	...	...	...	...	W/N	22	...	...
8	...	...	...	38	...	...	...	...	...	22	...	...
9	.75	78	...	37	...	...	.88	79	WNW	21	...	...
10	...	...	WNW	34	...	...	...	...	NNW	9	...	...
11	...	...	...	41	...	...	...	...	N/W	7	...	...
Midt.	.75	78	...	40	c m q	...	.94	76	...	6	...	...

On the 26th September light S breezes with rising barometer and cloudy weather prevailed in Luzon. Light airs and breezes chiefly from W prevailed at Hongkong with barometer rising towards evening and the sky clearing. At Victoria Peak there was NNE 2 during the morning backing to WNW 3 during the afternoon and becoming NW 3 at night. N to NE moderate to strong breezes prevailed in the Channel during the morning with cloudy weather and falling barometer. During the evening the barometer was rising again and at the S entrance to the Channel the wind backed to SW 3 and the sky cleared. At Fisher Island there blew N 8 during the afternoon backing to NNW 4 at midnight. At S Cape the wind commenced veering from NE at 3 a. but was no stronger than force 4 until after 7 a. Between 9 a. and 11 a. the barometer fell very rapidly, the wind being ESE a fresh to strong gale with rain the whole time. From the record of the anemograph it is seen that at 11.30 a. the wind commenced to veer from ESE and at 11.50 a. it fell absolutely calm, the direction

at that time being S by E. The calm lasted until 12.13 p. when the storm burst again from the WNW. The lowest reading of the barometer occurred at noon (29.12). It remained overcast while the calm lasted but no rain fell. The average rate of motion was about 10 miles per hour at this time and the central calm therefore corresponded to a diameter of about 4 miles. It blew with almost typhoon force for one hour immediately after the passage of the centre and then gradually decreased to force 7 at midnight preserving about the WNW direction, the weather being showery. The heaviest rainfall took place in front of the centre where also the steepest gradients were found and which corresponded to 0.3 inch in 15 nautical miles. The lowest barometer reading was about 0.8 inch below the normal. Fresh gales blew within 100 miles of the centre.

The *Don Juan* on the early morning of the 26th had the wind quickly decreasing to W 5 (barometer 29.77 rising) at 8 a. on the 26th as she steamed southward. The barque *Penshaw*, at 2.30 a. about 70 miles ESE of the centre, had the lowest reading of the barometer (29.50) with a whole gale from S with heavy sea. She was still hove to at noon in 20° 28', 120° 52' and the barometer had risen quickly and a fresh SW gale was blowing moderating however and the direction veering (at midnight WNW 6).

The following are some observations for the 27th September at noon:—

COAST STATIONS.

Bolinao,	29.91 + .04	SSW	1	c.
Hongkong, .....	.91 + .06	WSW	1	b.
Breaker Point, .....	.91 + .11	SW	1	bm.
Lamoeks, .....	.90 + .12	NNW	1	b.
South Cape, .....	.85 + .73	WNW	5	c.
Takow, .....	.87 + .21	NW	3	b.
Anping, .....	.87 + .20	NW/N	4	b.
Fisher Island, .....	.87 + .19	N	2	c.
Chapel Island, .....	.87 + .12	NE	1	c.
Turnabout, .....	.91 + .13	E	1	om.
Tamsui, .....	.94 + .17	N/E	1	c.
Keelung, .....	.87 + .19	NNE	1	c.

VESSELS.

Sch. <i>Santa Cruz</i> ,	17° 13'	120° 0'		SW		c.	
Bk. <i>Penshaw</i> ,	20 12	120 44	29.88	WNW	2		fine.
Sh. <i>Albania</i> ,	19 20	115 31		calm			
Bk. <i>Sachem</i> ,	20 16	115 30		W	1		fine.
S.S. <i>Deuteros</i> ,	22 19	115 1	29.93	WNW	2		fine.
„ <i>Tai Yick</i> ,	24 13	118 47	.90	NW	3	c.	
„ <i>Gaelic</i> ,	26 38	123 3	.80	N	7	o.	

On the 27th the barometer was rising at all stations particularly in Formosa and at the adjacent Channel stations, the weather being fine generally. At Takow and Anping moderate NW breezes prevailed. At S Cape the wind continued to blow from about WNW the whole day decreasing from force 7 in the early morning to force 3 at night. In N Formosa light NNE airs prevailed with detached clouds. The barque *Penshaw* had now fine weather and a light WNW breeze. The *Gaelic* about 100 miles to the NNE of N Formosa steering SW had a moderate N gale decreasing with rough sea, overcast sky and rising barometer. The centre was possibly at noon on the 27th in 23½°, 126° but this is very uncertain and afterwards it disappeared from observation:—

DATE.	Hour.	BREAKER POINT						LAMOOCKS.					
		Bar.	Temp.	WIND.		Weather.	Rainfall.	Bar.	Temp.	WIND.		Weather.	Rainfall.
				Dir.	Force.					Dir.	Force.		
September 26,	3 a.	29.89	75	N	4	o m	...	29.76	75	NNE	6	c	...
	6	.81	73	NW	2	c m	...	.78	75	...	4-5	...	...
	9	.85	81	N	2	c m	...	.80	78	NW	2	...	...
	Noon	.80	82	SW	2	b	...	.78	82	W	2	...	...
	3 p.	.77	82	...	3-4	b	...	.75	82	SW	2	...	...
	6	.79	79	...	4	b m	...	.79	78	...	3	...	...
	9	.84	78	...	4	b m	...	.84	77	...	3	b	...
	Midt.	.82	75	...	3	b m	...	.85	76	W	3	c	...

CHAPEL ISLAND.

TURNABOUT.

September 26,	3 a.	29.77	75	N	5	c	...	29.83	72	N	6	o m	...
	6	.80	75	...	4	...	...	.82	71	...	6	...	...
	9	.79	79	NNE	3	...	...	.81	74	...	7	g m	...
	Noon	.75	82	...	2	...	...	.78	75	...	7	o m	...
	3 p.	.71	86	ENE	1	...	...	.73	75	...	6	c m	...
	6	.74	78	...	1	...	...	.76	75	...	4	...	...
	9	.82	77	ESE	1	...	...	.84	75	NNW	5	...	...
	Midt.	.82	77	...	1	...	...	.83	74	...	5	c m w	...

DATE.	Hour.	TAKOW.						ANPING.						FISHER ISLAND.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force					Dir.	Force					Dir.	Force		
Sept. 26,	3 a.	...	...	...	...	...	29.74	77	NE	2	o r	...	29.71	76	NNE	6	c m	...	
	6	...	...	...	...	...	...	...	...	...	...	...	.73	77	...	6	o m g	...	
	9	29.72	74	NW	2	r	...	.72	76	...	3	...	0.44	.74	76	...	6	...	...
	Noon	...	...	...	...	...	...	...	...	...	...	...	.68	76	...	7	...	...
	3 p.	.60	78	NNW	10	sg	...	.63	79	N	7	o g	...	.67	76	N	8	o m q	...
	6	...	...	...	...	...	...	...	...	...	...	...	...	.72	77	...	6	c m	...
	9	.80	76	NNE	9	c	...	.82	77	...	4	o	...	.79	76	NNW	5	...	...
	Midt.	...	...	...	...	...	...	...	...	...	...	...	...	.83	77	...	4	...	...

OCTOBER.

During the first few days of October moderate NE monsoon prevailed on the China Coast and in the China Sea, and, in Luzon, light variable breezes the weather being fine generally.

The following observations are for the 7th October at noon :—

COAST STATIONS.

Bolinao,	29.75	-.08	NNE	3	c.
Hoihow, .....	.97	-.05	NE by N	3	b.
Hongkong, .....	.90	-.10	W by S	1	b.
Breaker Point, .....	.91	-.07	E	2	bm.
Lamoeks, .....	.89	-.11	NE	5	b.
S. Cape, .....	.84	-.04	NE	4	cmd.
Anping, .....	.82	-.10	N by E	3	b.
Fisher Island, .....	.83	-.08	N	6	cm.
Chapel Island, .....	.87	-.10	NNE	4	b.
Turnabout, .....	.93	-.09	N	5	om.
Steep Island,	30.03	-.05	ENE	3	c.
North Saddle, .....	.02	-.06	E by N	4	om.
* Kiukiang, .....	.01	+.01	var.	2	c.
* Ichang,	29.99	+.04	...	...	o.

* The barometer readings at the *Yangtze* Stations are uncorrected, the index errors and heights above M.S.L. being unknown.

VESSELS.

S.S. <i>Bombay</i> ,	7° 57'	109° 23'	29.86	SW	4	rq.	swell.
" <i>Ravenna</i> ,	12 22	111 8	.86	N	2		do.
" <i>Bantam</i> ,	12 50	112 45	.87	NNE	2		do.
Sch. <i>Santa Cruz</i> ,	15 49	126 54	.74	NW			
S.S. <i>Airlie</i> ,	14 13	119 47	...	NW	4	c.	
" <i>Don Juan</i> ,	15 2	119 13	.71	N	3		high sea.
" <i>Sungkiang</i> ,	15 48	119 4	.71	N by E	6		do.
" <i>Kowshing</i> ,	17 33	117 53	.77	NNE	6	c.	
" <i>Cosmopolit</i> ,	19 53	116 1	.87	NE	6	b.	increasing sea.

On the 7th October the barometer was falling rapidly on the China Coast with moderate NE breezes and fine weather except at S Cape where drizzling rain was falling. In Luzon the barometer had also fallen quickly with a gentle NNE breeze at Bolinao and cloudy weather. Off the W coast of Luzon moderate to strong N breezes with high sea prevailed. On the western side of the China Sea in $12\frac{1}{2}^{\circ}$, 112° light N breezes were blowing and the *Bombay* to the SSW of that position in 8° , $109\frac{1}{2}^{\circ}$ had W to SW moderate breezes veering to N 3 as she proceeded northwards with squally wet weather, falling barometer and confused swell.

The schooner *Santa Cruz* at noon on the 6th October in $17^{\circ} 7'$, $125^{\circ} 18'$ (barometer 29.94) already had an increasing NNE breeze, falling barometer and rising sea. They put two reefs in the mainsail and made the upper topsail fast. Next morning it began to blow hard and the sea to run clean over the small vessel. They kept her two and a half points off, steering SE by S to keep the deck dry and in the hope of running out of the typhoon. Mainsail and jib were made fast at 4 a. (barometer 29.80). At 9 a. it blew hard from the north and the vessel worked fearfully in the tremendously high sea. At noon on the 7th in $15^{\circ} 49'$, $126^{\circ} 54'$ (barometer 29.71) the wind had backed to NW and continued increasing in force. At 3.30 p. they had to heave her to under double reefed foresail—the wind had backed to WNW. Sea after sea came breaking over the ship carrying the starboard boat with its davits away, breaking on the after hatch and washing the binnacle stand and compass overboard and the cargo shifted to starboard. At 8 p. (barometer 29.59) they lost the jibboom and at midnight part of the bulwarks on the starboard bow was stove in. The galley was smashed in and one tank got adrift.

The centre at noon on the 7th October was perhaps in $15\frac{1}{2}^{\circ}$, 130° .

The following are the observations for the 8th October at noon :—

COAST STATIONS.

Manila,	29.66	-.09	WSW	1	c.
Bolinao, .....	.66	-.09	N	4	o.
Hoihow, .....	.94	-.03	NE	3	b.
Hongkong, .....	.89	-.01	N by E	3	b.
Breaker Point, .....	.87	-.04	NE	3	cm.
Lamoeks, .....	.89	.00	NE	4	b.
S. Cape, .....	.76	-.08	NNE	4	c.
Anping, .....	.78	-.04	NNE	4	b.
Fisher Island, .....	.78	-.05	N	7	omq.
Chapel Island, .....	.86	-.01	NE	6	cm.
Turnabout, .....	.93	.00	NNE	7	om.
Steep Island,	30.05	+.02	NE	4	c.
North Saddle, .....	.05	+.03	NE	6	o.
Kiukiang, .....	.04	+.03	NE	2	c.
Ichang, .....	.02	+.03	SE	1	b.

VESSELS.

S.S. <i>Bombay</i> ,	11° 35'	111° 21'	29.77	NNE	5	p.	
" <i>Bantam</i> ,	15 38	113 24	...	NNE	6		high irregular sea.
" <i>Ravenna</i> ,	15 55	113 6	.79	NNE	5		high sea.
Sch. <i>Santa Cruz</i> ,	15 50	127 0	28.81	WSW	12	oqr.	heavy confused sea.
S.S. <i>Zafiro</i> ,	16 17	118 50	29.71	NNE	4	og.	increasing sea.
" <i>Cosmopolit</i> ,	16 52	118 31	.71	NE	7	o.	high sea.
" <i>Airlie</i> ,	17 11	118 6	...	NE	5		moderate sea.
" <i>Don Juan</i> ,	17 50	117 37	.70	NE	6		
" <i>Sungkiang</i> ,	18 39	116 48	.69	NNE	6	op.	
" <i>Kowshing</i> ,	21 21	115 16	.88	NE by N	6		heavy sea.
" <i>Taisang</i> ,	24 46	118 48	.87	NE	6		fine, high sea.

From the above observations it is seen that a rapid fall in the barometer had taken place in Luzon. At Manila there was a light W to SW breeze and at Bolinao a moderate N breeze. The sky was clouded. At S. Cape pressure was decreasing rather rapidly. The weather was fine with moderate NNE breeze.

On the S and SE China Coast the barometer was falling slightly and NE to NNE moderate breezes with fine weather prevailed. Strong N to NE breezes prevailed in the north and central parts of the Formosa Channel. On the East Coast and along the Yangtze the barometer was rising slightly with NE fresh to strong breezes off the Coast. The mean temperature on the 8th October for the 24 hours was in excess at Hongkong, being 3° above the mean. At S. Cape the mean of tri-hourly observations of temperature was 80°, at Chapel Island 75°, at Turnabout 73°, at N. Saddle 70°. Fresh to strong NNE breezes prevailed in the middle of the China Sea and as far South and West as 11°, 111° as shown by the log of the *Bombay*. Off the NW coast of Luzon strong NNE breezes to moderate gales were experienced by several vessels and a high sea was general. The *Cosmopolit* steaming SSE had the barometer falling until midnight (29.62) the wind backing and decreasing and the sea going down.

The schooner *Santa Cruz* (barometer 4 a. 29.20) at 5 a. on the 8th lost part of the bulwarks on the poop which caused the cabin to be flooded with two feet of water and the water to run down the cabin hatch on top of the cargo. At 5.30 a. the ship was laying on its beam ends and as everything was afloat on deck and the ship in a sinking condition they cut away the masts and after they went overboard she righted herself somewhat. There was now five feet of water in the hold and all hands were at work clearing the decks and working the pumps. The rain was pouring down and it was blowing fearfully hard. The wind was changing all the time as the vessel was carried helplessly around the centre. At noon on the 8th the barometer read 28.78, at 8 p. 28.70, but these readings are hardly to be trusted. The position of the vessel was, of course, not properly known, but at noon on the 7th she was in 15° 49', 126° 54', and at noon on the 12th in 15° 53', 127° 45' and how she drifted about in the meantime we do not know.

The centre was on October 8th at noon in 16°, 127° moving north-westward.

The following observations are for the 9th October at noon :—

COAST STATIONS.

Manila,	29.61	-.05	W	3	c.
Bolinao, .....	.61	-.05	N	5	or.
Hoihow, .....	.94	.00	NE	4	b.
Hongkong, .....	.82	-.07	NNW	3	b.
Breaker Point, .....	.77	-.10	N	2	c.
Lamoeks, .....	.80	-.09	NNE	6	cm.
S. Cape, .....	.50	-.26	NNE	7	cmq.
Takow, .....	.57	-.22	N	6	c.
Anping, .....	.61	-.17	N by E	5	o.
Fisher Island, .....	.61	-.17	N	9	cmq.
Chapel Island, .....	.72	-.14	NE	7	cm.
Ockseu, .....	.76	-.11	NE	8	cm.
Turnabout, .....	.88	-.05	NNE	10	cm.
Middle Dog, .....	.90	-.02	NNE	6	cm.
Steep Island,	30.09	+.04	NE	5	c.
North Saddle, .....	.08	+.03	NE	7	cv.
Kiukiang, .....	.01	-.03	NE	3	c.
Ichang, .....	.02	.00	...		b.

VESSELS.

Sch. <i>Santa Cruz</i> ,	(16° 0'	127° 0')?	...	SW	orq.	
S.S. <i>Tahsang</i> ,	10 21	121 59	...	W	6	orq. moderate sea.
" <i>Cosmopolit</i> ,	13 15	120 21	29.66	NW	4	o.
" <i>Pakshan</i> ,	14 46	112 6	.79	NNE	5	orq. heavy sea.
" <i>Bombay</i> ,	14 48	112 44	.77	NNE	5	rough sea.
" <i>Bantam</i> ,	18 1	113 43	...	NE by N	6	o. heavy sea.
" <i>Ravenna</i> ,	19 23	113 29	.83	NNE	6	o. high sea.
" <i>Zafiro</i> ,	19 12	116 20	.69	N	7	increasing sea.
" <i>Airlie</i> ,	19 43	116 17	...	N by E	7	c. high sea.
" <i>Don Juan</i> ,	20 24	115 42	.74	NE	7	moderate sea.
" <i>Sungkiang</i>	21 34	114 40	.79	N	5	b. high sea.
" <i>Verona</i> ,	23 20	117 41	.78	NNE	8	fine, high sea.
" <i>Empress of China</i> ,	23 48	118 14	.85	NE	7	c.
" <i>Empress of Japan</i> ,	24 23	118 52	.79	NE	8	high sea.
" <i>Choysang</i> ,	25 47	120 20	.92	ENE	7	o. do.
" <i>Taisang</i> ,	26 19	119 58	.90	NNE	7	
" <i>Protos</i> ,	26 31	120 53	.96	NNE	9	do.
" <i>Nanchang</i> ,	27 12	121 19	.95	NNE	6	b.
" <i>City of Peking</i> ,	27 17	123 26	.95	NNE	5	o. moderate sea and swell
" <i>Bokhara</i> ,	(27 50	122 0)?	...	NE	6	
H.I.A.M. Fr. <i>Fasana</i> ,	28 0	121 50	30.00	NE	7	
S.S. <i>Cyclops</i> ,	28 5	121 55	29.97	NNE	6	o.
" <i>Phra Nang</i> ,	28 28	123 44	.96	NNE	5	b.
" <i>Fu Ping</i> ,	32 16	122 56	...	NE	4	b.

On the 9th October the centre of the typhoon was in 19° , $123\frac{3}{4}^{\circ}$ and it was still moving north westward. The following is a summary of the weather prevailing at the coast stations on that day. In Luzon the barometer continued falling during the morning hours with gentle SW to W breezes and cloudy weather in S. Luzon. At Bolinao (NW Luzon) the wind increased in force from N with rain and at 8 a. it had backed to NW by N and blew a fresh gale, the lower clouds coming from the same direction as the wind. During the afternoon and evening the wind moderated and was from NW and WNW force 4, the weather being squally and showery and the barometer commencing to rise. Around the Gulf of Tonking pressure had not changed since the previous day, but during the evening the barometer commenced falling. N to NE moderate and fresh breezes with fine weather prevailed. The barometer was falling on the SE coast of China and in Formosa moderately fast at Hongkong, but very rapidly at those stations near S. Formosa and particularly so at S. Cape where the decrease amounted to a quarter of an inch during the previous 24 hours. On the East Coast the observations show a slight rise of the barometer since noon of the 8th October while along the Yangtze pressure had varied but little.

Gradients for NE winds had become very steep and were increasing between the northern entrance to the Formosa Channel and S. Cape and N to NE fresh and strong gales increasing with high sea prevailed in the Channel during the day, the sky being partially clouded. At night the sky became overcast and a whole NNE gale was blowing at Turnabout and Fisher Island. The observations recorded at S. Cape between October 9th at 1 a. and October 11th midnight are annexed. They show that the barometer continued to fall very rapidly during the evening and that the wind had increased to a fresh gale from N by E with rain squalls. Very heavy continuous rain was falling at Tamsui in N Formosa with a strong ENE breeze, the barometer falling but moderately fast until the evening when the fall was accelerated and the wind became NNE 10. Very fine weather prevailed at the East Coast stations with chiefly moderate to fresh NE breezes. At N. Saddle a moderate NE gale. At Hongkong the weather was very fine and the temperature high, the mean of the 24 hours being 79° . 1. A gentle NNW breeze prevailed and some sm-cum. cloud came from N. At Victoria Peak there was a fresh NNW breeze. The mean temperature for some of the stations on October 9th was as follows:— Hongkong 79° , Swatow 81° , Lamocks 76° , S. Cape 77° , Fisher Island 74° , Chapel Island 74° , Turnabout 71° , Foochow 74° , Steep Island 70° , North Saddle 68° , Kiukiang 70° . At Hongkong and Swatow temperature was in excess, at the other stations it was about normal. The weather experienced by vessels at sea on the 9th October was as follows:—

The schooner *Santa Cruz* at noon in the approximate position of 16° , 127° had strong SW winds and decreasing sea. The *Bombay* and *Pakshan* in about 15° , $112\frac{1}{2}^{\circ}$ had fresh NNE breezes, squally wet weather and rough sea with almost steady barometer (on *Bombay* at 8 p. 29.75). Several vessels to the South of Hongkong in the northern part of the China Sea had strong NNE breezes and moderate gales with the direction backing a little towards evening as they steamed northwards. A high sea was running, the sky was partially clouded and the barometer falling slightly. Vessels approaching Hongkong from the Eastward had strong NNE breezes backing and decreasing. The character of the weather in and near the Formosa Channel may be seen from the detailed logs of some vessels and also from the observations made at the lighthouse stations which are appended. In general it may be stated that during the evening NNE fresh to whole gales blew throughout the Channel, the force being somewhat lighter in the southern portion. Whole gales were blowing between Fisher Island and Turnabout, and there was a very turbulent sea. The *Choysang*, *Protos*, *Empress of Japan*, *Formosa*, *Ly-ce-mun* and *Glengarry* were between Amoy and Turnabout during the evening and experienced

NE to NNE strong and whole gales, the record of the *Choysang* describing the squalls as of "hurricane force." The *Glengarry* left Foochow for Amoy at noon and during the evening had 90 tons of coal, which she was carrying on deck, washed overboard. She was hove to for one hour at 8 p. near Turnabout, but afterwards proceeded for Amoy, the weather getting worse all the time.

Vessels approaching the northern entrance to the Channel from the N and NE had the wind rapidly increasing and the barometer falling quickly. Among these were the *Phra Nang*, *Nanchang*, *Kaifong*, *City of Peking*, *Fasana*, *Cyclops* and *Bokhara*. The latter vessel was subsequently wrecked with great loss of life. She left Shanghai for Hongkong at noon on October 8th and experienced ordinary fresh NE monsoon until the afternoon of the 9th when the wind commenced to increase in force and the barometer to fall. At 8 p. she was estimated to be 8 miles East of Tung Ying, the latter being situated in $26^{\circ} 23'$, $120^{\circ} 31'$. The vessel's course was then altered to make Turnabout and at 10 p. (barometer 29.77 uncorrected) everything was secured and preparations made for heaving the ship to, her Commander and Officers suspecting a typhoon to the Southward. At this time there was a heavy sea and the vessel was taking heavy water on board.

The Austrian corvette *Fasana* bound for Hongkong had been passed by the *Bokhara* during the morning and the *Cyclops* was also not far behind. The former vessel reports having seen the land the whole time, while on board the *Bokhara* no land was seen. The *Taisang* was at noon about 20 miles north of the White Dogs proceeding northwards. Captain HOGG states that during the day time of the 9th he could see 30 to 40 miles and at night about 10 miles. It therefore appears probable that the *Bokhara* was to the Eastward of her supposed position at 8 p. the currents prevailing at such times being often exceptionally strong. The *Taisang* had the wind decreasing as she steamed northwards, but there was a tremendous sea from SE with waves 400 feet long.

The following are some observations for noon on October 10th which are not included in the appended detailed observations :—

COAST STATIONS.

Bolinao,	29.71 + .10	W	1	o.
Kiukiang,	30.02 + .01	NE	5	b.
Ichang, .....	.00 - .02	N	1	b.

VESSELS.

Sch. <i>Santa Cruz</i> ,	(16° , 127°)?	...	S		q.	
S.S. <i>Cosmopolit</i> ,	at Iloilo.	29.79	S	5		
" <i>Taksang</i> ,	$13^{\circ} 36'$ $120^{\circ} 7'$	.79	WNW	4	bq.	increasing sea.
" <i>Catherine Apear</i> ,	7 44 108 17	.88	NW	4	q.	swell.
" <i>Bombay</i> ,	17 47 113 29	.72	N	4		high sea.
" <i>Bantam</i> ,	20 23 113 56	...	NNW	7		
" <i>Zafiro</i> ,	21 57 114 6	.68	NNW	5	b.	
" <i>Pekin</i> ,	25 5 119 5	...	NE	9		high sea.
" <i>Nurnberg</i> ,	34 34 134 47	30.00	calm.		c.	

On the morning of the 10th October the typhoon was advancing in a N by W direction and directly upon South Cape (Formosa). The barometer was falling at that station about 0.05 inch per hour on an average between 1 a. and 9 a. The wind had veered since the previous evening and was from NE force 8 until 5 a. when it commenced to veer steadily and to increase in force. The barometer fell very rapidly after 9 a.—over 0.1 inch per hour—and at 11 a. the wind had attained full typhoon force from E by N. The lowest reading of the barometer was made at 1 p. 28.28, this being about 1.6 inches below the normal. There was then typhoon force of wind from SE by E. After this hour the barometer rapidly rose and the wind continued to veer but force 12 continued until after 3 p. and then it quickly decreased. At 6 p. the force had dropped to 7 and it maintained that force from about SW during the remainder of the evening. The centre passed perhaps within 10 miles to the west of S Cape about 1 p. There was at that time no trace of any decrease of wind velocity as shown by the anemograph curve neither was there any partial clearing of the sky or diminution of rain which fell continuously the whole day. The steepest gradients near the centre corresponded to about 0.3 inch in 15 nautical miles. The weather prevailing at the other stations during the morning of October 10th may be briefly described as follows :—At Bolinao (NW Luzon) light to gentle W breezes, overcast sky and rising barometer, at Hoihow fresh W breezes, clear sky and steady barometer. At Hongkong the barometer was slightly falling and there was a gentle breeze from NNW to NW with partially clouded sky. In the neighbourhood of Swatow the barometer was falling and the wind a moderate to strong breeze from NNW to NW with detached clouds. At Anping and Takow a fresh increasing NE backing gale was blowing with light rain and rapidly falling barometer. At Fisher Island and Turnabout the barometer was falling but moderately fast and a storm was blowing from the NNE with occasional drizzling rain. At the former station at 1.37 a. on the 10th a bright red glare spread over the whole sky which was observed by the keeper in charge and the assistant on watch to have lasted five seconds and then to have vanished as suddenly as it appeared. At Tamsui the barometer was falling rather slowly with a whole gale from NNE with heavy rain squalls

decreasing to a strong breeze at noon. The observations are from the log of the *Fokien* at anchor in the port. NE fresh increasing breezes were felt at the east coast stations with the weather becoming wet and the barometer falling. Fine weather with almost steady barometer prevailed along the Yangtze.

The centre of the typhoon entered Formosa soon after passing to the west of S Cape and moved northward but it at once commenced filling up. An inspection of the detailed observations printed elsewhere shows that two maxima of wind force and two minima of the barometric readings were observed by some stations or vessels near the N entrance to the Channel, the first occurring before the centre entered the land, when the depression at the centre was excessive, and the second as it approached the station or vessel in its diminished intensity. Some stations do not exactly show the two minima of the barometric readings, but it is seen that the barometer remained steady or almost steady for some hours as the typhoon approached, showing clearly that it was filling up as it advanced towards them. With respect to the wind force this is perhaps not so distinctly seen except in the case of the observations recorded on board the *Fokien* lying at Tamsui, the gradients existing for N winds being excessively steep the whole time owing to the comparatively high pressure prevailing over the interior of China. In fact the chief characteristic of this typhoon in the latter part of its course was the effect produced by the combination of a strong monsoon and the winds due to the typhoon itself and a reference to the detailed observations shows that in the left hand semi-circle the wind in most cases backed but very slightly as the typhoon approached and passed northward. Its influence quickly disappeared and the prevailing N wind was soon again experienced. At Tamsui in the right hand semi-circle N winds were established a few hours after the centre passed the station.

During the afternoon and evening of the 10th October the centre was moving about N by W inland on the west side of Formosa. The lowest reading of the barometer was registered at both Takow and Anping at 6 p., the reading at the former station being 28.91 and at the latter 29.00. The centre was about 20 miles ESE of Takow at the time and it is evident from these observations that a great change had already taken place as regards the depth at the centre during its passage over the land. Whole gales were blowing at both stations from NNE at Anping and between NNE and N at Takow with overcast sky and gloomy appearance at both stations. At Fisher Island about 70 miles NW by N of Takow the lowest reading of the barometer was 29.06 at 4 p. and the wind was of typhoon force from the NNE.

During the six hours from 6 p. until midnight the typhoon moved very slowly, its rate of progress northwards being diminished by the friction caused by the hilly country to the East of Takow and Anping and also to the strength of the N winds blowing into it, being penned up so to speak by the high mountain chain to the eastward, and at this time the depression at the centre was again much reduced. At 9 p. it was about 20 miles to the East of Takow and at midnight about the same distance E by S of Anping. A strong N gale blew at Takow during the evening with rain and rising barometer. At Anping the wind veered to NE of force 10 at 9 p. continuing the same direction but moderating to force 8 at midnight. From 3 p. to 9 p. it blew with full typhoon force in the squalls. Rain set in at 11 p. Mr. STRANGMAN, the observer, adds: "Considerable damage has been done to the roofs of foreign houses, large quantities of tiles having been blown away. Many native houses are level with the ground. The shipping did not suffer, the water being low." At Fisher Island typhoon force continued until 8 p. from NNE after which hour it decreased to force 11 remaining thus until midnight. Drizzling rain commenced at 9 p. and rain at 10 p.

The weather during the afternoon and evening of the 10th October in other districts was as follows. At Hongkong light to moderate NNW breezes with rising barometer, and fine weather prevailed. Some c-str cloud was observed to come from the NNW. At Victoria Peak fresh to strong NNW breezes were blowing. In the neighbourhood of Swatow moderate to strong NW breezes were blowing with rising barometer and cloudy sky. At Chapel Island there was a strong N backing and decreasing gale with drizzling rain commencing at midnight. At Turnabout the wind increased in force during the afternoon and blew with typhoon force the whole evening from N and NNE, with occasional drizzling rain. The barometer showed a slight fall when the daily variation is allowed for between 3 p., and 10 p., but after the latter hour it fell rather faster again as the typhoon advanced northward. At Tamsui there was a fresh NNE breeze increasing towards midnight with heavy rain squalls at times and falling barometer. The barometer was falling slowly on the East Coast and the wind increasing in force from the NE and rain was falling in the southern part of the district. There was a very slight decrease of pressure at the Yangtze stations where light to moderate NE breezes prevailed and very fine weather.

Some account of the experiences of vessels at sea on October 10th may now be given:—

The schooner *Santa Cruz* to the Eastward of Luzon in 16°, 127°, approximately, had S winds and squally weather. The *Cosmopolit* near Iloilo in the morning had strong S to SW breezes and wet squally weather with rising barometer. The *Taksang* off the SW coast of Luzon had W to WNW moderate breezes, squally weather and heavy N sea during the evening. Fresh NNW breezes and moderate gales were experienced during the morning by vessels approaching Hongkong from the

southward with rough sea and fine weather, and fresh NE monsoon weather prevailed in the China Sea with high sea and N swell. Vessels approaching Hongkong from the Eastward had fresh NNW to NW breezes and fine weather.

The *Choysang* was a little South of Chapel Island at 2 a. and had then a strong NNE gale backing and moderating (NW 6 at 8 a.) as she steamed SW and became farther to the West of the centre. The sky also cleared to some extent. The barometer was falling but slightly.

The *Protos* which entered the Channel from the N early in the evening on the 9th bound for Hongkong was about 70 miles ahead of the *Bokhara* and had then a NE by N whole gale and falling barometer. She however went ahead on the starboard tack, wind and sea increasing all the time. At 8 a. on the 10th she experienced full typhoon force from the NNE which continued until noon. She was at the latter hour 150 miles NW by N of the centre. She sustained some damage losing one boat, two others being stove in, the two companion ladders were carried away and the engine room skylights smashed in. After noon the wind decreased in violence and towards evening it backed (at midnight N 6).

The Austrian corvette *Fasana* was also bound for Hongkong from the northward. She was at 8 p. on the 9th about 35 miles NNE of the *Bokhara's* estimated position at that time. The *Fasana* was then under sail, but as the wind and sea were increasing they kept their course but got up steam so that they might get along faster. At 8 a. on the 10th October the vessel was a little to the SE of Ockseu and had a N by E storm with rain and the wind direction backing a little. At 9 a. the clouds were flying very low near sea surface and this in conjunction with sea spray made it impossible to see more than a ship's length ahead. At noon flying spray like heavy rain prevented the lookout from being of any use at all. At 1 p. she was about 35 miles E of Chapel Island and 170 miles NW $\frac{1}{2}$ N of the centre and had typhoon force from the N with high confused sea. The lowest barometer reading was made at 2 p. (29.36), and at 2.30 the rise of the mercury commenced with wind N by W force 11 decreasing, and appearance of improving weather. During the evening the wind backed to WNW force 7 with overcast weather and occasional rain.

The *Nanchang* was another vessel bound for Hongkong and about 30 miles in advance of the *Bokhara*. She experienced a whole NNE gale, but sustained little damage.

The *Kaifong*, which was about four hours behind the *Nanchang* at Turnabout, sustained a great deal of damage. Her log book was lost from the wheelhouse which was stove in and no meteorological data observed on board this ship are therefore available. She lost one boat, the engine room skylights were carried away and much water got into the stoke hole rendering it difficult to keep up steam.

The *Formosa* and *Ly-ee-mun* were between Dodd Island and Turnabout working their way up the coast under the land. They both went into shelter as soon as opportunity offered, the former in Pinghai Bay and the latter in Hungwha Sound. They experienced NE to NNE whole gale during the day with very heavy squalls of typhoon force and there was a very heavy sea. The experience of these two coasting vessels shows that by keeping under the land they gained some advantage. They had the wind somewhat less fierce and, perhaps, not so bad a sea as encountered by those vessels farther out and more in midchannel. The dangerous sea already prevailing at the north and narrow part of the Channel when a typhoon is even yet at some distance to the southward should be taken note of and steps taken early by shipmasters to avoid it.

The *Phra Nang* entered the Channel bound for Hongkong during the morning. At noon she was about 10 miles SSE of Turnabout and 220 miles N by W of the centre and had the barometer falling rapidly with a strong NNE gale. At 4 p. there was a NNE storm blowing and a mountainous sea. She had then a lifeboat smashed and others damaged. At 5 p. she was hove to on the port tack, the barometer reading 29.20 (lowest). The barometer then commenced rising slowly, but at 8 p. they had typhoon force from N with a terrible sea and such as her Commander had never experienced during nine years on the China Coast. Towards midnight the wind commenced backing and decreasing slowly in force.

The *Empress of Japan* was about 20 miles NE of Turnabout at noon on the 10th and 240 miles N by W of the centre. They had a whole N gale veering to NE at midnight with a very high sea and falling barometer. This vessel was steering northwards and went full speed using Sir W. THOMSON'S sounding machine the whole time, but only made about 40 miles during the 24 hours between noon of the 10th and 11th.

The *Cyclops* was another vessel coming down from the north a few hours behind the *Bokhara*. At 1.30 a. on the 10th the vessel was anchored under Tungsha (White Dogs) for shelter and remained there until the morning of the 11th. On the 10th she experienced in the morning a strong NNE gale which increased to between a whole gale and storm from the same direction during the evening. Continuous heavy rain fell with heavy squalls during the afternoon and evening.

The *City of Peking* approaching the northern entrance to the Channel was hove to on the port tack before 4 a. on the 10th. The barometer was falling quickly at the time and there was a strong

NE gale blowing. At noon she was about 40 miles ENE of Turnabout and 230 miles N of the centre. During the latter part of the day she experienced a whole gale from NE by N with rain and hard squalls and a very heavy sea.

The *Taisang* off the East Coast steaming northwards had the wind again increasing and the barometer falling on the morning of the 10th, so at 11.30 a. the vessel was taken into shelter under Taichow ($28^{\circ} 28'$, $121^{\circ} 50'$). They paid out 100 fathoms of chain with the port anchor, and 70 fathoms with the starboard anchor and had a third anchor ready astern in case it was wanted. They had a fresh to strong NNE gale during the evening.

The *Fu Ping* off the East Coast in $28^{\circ} 36'$, $121^{\circ} 52'$ at noon on the 10th had a strong N gale increasing as she steamed southward and at 6 p. was anchored under Taluk Island ($28^{\circ} 4'$, $121^{\circ} 31'$) for shelter. During the evening a whole gale from NNE with rain squalls was experienced.

The *Wo Sang* which left the Yangtze river in the morning on the 10th had the barometer falling and the wind increasing to a fresh NE gale at midnight with high sea and falling barometer as she steamed southward.

The *Benlarig* and *Deuteros* were at noon on the 10th in about 32° , $126\frac{1}{2}^{\circ}$ steering SW. They experienced NE fresh increasing breezes with high sea and rainy weather and barometer beginning to fall.

The *Bokhara* as already stated was at 8 p. on the 9th October put on a course to make Turnabout. This lighthouse, however, was not sighted. At 1.45 a. on the 10th October, the vessel was hove to on the port tack heading between $N 50^{\circ} E$ and $N 80^{\circ} E$, her position then being—as determined by the Court of Enquiry which subsequently sat to determine the cause of the loss of the vessel—about $21\frac{1}{2}$ miles SSW of Turnabout, but perhaps she may have been a little to the eastward of this. At this time the wind was gradually increasing in force from the NNE with furious squalls and a mountainous sea and the barometer falling. The weather was so thick that they could only see half a mile. At 4 a. the barometer read 29.60, at 6 a. 29.55, at 8 a. 29.50. At the latter hour, the wind and sea being terrific from the NNE, efforts were made to put the vessel on the other (starboard) tack, but she would not come up even with the aid of tarpaulins in the rigging. The sails on being loosed were blown to pieces. Attempts were then made to wear, but this was found to be impossible also. Unfortunately no storm canvas was ready. At 10 a. the wind reached full typhoon force. The vessel rolled fearfully and much damage was done at this time. Between 10 a. and noon (barometer 29.27) the engines had been stopped to prevent the vessel forging ahead, and the vessel fell off into the trough of the sea and between 10 a. and 2 p. further damage was done: boats, gangways, bulwarks, etc. being swept away, and at 2 p. she had only one boat left. Oil was put into the weather latrines aft and forward and considerable relief was obtained, the heavy seas being prevented from breaking on board to some extent. At 4 p. (barometer 29.15) the wind still continued to blow with terrific force from NNE and after that hour the barometer remained practically steady (at 8 p. 29.15) with much the same wind and weather. For some reason the supply of oil does not appear to have been constantly kept going, and at 10 p. the vessel took some heavy seas which did further damage, breaking in after skylights, commander's cabin, wheelhouse, engine room skylight and stokehold doors, thus putting out the fires below and causing the vessel to become quite unmanageable. At 11.35 p. land was seen on the lee beam and a few minutes afterwards the vessel struck on what afterwards turned out to be Sand Island, a northern island of the Pescadores group, and immediately broke up, the greater part of the ship's company being lost.

At the time the vessel was hove to (1.45 a. on the 10th) she was about 300 miles NNW of the centre of the typhoon which continued to advance towards her position the whole day. At noon she was about 170 miles NNW of the centre. At 6 p. 100 miles NW by $N \frac{1}{2} N$ and when she struck 70 miles NW. The readings of the barometer taken on board which are uncorrected show no change after 4 p. This indicates a slight fall, however, when daily variation is allowed for, but as the typhoon centre was now on the land and rapidly filling up the readings remaining almost steady is accounted for although the centre was gradually approaching. The wind was from NNE the whole time and blowing with typhoon force from perhaps 10 a. until the time the vessel struck.

There is no doubt that had this vessel run on the starboard tack she would have come through safely. She would not have had typhoon force at all and the weather would have quickly moderated. Those vessels who adopted this course did not all escape without damage, but they quickly ran out of the worst part of the storm and brought themselves to the W and SW of the centre. Vessels in the northern part of the Formosa Channel where such a dangerous sea prevails and where, with a typhoon to the southward, the wind is relatively much stronger owing to its being confined, should on the weather becoming bad. seek shelter early. The *Bokhara* was helplessly drifting for some hours, her officers thinking that she was being set to the SW on a safe course, whereas it appears that she was set S by W at the rate of about 4 knots per hour and in a direction almost opposite to that of the wind. The fact that she was allowed to fall off and lie beam on to wind and sea doubtless accelerated the speed with which she drifted.

The current running down the China Coasts from the Yellow Sea at this time of year was certainly much increased by the strong NNE winds prevailing along the East Coast.

The following are some observations for October 11th not included in the detailed observations:—

COAST STATIONS.

Bolinao,	29.81 + .10	var.	2	c.
Kiukiang,	30.05 + .03	NE	5	b.
Iehang, .....	.01 + .01	var.	1	b.

VESSELS.

Sch. <i>Santa Cruz</i> ,	16°	127°	...	...	3	b.	sea smooth.
S.S. <i>Taksang</i> ,	16° 36'	118° 12'	...	WNW	3	b.	
„ <i>Catherine Apear</i> ,	10 55	110 21	29.92	NNE	5		high sea.
„ <i>Bombay</i> ,	21 3	113 52	.82	N by W	5		moderate sea.
„ <i>Activ</i> ,	21 39	112 58	.88	NNW	4	b.	swell.

During the early morning of the 11th October the centre continued advancing northward, its rate of motion being accelerated at this time. The wind at Fisher Island and Anping was decreasing in force and backing, but at the former station it continued to blow a whole gale from the NW until 5 a. with rain, the centre being at 5 a. 90 miles to the NE of the station. At noon there was a moderate WNW gale with light rain and barometer rising rapidly. At Anping the wind force decreased after midnight of the 9th and blew only a moderate to strong breeze from N for 3 hours. At 4 a. 10th it freshened again from NW and blew a strong gale decreasing and backing to WNW force 7 at 9 a. The weather was wet and the barometer rising. At Turnabout the barometer was almost steady during the early morning of the 10th, but there it was blowing with typhoon force from N until 3 a. (centre 90 miles SSE) when it decreased a little. Between 6 a. and noon the barometer was rising and the wind was between N and NNW the force having decreased to 10 at the latter hour. Drizzling rain fell occasionally. From the observations made on board the *Fokien* at anchor at Tamsui it is seen that the barometer fell sharply until 5 a. 10th with wind increasing and veering after midnight of the 9th. It blew a whole gale from E at 4 a. and from ESE at 5 a. (barometer 29.37 lowest) with squalls of typhoon force. The barometer rose quickly between 5 a. and 8 a. and the wind continued veering and moderating. At noon it was from W force 5. Heavy rain was falling. The typhoon had now commenced to move towards the NE. After noon the barometer rose very rapidly and the wind became NW and N a moderate breeze with less rain. The centre was 35 miles SW $\frac{1}{2}$ W of Tamsui at 6 a. and 40 miles to the north of the station at noon.

The weather experienced in other districts on the 11th October was as follows:—At South Cape a fresh gale from WSW with rain during the early morning and rising barometer. During the remainder of the day a moderate to fresh gale chiefly from WNW prevailed at this station with clouded sky, but the barometer did not rise so quickly as at the other stations in the vicinity. In fact the readings were between one and two tenths lower during the evening than those of Anping and Fisher Island, the cause of which may be ascribed to first the usual gradient prevailing at this season of the year (to which the prevalence and force of the N wind was due) and secondly to the fact that owing to the mountain chain running N and S through Formosa, the air is penned in at those places which have the mountains to the E of them and this caused the air pressure to be higher than at freely exposed stations. For a similar reason the air-pressure on the East Coast of Formosa where there are no stations must have been deficient while at S Cape the air is free to escape and for this reason also the wind is deflected towards the W at the latter station.

On the SE coast to the S of Amoy gentle to fresh N and NW breezes blew with rapidly rising barometer and cloudy sky. At Chapel Island the wind backed through W to SW a fresh to moderate breeze with occasional drizzling rain and rising barometer during the morning. A N backing and decreasing gale was felt at Middle Dog. On the East Coast the barometer was falling, but not quickly, the weather was wet and strong breezes to fresh gales were blowing chiefly from NE. Along the Yangtze light to moderate NE breezes prevailed with very fine weather and barometer almost steady.

Vessels at sea on October 11th experienced the following weather:—

In the China Sea ordinary fresh NE monsoon weather prevailed with N swell. Those vessels (*Protos*, *Fasana*, *Nanchang*) off the coast between Hongkong and Lamocks had moderate to strong N and NW breezes and cloudy weather.

The *Phra Nang* still hove to had during the early morning the wind from NW force 11 decreasing with rising barometer. At 10 a. she proceeded the wind gradually decreasing in force. Towards evening she had moderate breezes from NW.

The *Ly-ee-mun* and *Formosa*, at shelter in the neighbourhood of Haitan Straits, had N gales backing and decreasing after noon with wet weather and rising barometer. The vessels were about 100 miles West of the centre at noon.

The *Cyclops*, at shelter under the White Dogs, had a whole N gale decreasing during the early morning and at 8 a. she proceeded for Foochow.

The *Empress of Japan* was about 40 miles WNW of the centre at noon. She had then a strong NNE gale with rising barometer and very high sea. She was steering northwards and at midnight had a strong NNW gale.

The *City of Peking* hove to on the previous day went ahead again at 6 a. the wind having decreased to a moderate NNE gale at that time. At noon she was hove to again on the port tack the wind having increased to a whole NNE gale increasing with rain and barometer falling again. She was then about 20 miles WNW of the centre. At 2.30 p. the lowest reading of the barometer was made (29.35), and at 4 p. she had a NNE storm. After this hour the wind decreased in force, but did not back till late at night.

The *Fu Ping* was still in shelter under Taluk Island and during the early morning had a whole gale from the NNE with rain squalls. At noon the wind had decreased to a fresh NNE gale and during the afternoon the vessel proceeded southward having during the evening a strong NNE breeze, showery weather and a rough E sea.

The *Taisang* and *Wosang* were not very far asunder and near the position $28\frac{1}{2}^{\circ}$, 122° . The former was in shelter and had a strong NNE gale at noon with rain and slightly falling barometer. At midnight she had a moderate N gale. The *Wosang* was hove to on the port tack at 7.25 a. and had at the time a strong NE by N gale with very high sea which did some damage to deck fittings and later on stove in the saloon doors. The barometer fell but slightly, but towards evening the wind increased to a whole gale from NE by N with heavy rain squalls. These vessels were at noon about 200 miles N by E of the centre which was then commencing to move NEward.

The *Soochow* was about 40 miles NE by N of the *Wosang* at noon steaming southward. She had then a moderate NE increasing gale with falling barometer. During the afternoon she sustained some damage on deck and at 4 p. was hove to. During the evening the wind increased to a whole gale from N with violent squalls and rain.

The *Benlarig* at noon in $29^{\circ} 26'$, $123^{\circ} 36'$ and about 250 miles NNE of the centre had a NE by E fresh gale during the early morning with falling barometer. At 11 a. she was hove to and oil was made use of as there was a very high sea running. During the evening the wind increased in force and at 8 p. there was a whole gale with rain from the NNE. About this time the heavy sea started the breakwater on fore-castle head breaking three deck planks. At midnight the wind had backed to N, but was still a whole gale with barometer continuing to fall. More oil was used at this time. The centre was about 90 miles to the SSE of this vessel at midnight.

The *Deuteros* was about 40 miles to the N of the *Benlarig* at noon and during the evening experienced a whole gale from NE by N backing and decreasing after midnight. Rain fell continuously after noon.

The following observations are for noon of the 12th October :—

COAST STATIONS.

Bolinao,	29.86 + .05	var.	2	c.
Hoihow,	30.02 + .11	NE	4	b.
Hongkong,	29.96 + .14	W by S	1	b.
Breaker Point, .....	.95 + .16	NNW	3	c.
Lamoeks, .....	.95 + .18	N	1	c.
S. Cape, .....	.88 + .22	var.	2	c.
Anping, .....	.90 + .15	N	5	c.
Fisher Island, .....	.91 + .22	N	4	cv.
Chapel Island, .....	.92 + .18	WNW	1	c.
Turnabout, .....	.96 + .32	NW	3	c.
Keelung, .....	.95 + .43	NW	2	o.
Steep Island, .....	.86 - .14	NW by N	6	c.
North Saddle, .....	.87 - .11	N	8	om.
Chinkiang, .....	.86 - .11	NNW	3	b.
Kiukiang, .....	.99 - .06	W	1	b.
Ichang,	30.00 - .01	var.	1	b.

VESSELS.

Sch. <i>Santa Cruz</i> ,	15° 53'	127° 45'	...	SE		
S.S. <i>Catherine Apcar</i> ,	14 24	112 29	29.97	N.	4	
" <i>Kutsang</i> ,	19 12	111 55	.97	NE by N	4	fine.
" <i>Taksang</i> ,	19 42	116 12	.94	NNW	4	b.
Bq. <i>Altair</i> ,	22 0	119 33	...	NW	5	
S.S. <i>Phra Nang</i> ,	22 55	116 44	.89	NW	3	
" <i>Kwanglee</i> ,	23 0	116 40	.88	N	5	
" <i>Kriemhild</i> ,	23 2	117 8	.96	NE	3	
" <i>City of Peking</i> ,	24 33	119 10	.93	NW	4	b.
" <i>Fu Ping</i> ,	24 58	119 32	...	NW	2	b.
" <i>Wosang</i> ,	25 58	120 55	.92	NW by N	4	high cross sea.
" <i>Deuteros</i> ,	27 12	121 3	.88	NW	7	c.
" <i>Soochow</i> ,	28 4	121 5	...	N by W		fine.
" <i>Empress of Japan</i> ,	28 12	121 54	.89	NNW	6	"
" <i>Woosung</i> ,	28 16	121 46	.96	NW	5	"
" <i>Benlarig</i> ,	28 46	122 51	.77	NW	7	sea decreasing.
" <i>Taisang</i> ,	29 21	122 7	.83	N by W	6	
" <i>Chi Yuen</i> ,	33 47	126 37	.79	NNE	6	od. heavy sea.
" <i>Asaguo</i> ,	32 45	129 51	...	SE	6	orq.

On October 12th moderate NE monsoon prevailed on the West Coast of China and in the China Sea with fine weather. Weather was also fine at the stations surrounding the Formosa Channel where light to moderate N to NW winds prevailed with a great rise in the barometer since the previous day. On the East Coast in the neighbourhood of Shanghai a considerable reduction of pressure had taken place and in North China, Korea and W. Japan the fall amounted to between two and three tenths in the 24 hours. At the East Coast stations near the mouth of the Yangtze there blew a moderate to fresh gale from NNE with rain during the early morning. In the afternoon the weather cleared up, the wind backing to NNW and NW and decreasing in force. Fine weather prevailed along the Yangtze with light NE to NW breezes. In Korea NE breezes prevailed, fresh to strong breezes in the South with rain. In W. Japan light to moderate E breezes veering and increasing during the day with wet weather prevailed.

The *Benlarig* at noon on the 12th was about 240 miles WSW of the centre and she had then a moderate NW gale with sea going down. Earlier in the morning at 4 a. she had a strong N gale (barometer 29.60 lowest).

The *Taisang* left her anchorage ($28^{\circ} 28'$, $121^{\circ} 50'$) for the North at 4 a. the wind having decreased and backed with rising barometer. At 5 a. she had a fresh WNW gale decreasing.

The *Wosang* also proceeded on her course Southward at 4 a. the barometer rising and the wind moderating from a strong NNW gale at 4 a. to a strong NW by N breeze at 8 a.

The *Soochow* had a strong N gale at 4 a., but later it moderated and backed a little. At noon she was in $28^{\circ} 4'$, $121^{\circ} 5'$.

The *Empress of Japan* was at noon in $28^{\circ} 12'$, $121^{\circ} 54'$ steaming northwards. The barometer was rising and she had fine weather with a strong NNW breeze decreasing and backing to W at midnight.

The *Meefoo* was hove to near Barren Island ($30^{\circ} 43'$, $123^{\circ} 7'$) during the morning of the 12th and experienced a fresh N backing gale with a very heavy sea from NNE to ESE. The barometer was rising after 6 a. and towards noon the weather was improving.

The *Chi Yuen* in $33^{\circ} 47'$, $126^{\circ} 37'$ at noon had a strong NNE breeze with falling barometer and wind backing and decreasing in the evening. The weather was squally and showery.

The *Nurnberg* which left Nagasaki for Hongkong on the evening of the 12th met a moderate S gale with rain squalls soon after leaving port and barometer at 8 p. 29.54. On the 12th at noon the centre was in $30^{\circ} 40'$, $126^{\circ} 40'$. It continued to move in about a NE by N direction with increasing speed and in the evening the centre was near the coast of NW Kiusiu (Japan). It had become now an ordinary depression. From the Japanese weather maps it is seen that the depression on the 13th after passing along the northern shores of the Inland Sea quickly traversed central and northern Japan and disappeared towards the NE.

The following gives the position of the centre from October 7th noon to October 13th 2 p:—

Date and Hour.	Latitude. North.	Longitude. East.	Date and Hour.	Latitude. North.	Longitude. East.
October 7, Noon	$15\frac{1}{2}^{\circ}$	130°	October 11, 3a.	$24^{\circ} 10'$	$120^{\circ} 36'$
8, "	16°	127°	6a.	24 50	120 55
9, "	19°	$123\frac{3}{4}^{\circ}$	9a.	25 18	120 56
10, 6a.	$20^{\circ} 50'$	$121^{\circ} 0'$	Noon	25 50	121 25
9a.	21 20	120 50	6p.	26 40	122 30
Noon	21 47	120 45	Midt.	27 45	124 0
3p.	22 13	120 35	12, 6a.	29 0	125 15
6p.	22 30	120 33	Noon	30 40	126 40
9p.	22 40	120 36	10p.	33 40	129 40
Midt.	22 57	120 30	13, 6a.	34 45	134 0
			2p.	$43\frac{1}{2}^{\circ}$	141°

The average angle between the radius and the direction of the wind within a distance of 250 miles of the centre from October 10th 9a. to October 11th noon inclusive, was as follows:—

NNE	of the centre,.....	=	37°
SSE	"	=	61
SSW	"	=	103
WSW	"	=	79
WNW	"	=	55
NNW	"	=	43
	Mean,	=	63

This shows a great difference between the angle to the N and to the S of the centre. To the north the angle is small and to the south large. This is accounted for by strong N monsoon prevailing at the time. The winds at a distance towards the N of the centre blew very nearly straight towards it, and to the south of the centre the winds were deflected towards the north and it is seen that the wind circulation there was, for a very short time only, under the direct influence of the storm area, the N monsoon quickly making itself felt again. The progressive motion of the typhoon towards the N and NE against a strong monsoon must have been caused by the air motion prevailing at some height, the NE monsoon frequently being of no great depth. Owing to the temperature being lower over Asia than over the Pacific, gradients at a moderate height above sea level were inverted with lower pressure over Asia than over the Pacific and the centre would move so as to keep that high pressure area on its right hand.

On October 10th on an average the wind blew with force 10 within a distance of 100 miles of the centre, between 100 and 150 miles with force 9, and between 150 and 250 miles with force 7. The winds were stronger to the north than to the South of the centre and during midday on the 10th typhoon force was felt in some places at a distance of 150 miles to the NNW of the centre *i. e.* in the northern part of the Formosa Channel. On the 11th October the typhoon having filled to a great extent the force decreased somewhat. On that day the average force was 9 within a 100 miles of the centre, between 100 and 150 miles it was force 7 and between 150 and 250 miles force 6. Between October 10th at 9 a. and October 11th at noon the wind forces between the centre and a distance of 250 miles were as follows: on an average NNE of the centre force 8, SSE force 7, SSW force 6, WSW force 7, WNW force 7, NNW force 10.

It was densely overcast within 400 miles to the north, within 170 miles to the northwest, within 150 miles to the west, and within 170 miles to the south of the centre.

Heavy rain fell within 250 miles to the north, within 70 miles to the northwest and west, and within 100 miles to the south of the centre. Drizzling rain and light showers prevailed 50 miles beyond these distances respectively.

A heavy sea prevailed within a distance of 300 miles to the north of the centre and nearer to the centre *e. g.* in the Formosa Channel it was of an exceptionally severe character.

A gradient of 0.03 inch in 15 miles corresponded to force 6, 0.04 inch to force 7, 0.06 inch to force 9, 0.15 inch to force 11, 0.20 inch to force 12. The steepest gradient found was 0.33 inch in 15 miles.

DATE.	Hour.	HOIHOW.						HONGKONG.						BREAKER POINT.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.					Dir.	Force.		
Oct. 10	3 a.	...	...	...	...	...	29.74	74	NNW	2	c	...	29.65	74	NNW	4	cm	...	
	6	...	...	...	...	...	.72	73	...	3	...	...	.60	74	...	4	...	...
	9	29.90	77	N	5	b	0.00	.77	77	NW/W	2	...	0.00	.60	80	NW	5	...	0.00
	Noon	...	...	...	...	...	.71	84	NW	3	...	...	.51	85	...	6	...	...
	3 p.	.80	80	W	5	...	...	.64	84	...	4	...	...	.49	87	...	6	...	...
	6	...	...	...	...	...	...	.69	80	...	2	b	...	.51	82	...	5	...	...
	9	.87	79	W	5	...	...	.76	79	NNW	2	c	...	.65	78	...	4	...	...
	Midt.	...	...	...	...	...	...	.77	75	N/W	4	b	...	.67	75	...	3	...	...
	11	3 a.	...	...	...	...	...	.76	74	NNW	2	c	...	.70	78	...	3	...	...
		6	...	...	...	...	...	.78	73	W/N	3	...	...	.72	73	...	2	om	...
9		.96	75	N	5	...	0.00	.84	77	N	1	...	0.00	.78	74	NNW	3	...	0.00
Noon		...	...	...	...	...	.82	82	NNW	2	...	...	.79	79	...	3	...	...
3 p.		.87	78	NW	4	...	...	.80	83	...	2	...	...	.80	78	...	2	...	...
6		...	...	...	...	...	...	.86	79	N/E	2	...	...	.84	76	N	2	omg	...
9	.97	73	NE	2	...	...	.95	75	N	2	...	...	.93	72	...	3	...	...
Midt.	...	...	...	...	...	...	.96	71	N/E	3	...	...	.93	70	...	3	...	...

DATE.	Hour.	SWATOW.						LAMOCKS.						CHAPEL ISLAND.						
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	
				Dir.	Force.					Dir.	Force.					Dir.	Force.			
Oct. 10	3 a.	29.60	75	N	6	b	...	29.61	75	NE	3	c	...	29.57	72	N	9	c	...	
	6	...	...	...	...	...	...	.58	75	NNW	3	...	...	.52	72	...	8	cm	...
	9	.65	78	NNW	6	c	0.00	.60	75	...	4	...	0.00	.55	72	NNE	9	...	0.00	
	Noon	...	...	...	...	...	...	.53	78	NW	3	...	...	.45	74	...	9	...	...
	3 p.	.58	88	...	6	o	...	.50	80	...	3	...	...	.39	76	N	10	...	...
	6	...	...	...	...	...	...	.55	80	...	4	cp	...	.47	75	NNW	8	...	...
	9	.64	77	NW	5	o	...	.60	78	...	6	c	...	.52	74	...	7	o	...
	Midt.	...	...	...	...	...	...	.63	76	...	6	...	...	.53	73	NW	6	omd	...
	11	3 a.	.67	73	NNW	6	c65	74	...	655	72	W	5	o	...
		667	72	...	5	o60	67	WSW	5	omd	...
9		.81	75	WNW	4	og	0.00	.78	73	WNW	4	cm	0.00	.70	70	SW	4	c	0.00	
Noon		...	...	...	...	...	...	.77	76	...	4	c	...	.74	68	WNW	2	...	...
3 p.		.79	78	NNW	4	og	...	.80	77	NW	4	...	...	.75	75	N	1	...	...
6		...	...	...	...	...	...	.83	74	...	3	...	...	.81	71	NNE	1	...	...
9	.92	72	...	6	...	...	.93	72	...	4	...	...	.86	70	E	1	...	...
Midt.	...	...	...	...	...	...	.93	71	...	3	...	...	.90	70	WNW	1	...	...

DATE.	Hour.	AMOY.						OCKSEU.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.		
Oct. 10,	3 a.	29.65	76	NE	3	c	...	29.59	69	NNE	8	om	...
	6	.61	76	...	2	...	...	.55	68	...	8	...	...
	9	.62	77	NNE	3	...	0.00	.55	67	...	9	omd	0.00
	Noon	.57	81	N	4	...	...	.49	68	...	9	om	...
	3 p.	.50	81	...	5	...	...	.35	67	...	9	...	...
	6	.53	78	NNW	4	...	...	.37	68	...	10	...	...
	9	.60	79	...	3	...	...	.39	67	...	9	...	...
	Midt.	.61	77	N	2	...	...	.41	68	...	9	...	...
	11,	3 a.	.60	72	W	3	d42	68	...	9	...
6		.66	68	...	3	r	...	.47	67	...	8	omd	...
9		.74	70	...	3	o	0.62	.59	67	...	6	om	0.00
Noon		.76	74	N	1	...	...	.65	68	...	4	...	...
3 p.		.78	75	NNW	3	...	...	.71	65	N	3	omd	...
6		.84	75	Calm	...	...	...	.81	66	NNW	2	om	...
9		.92	72	W	3	...	...	.88	66	...	2	c	...
Midt.		.93	72	NNW	1	...	...	.91	66	...	2	...	...

TAKOW.

MIDDLE DOG.

Oct. 10,	3 a.	...	...	...	...	...	...	29.78	69	NNE	7	omp	...
	6	...	...	...	...	...	...	.74	67	...	7	...	...
	9	29.21	74	N	10	r	0.50	.74	66	...	7	...	0.33
	Noon	...	...	...	...	...	...	.67	65	...	7	...	...
	3 p.	28.97	77	NNE	10	g	...	.62	65	...	7	...	...
	6	.91	...	...	...	...	...	.63	65	...	7	...	...
	9	.99	73	N	10	r	...	.61	66	...	8	omqp	...
	Midt.	...	...	...	...	...	...	.57	67	...	9	...	...
	11,	3 a.54	68	...	8	...
6		...	...	...	...	...	...	.56	67	...	9	...	...
9		29.72	70	NW	7	r	6.30	.61	67	NNW	9	...	0.37
Noon		...	...	...	...	...	...	.63	66	...	8	...	...
3 p.		.74	76	...	8	g	...	.67	65	...	7	...	...
6		...	...	...	...	...	...	.74	65	NW	6	omr	...
9		.82	68	NNW	10	g	...	.83	65	...	5	omd	...
Midt.		...	...	...	...	...	...	.83	67	...	5	c	...

DATE.	Hour.	FOOCHOW.						TAMSUI.						KEELUNG.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.					Dir.	Force.		
Oct. 10	3 a.	29.80	73	NE	4	c	...	...	...	...	...	...	...	...	...	...	...	...	...
	9	.79	64	...	4	or	0.00	29.67	73	NE	5	r	10.80	29.66	79	NE	7	or	7.55
	3 p.	.69	66	...	5	...	...	.58	76	...	3	...	...	.53	82	...	5	op	...
11	9	.68	73	...	5	...	...	.62	74	ENE	3	o	...	.53	80	...	5	op	...
	3 a.	.66	72	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	9	.73	68	NNW	4	...	0.17	.55	77	SE	4	...	3.32	.51	81	...	2	od	2.87
	3 p.	.78	66	NNW	4	...	...	.60	75	S	1	od	...	.54	80	...	4	or	...
	9	.91	65	...	6	c	...	.78	67	NW	4	od	...	.71	76	...	2	...	...

DATE.	Hour.	STEEP ISLAND.						NORTH SADDLE.					
		Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
				Dir.	Force.					Dir.	Force.		
Oct. 10,	3 a.	30.06	68	NE	5	cq	...	30.06	65	NE	6	cm	...
	9	.08	68	...	4	...	...	.06	68	...	5	...	0.00
	3 p.	.04	66	...	4	omd	...	.02	69	ENE	7	ov	...
11,	9	.04	65	...	4	...	...	.01	62	...	9	gcmq	...
	3 a.	29.96	64	...	5	...	...	29.94	65	NE	10	omq	...
	9	30.03	64	...	6	...	...	.99	65	ENE	8	...	0.00
	3 p.	29.97	64	...	6	...	...	.97	64	...	7	omr	...
	9	.97	63	...	6	...	1.30	.94	65	NE	8	ogr	...

OBSERVATIONS MADE AT FISHER ISLAND LIGHTHOUSE.

October 9th to October 11th.

Hour.	OCTOBER 9.						OCTOBER 10.						OCTOBER 11.						
	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	
			Dir.	Force.					Dir.	Force.					Dir.	Force.			
1 a.,	ins.	°	...	0-12	...	ins.	ins.	°	NNE	11	omqd	...	ins.	ins.	°	N	10	omqr	...
2	...	...	...	...	...	...	29.40	...	...	11	...	...	29.30	...	...	N	10	...	...
3	29.67	75	N	9	o m q	...	.36	...	...	11	...	...	.33	...	...	NNW	11	...	...
4	...	...	...	...	...	...	.33	73	...	11	...	...	.36	70	...	...	10	...	...
5	...	...	...	...	...	...	.29	...	N	11	o m q	...	.43	...	...	NW	10	...	...
6	.64	74	NNW	9	...	...	.28	...	NNE	11	omqd	...	.47	...	...	...	10	...	...
7	...	...	...	...	...	...	.26	72	N	11	o m q	...	.51	69	...	...	9	...	...
8	...	...	...	...	...	...	.24	...	...	11	omqd	...	.58	...	WNW	...	7	o m d	...
9	.65	75	NNE	9	c m q	0.03	.26	73	...	11	omqd	0.00	.65	68	w	...	6	...	0.49
10	...	...	...	...	...	...	.24	...	NNW	11	o m q	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	.22	...	NNE	11	omqd	...	...	...	...	...	...	...	...
Noon,	.61	75	N	9	...	...	.20	73	...	11	o m q	...	.69	68	WNW	7	o m p	...	
1 p.,	...	...	...	...	...	...	.17	...	...	11	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	.11	...	...	11	...	...	...	...	...	...	...	...	...
3	.51	74	NNE	10	...	...	.10	73	...	11	...	...	.71	68	...	...	8	omqr	...
4	...	...	...	...	...	...	.06	...	...	12	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	.07	...	...	12	...	...	...	...	...	...	...	...	...
6	.53	74	...	10	o m q	...	.11	72	...	12	...	...	.77	67	NW	7	o m q	...	
7	...	...	...	...	...	...	.14	...	...	11	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	.15	...	...	12	...	...	...	...	...	...	...	...	...
9	.54	73	...	10	omqd	...	.22	71	...	11	omqd	...	.86	66	NNW	7	o m p	...	
10	.52	...	...	10	...	...	.20	...	...	11	omqr	...	...	...	...	...	...	...	...
11	.50	...	...	10	...	...	.23	...	...	11	...	...	...	...	...	...	...	...	...
Midt.,	.45	73	...	11	...	...	.29	71	...	11	...	...	.87	68	N	6	...	...	...

OBSERVATIONS MADE AT TURNABOUT LIGHTHOUSE.

October 9th to October 11th.

Hour.	OCTOBER 9.						OCTOBER 10.						OCTOBER 11.					
	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.	Bar.	Temp.	WIND.		Weather.	Rain.
			Dir.	Force.					Dir.	Force.					Dir.	Force.		
1 a.,	ins.	°	...	0-12	...	ins.	ins.	°	...	...	...	ins.	ins.	°	N	12	o m	...
2	...	...	...	...	...	...	...	...	...	...	...	...	.49	...	...	11	o m d	...
3	29.90	72	NNE	9	o m	...	29.72	70	NNE	10	o m p	...	.48	67	...	12	...	...
4	...	...	...	...	...	...	...	...	...	...	...	...	.47	...	...	11	o m	...
5	...	...	...	...	...	...	...	...	...	...	...	...	.50	...	...	11	o m d	...
6	.89	71	...	8	...	...	.70	69	...	10	g m d	...	.52	67	...	11	g m p	...
7	...	...	...	...	...	...	...	...	...	...	...	...	.54	...	NNW	11	g m d	...
8	...	...	...	...	...	...	...	...	...	...	...	...	.57	...	N	11	g m d	...
9	.92	71	...	9	...	0.00	.69	68	...	11	g m p	0.22	.59	66	NNW	10	...	0.21
10	...	...	...	...	...	...	...	...	...	...	...	...	.60	...	NNW	11	...	...
11	...	...	...	...	...	...	...	...	...	...	...	...	.61	...	N	10	o m	...
Noon,	.88	71	...	10	c m	...	.64	67	N	11	g m	...	.64	65	NNW	10	o m d	...
1 p.,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	.83	71	...	10	...	...	.57	66	...	11	g m d	...	.67	65	...	9	...	...
4	...	...	...	...	...	...	.55	...	...	11	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	.54	...	...	12	...	...	...	...	...	...	...	...
6	.82	71	...	10	...	...	.55	66	NNE	12	g m	...	.78	65	NW	7	...	...
7	...	...	...	...	...	...	.55	...	N	12	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	.54	...	...	12	g m d	...	...	...	...	...	...	...
9	.82	71	...	10	o m	...	.54	66	NNE	12	...	...	.88	65	...	7	g m	...
10	...	...	...	...	...	...	.54	...	...	12	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	.50	...	N	12	o m	...	...	...	...	...	...	...
Midt.,	.77	70	...	10	...	...	.51	68	...	11	...	...	.90	67	NNW	5	o	...

Log of the S.S. Fokien at anchor in Tamsui Harbour October 9th to 11th.

Date and Hour.	Bar.	Wind.		Remarks.	Date and Hour.	Bar.	Wind.		Remarks.	
		Dir.	Force.				Dir.	Force.		
Oct. 9, 4a.	29.87	ENE	6	Strong winds with heavy rain squalls.	Oct. 10, 4p.	29.59	NNE	5	Frcsh wind with squalls.	
8a.	.89	"	...		6p.	.58	"	5		
Noon	.89	"	...		8p.	.56	"	5		
4p.	.87	"	...		10p.	.53	"	5		
8p.	.83	"	...		Midt.	.49	NE	6		
10p.	.78	NNE	10		11, 2a.	.45	ENE	8		Heavy squalls and rain. Squalls blowing with hurricane force.
Midt.	.72	"	10		4a.	.39	E	10		
10, 4a.	.67	"	10		5a.	.37	ESE	10		
6a.	.64	"	10		8a.	.51	SE	6		
8a.	.67	"	10		10a.	.54	SSW	6		
10a.	.69	"	8	Noon	.57	W	5			
Noon	.67	"	6	4p.	.75	NW	5			
1p.	.64	"	4	8p.	.83	N	4			
2p.	.60	"	4	Midt.	.39	NNE	4			
3p.	.59	"	4							

S.S. CHOYSANG.

October 9, 4a.	27° 4'	121° 0'	30.00	N	6	rough sea.
8a.	26 35	120 40	29.97	"	7 o.	high sea.
Noon	25 47	120 20	.92	NNE	7 "	"
1p.			.85	NE	8 "	very high sea, hazy horizon.
2p.			.83	"	8 "	"
3p.	25 18	119 54	.80	NNE	8 "	"
4p.	25 12	119 45	.78	"	9 "	"
5p.			.78	"	9 "	"
6p.	24 51	119 23	.75	"	9 "	"
7p.			.75	NE by N	9 "	"
8p.	24 39	119 1	.75	"	11 "	mountainous sea, wind fitful with squalls of hurricane force.
9p.			.75	"	11 "	"
10p.	24 32	118 46	.74	"	11 "	"
11p.			.73	"	11 "	"
Midt.	24 13	118 24	.70	NNE	11 "	"
10, 1a.			.67	"	10 "	"
2a.	24 3	118 6	.65	"	9 "	very high sea, weather moderating.
3a.			.61	N	8 "	high sea,
4a.	23 47	117 47	.59	"	8 "	" sky clearing.
5a.			.59	NNW	6	rather rough sea,
6a.	23 34	117 28	.59	"	3	moderate sea, fleecy sky and clear weather.
7a.			.59	NW	6	"
8a.	23 19	117 2	.60	"	6	" clear fine weather.
		arrival at Swatow.		...	...

S.S. FORMOSA.

October 9, 8a.			29.82	NE	6	heavy head sea.
9a.	24° 27'	118° 30'	...	...	6	"
Noon			.76	NNE	6	great quantity of water on board.
4p.			.69	NE	8	high sea,
8p.			...	"	8	"
Midt.			.63	"	9	"
10, 4a.			.59	"	10 orq.	"
8a.			.52	"	10 "	squalls with typhoon force.
Noon			.46	"	10 "	labouring, some [damage about decks.
3p.	25 2	119 12	...	...	10	"
4p.			.45	"	10 orq.	"
8p.			.49	"	10 orq.	"
Midt.	25 11	119 12	.47	"	10 bq.	at anchor Pinghai Bay.
11, 4a.			.48	N	10 dq.	"
8a.			.58	"	9 orq.	"
Noon	White Island.		.62	"	9 "	"
4p.			.68	NNW	9 or.	"
8p.			.82	N	5 o.	moderating.
Midt.	Station Is. (Haitan str.).		.82	NNW	2	fine.

S.S. GLENGARRY.

October 9,	Noon	left Foochow.	...	...					[board.
	4p.		29.57	NE	9				high sea, rolling, 90 tons of coal on deck washed over-
	8p.		...	"	9				" hove to near Turnabout for one hour.
	Midt.		...	"	10				increasing wind and sea.
10,	4a.		.58	"	9				high sea running.
	8a.	arrived at Amoy.	...	...			

S.S. LYEMOON.

October 9,	4a.		29.80	ENE	3	or.			high sea, great quantity of water on board.
	8a.		.82	NE	5	b.			" E swell.
	Noon	Fall Peak.	.77	"	7				increasing wind and sea.
	4p.		.67	"	7	c.			
	8p.		.78	"	9	o.			
	Midt.	Dodd Island.	.68	NNE	8				increasing storm.
		(24° 18' 118° 30')							
10,	4a.		.60	NE by N	9	oq.			
	8a.		.68	"	10	"			
	Noon	Gulai Point.	.48	NNE	10	"			
	4p.		.51	"	10	"			heavy seas on board, steered for Hungwha Sound.
	5p.		.44	...					
	8p.	Hungwha Sound.	.54	"	8	"			at anchor Hungwha Sound.
		(25° 20' 119° 35')							
	Midt.		.52	"	8	"			
11,	4a.		.54	N by E	7	"			
	8a.		.58	"	8	od.			6a. left Hungwha Sound.
	Noon	Station Island.	.65	"	7	odq.			at anchor Station Island.
	4p.		.70	NNW	6	orq.			SE swell.
	8p.		.82	"	5				

S.S. PROTOS.

October 9,	4a.		29.99	NNE	8				high sea, great quantity of water on board.
	Noon	26° 31' 120° 53'	.96	"	9				very high sea, " "
	4p.		.92	NE	10				high wild sea, " "
	8p.		.86	NE by N	10				" " "
	Midt.		.74	"	10				" " "
10,	4a.		.70	NNE	11	og.			" ship labouring.
	8a.		.68	"	12				" one boat lost, two smashed, two com-
									panions carried away.
	Noon	23 46 118 58	.62	"	12				" lights of engine room smashed.
	4p.		.50	"	10				decreasing wind and sea.
	8p.		.62	N	9	or.			rough sea.
	Midt.		.65	"	6				
11,	4a.		...	NNW	4	c.			moderate sea.
	8a.		...	"	6				
	Noon	22 22 115 29	...	NW	5				

H. I. A. M. CORVETTE FASANA.

October 9,	Noon	28° 0' 121° 50'	30.01	NE	7	c.			
	2p.		29.98	"	8	c.			increasing sea.
	4p.	27 27 121 17	.95	"	8	c.			
	6p.		.96	NNE	9	m.			
	8p.	26 52 120 53	.94	"	10	m.			
	10p.		.93	NE/N	9	m.			
	Midt.	26 10 120 32	.85	"	10	m.			
10,	2a.		.76	NNE	9	q.			
	4a.	25 31 120 6	.71	"	10	or.			
	6a.		.70	"	10	or.			
	7a.		.68	"	10	or.			high sea.
	8a.	24 53 119 32	.63	N/E	11	or.			
	9a.		.63	N	11	o.			
	10a.		.56	"	11	o.			increasing sea.
	11a.		.51	"	11	o.			
	Noon	24 19 118 59	.48	"	11	o.			
	1p.		.43	"	12	o.			
	2p.		.36	"	12	o.			high confused sea from NNW.
	3p.		.38	N/W	11	o.			clearing.
	4p.	23 49 118 27	.41	"	11	o.			
	5p.		.45	NW	10	o.			sea began to decrease, weather improving.
	6p.		.49	NW/N	8	o.			
	7p.		.55	NW	8	or.			
	8p.	23 24 117 51	.58	WNW	8	o.			
	9p.		.62	"	7	o.			
	10p.		.66	"	7	or.			
	Midt.	23 0 117 29	.67	NW	5	o.			
11,	2a.		.68	WNW	5	or.			
	4a.	22 42 117 15	.70	"	5	o.			
	6a.		.79	"	4	o.			
	8a.	22 29 117 0	.81	NW	4	o.			
	10a.		.83	NNW	4	o.			
	Noon	22 22 116 34	.80	"	4	o.			

S.S. NANCHANG.

October	9,	Noon	27° 12'	121° 19'	29.95	NNE	6	b.	
		4p.			.86	NE/N	6		high sea.
		8p.			.83	NNE	7	b.	"
		Midt.			.71	"	7	od.	"
	10,	4a.			.56	"	9	orq.	very high sea, foresail split.
		7a.			.45	"			"
		8a.			.46	"	10		increasing following sea.
		Noon	23 17	117 56	.47	N	9		gale abating, sea moderating.
		4p.			.45	"	6	q.	moderating.
		8p.			.57	NW/N	6		
		Midt.			.63	WNW	6	b.	
	11,	4a.			.64	NNW	6		
		8a.			.71	"	6		
		11a.	at Hongkong						

S.S. EMPRESS OF JAPAN.

October	9,	Noon	24° 23'	118° 52'	29.74	NE	8		high sea, great quantity of water on board.
		Midt.			.65	"	10		very high sea, " " "
	10,	Noon	25 41	120 15	.54	N	10	o.	" " " "
		Midt.			.40	NE	10	o.	" " " "
	11,	4a.			.35	N/E	10	o.	" " " "
		Noon	26 10	120 48	.50	NNE	9	o.	" " " "
		Midt.			.70	NNW	9	o.	" " " "
	12,	Noon	28 12	121 54	.84	"	6		fine.
		Midt.			.88	W	3		

BARQUE ALTAIR.

October	9,	Noon	22° 30'	115° 38'	29.72	N/W			increasing wind, heavy NE swell.
		4p.			.68	var			light variable wind.
		8p.			.66	NNW			increasing wind, heavy NE swell.
		Midt.			.58	"			moderate wind.
	10,	4a.			.56	"	o.		increasing wind, heavy sea, plain sails in.
		8a.			.52	NW			" " "
		Noon	22 57	117 30	.48	"	o.		fresh gale, heavy sea.
		4p.			.50	NNW	od.		" upper topsails furled.
		8p.			.52	NW			moderating.
		Midt.			.50	"			fresh gale, high sea.
	11,	4a.			.52	"			moderating, upper topsails set.
		8a.			.54	"			"
		Noon	22 0	119 33	.56	"			fresh breeze, plain sails set.

S.S. PHRA NANG.

October	9,	Noon	28° 28'	123° 44'	29.96	NNE	5	b.	
		Midt.			.90	"	6	oq.	wind and sea increasing.
	10,	4a.				"	7	o.	high sea.
		8a.			.60	"	8	oq.	"
		Noon	25 19	120 04	.50	"	9		"
		2p.			.48				
		3p.			.30				
		4p.			.22	"	11	oq.	mountainous confused sea, life boat smashed, others damaged.
		5p.	Hove to on port tack		.20				
		6p.			.21				
		8p.			.25	N	12		terrible sea.
		Midt.			.30	N/W	11		tremendously high sea.
	11,	4a.			.34	NW	11	oq.	" "
		6a.			.42				
		8a.			.52	"	10	od.	moderating sea, very heavy.
		10a.	Proceeded						
		Noon	24 08	119 13	.58	"	9		
		2p.			.60	"	9		
		10p.			.83	W	3		
		Midt.			.85	NW	4		smooth sea.
	12,	Noon	22 55	116 44	.89	NW	3		

S.S. CITY OF PEKING.

October	9,	Noon	27° 17'	123° 26'	29.95	NNE	5	o.	rough sea and swell.
		4p.			.88	"	6	ogm.	increasing breeze and sea.
		8p.			.90	NE	8	ogmq.	rough sea.
		Midt.			.80	"	8	"	"
10,		4a.			.78	"	9	"	"
		8a.			.62	"	10	"	ship labouring, large quantity of water on board.
		Noon	25 37	120 41	.62	"	10	"	"
		4p.			.58	NE/N	10	orq.	very heavy sea, " "
		8p.			.56	"	10	"	" " "
		Midt.	Hove to on port tack		.52	"	10	"	high topping sea.
11,		4a.			.46	"	7	ogq.	moderating sea.
		6.10a.	Went ahead						
		8a.			.52	NNE	7	ogm.	
		Noon	25 58	121 05	.48	"	10	or.	wind and sea increasing.
			Hove to on port tack						
		2.30p.			.35				
		4p.			.52	"	11	oq.	high topping sea, rolling heavily.
		8p.			.70	"	9	oq.	moderating.
		Midt.			.78	N	8		
12,		4a.			.80	"	6		sea going down.
		8a.			.90	NW	5	bv.	
		Noon	24 33	119 10	.93	"	4	b.	

S.S. CYCLOPS.

October	9,	Noon	23° 05'	121° 55'	29.97	NNE	6	o.	fine.
		4 p.			.93	...	5		lazy.
		10 p.			.87	...	8	o.	high sea.
10,		1.30 a.	anchored under Tungsha		...	...	
		4			.77	...	9	q.	
		Noon			.72	...	9	orq.	
		4 p.			.62	...	9		
		8 p.			.65	...	10		
		Midt.			.57	...	11		
11,		4 a.			.57	N	10		
		8 a.	proceeded		.63	...	7		moderating.
		Noon	at Foochow		.66	...	6	or.	

S.S. TAISANG.

October	9,	Noon	26° 19'	119° 58'	29.90	NNE	7		
		Midt.			.94	NE	6		moderating.
10,		11.30 a.	28 28	121 50	...	...			at anchor under Taichow.
		Noon			.90	NNE	7		
		Midt.			.81	N/E	8		
11,		Noon			.81	NNE	9	oqr.	
		Midt.			.77	N	7		
12,		1 a.			.77	NNW	8		rain ceased.
		3 a.			.75	NW/N	9		
		4 a.	proceeded		...	...	
		5 a.			...	WNW	8		
		Noon	29 21	122 7	.83	N/W	6		

S.S. BENLARIG.

October	10,	Noon	32° 10'	126° 30'	30.04	NE	5		
		8 p.			.00	...	6	od.	
		Midt.			29.98	...	7	or.	high sea.
11,		4 a.			.87	...	7		wind and sea increasing, ship labouring.
		8 a.			.87	NE/E	8		
		11 a.	hove to head to sea		...	...			used oil.
		Noon	29° 26'	123° 36'	.82	...	9		very high sea.
		4 p.			.73	NE/N	9		"
		8 p.			.72	NNE	10	or.	" sea started breakwater on fore-castle head breaking three deck planks.
		Midt.			.68	N	10		very high sea, castor oil used.
12,		4 a.			.60	...	9		
		8 a.			.66	N/W	8		moderating.
		Noon	28 46	122 51	.77	NW	7		" sea going down.

S.S. *DEUTEROS*.

October 10, Noon	32° 20'	126° 53'	30.07	NE/N	5	o.	high sea.
Midt.			.05	NE	6	or.	"
11, 4 a.			29.94	...	7		very high sea.
8 a.			.96	...	8		
Noon	30 04	123 44	.88	...	8		" from NE.
4 p.			.82	NE/N	10		
8 p.			.82	...	10		
Midt.			.80	NNE	10		moderating after midnight.
12, Noon	27 12	121 03	.88	NW	7	c.	

S.S. *SOOCHOW*.

October 11, Noon	29° 20'	122° 33'	29.93	NE	7	r.	wind and sea rapidly increasing.
2 p.			.86	...			
4 p.			.85	NNW			[sea. 3.30 p. damage on deck, ship's head to wind and
6 p.			.86	...			wind flying from NE to NNW in violent
8 p.			.88	N			squalls, heavy confused sea.
Midt.			.88	...	10	oqr.	
12, 4 a.			.82	...	9	q.	
Noon	28 4	121 5	.91	N/W			moderating, clear.

S.S. *WOSANG*.

October 10, Noon	near Tungsha lightship	31° 7'	122° 1'	30.05	E/N	5	fine.
8 p.				.04	ENE	5	odg.
Midt.				.00	NE	8	high following sea, much water on board.
11, 4 a.				29.88	...	9	or.
7.25 a.	hove to head to wind			...	...		" "
8 a.				.90	NE/N	9	high sea, sea swept away all moveables on deck.
Noon	28 40	122 10	.83	...	9		" saloon doors broken in.
4 p.			.82	...	9	orq.	
8 p.			.88	...	10		high cross sea.
Midt.			.83	...	10		"
12, 4 a.	proceeded			.81	NNW	9	" moderating.
8 a.				.89	NW/N	6	"
Noon	25 58	120 55	.92	...	4		still high cross sea.

S.S. *FU PING*.

October 10, 6 a.			...	NNE	6	c.	rough ESE sea.
Noon	28° 36'	121° 52'	...	N	7	r.	"
2 p.			...	...	9		heavy confused sea.
6 p.	28 4	121 31	...	...			at shelter under Taluk Island.
8 p.			...	NNE	10	orq.	
11, 6 a.			...	...	10		
Noon			...	...	8		
8 p.	left Taluk Island		...	...	6	op.	rough E sea.
12, 6 a.			...	NW	4	b.	heavy NE sea.
Noon	24 58	119 32	...	...	2		light E sea.

S.S. *MEEFOO*.

October 11, Midt.	off North Saddle		29.74	N	8	q.	
12, 2 a.			...	...	8		ship hove to heading East drifting southward.
6 a.	off Barren Island		.68	...	8		fearful sea from NNE to ESE.
9 a.	30° 43'	123° 7'	.74	...	8		anchored in E Saddle Island Bay.
Noon			.82	NNW			weather clearing, heavy sea outside islands.

On the 22nd October the weather was fine in China and the Philippines. Moderate NE breezes prevailed in China. Vessels in the China Sea experienced strong NE breezes. The American barque *Xenia*, bound from Sydney for Hongkong, at noon in 12° 52', 133° 59', had high barometer (29.90 at noon), NNE 1, a smooth sea and a NE swell was met. At noon on the 23rd in 13° 3', 133° 28' the barometer had fallen to 29.85 with N 4, clear weather and a long NE swell. There must have been every indication of a typhoon coming on from the eastward. At the same time the barometer began to fall very slightly in China as far as Shanghai and Haiphong. The barque *Altair* in 29° 24', 126° 56' had 30.00, N 5 and fine weather.

The barque *Xenia* experienced cloudy and squally weather with lightning and heavy rain up to 8 a. on the 24th, with W wind. At 8 a. she tacked to the N *i. e.* she chose the port tack for running in a typhoon which is not recommended. Had she proceeded on the other tack she would have escaped the typhoon. At noon in 13° 57', 132° 45' same weather with 29.78, WNW 4, wind and sea increasing. Shortly after the gaff topsail and main topgallant sail split and new sails were bent in their place. At 4 p. with N by W wind she went on the starboard tack and at 6 p. again on the port-tack *i. e.*

proceeding N. At 8 p. with NW by W gale increasing the royals were handled and at 9 p. the jib-boom carried away at the cap. There was now a strong W gale and high sea. At 11 p. all was made snug and they wore the ship to the southward, but too late. Shortly after midnight on the morning of the 25th it blew a typhoon from SW by S with fierce squalls and a high cross sea. The barque laboured heavily, rolling and pitching hard and the waves broke on board both fore and aft. The mainsail was blown from the yard. The gaff topsail and flying jib were lost, and the mizzen staysail and main-topmast-staysail blew to ribands. In the forenoon it continued blowing with full typhoon force from SW. The lowest barometer was 29.40 and the temperature (88°) continued abnormally high. At noon in $14^{\circ} 40'$, $132^{\circ} 28'$ barometer was registered 29.70 (with SSW 12), at 4 p. 29.65 and at midnight 29.63. It then blew from SSW with increased fury, high cross sea, furious squalls and continuous downpour of rain. Of course the readings of the aneroid are uncertain as it is so difficult to read it to a tenth in such weather. At noon on the 25th South Cape registered: 30.02, NNE 5, c. Light N breezes prevailed over Luzon with cloudy weather (barometer 29.91 in the north and perhaps about 29.80 in the south).

On the 26th October from midnight to 8 a. the typhoon continued from SW on board the *Xenia*. At 1 a. the foretopsail blew away and she was hove to on the port tack (being in the left hand semi-circle). At 11 a. she was kept away from the wind. At noon she was in $15^{\circ} 41'$, $131^{\circ} 12'$. At 1 p. the typhoon blew from SSE. At 3 p. the foretopmast stay carried away but the mast was secured (barometer 29.60 falling). At 8 p. it blew from the same quarter with unabated fury. The schooner *Jenny* in 7° , 150° had strong southerly wind on this day.

On the morning of the 27th it blew from SSE by E on board the *Xenia*. Part of the starboard bulwarks were washed away. After 8 a. it began to moderate. Foresail and upper foretopsail were set. At noon she was in $18^{\circ} 13'$, $129^{\circ} 1'$ with barometer 29.80. In the afternoon it blew ESE 8 with a fearfully high cross-sea. At noon South Cape registered 29.97, NNE 3, c. and Bolinao 29.84, NNE 1, b.

On the 28th the *Xenia* at noon in $19^{\circ} 12'$, $127^{\circ} 40'$ had the wind from ESE moderating to a breeze but the sea kept running high from all directions. At 7 a. the cap to the foremast head carried away and broke the foretopmast stay. The weather was clear and barometer rising (29.93 at 6 p.) At noon it blew a moderate NNW gale in Bolinao with falling barometer (29.67). South Cape registered: 29.96, NNE 4, c. but it blew NNE 6 to 7 at Fisher Island. The S.S. *Kowshing* in $16^{\circ} 41'$, $119^{\circ} 42'$ registered 29.61 strong NNW wind and rough sea. At Manila it blew a gentle WSW breeze. The barometer was rising in southern China, gradients rather steep for N winds, weather clear, warm and dry.

Although it is not possible to construct a very accurate path from these observations the positions of the centre of the typhoon must have been nearly as follows. On the 24th October 15° , 136° ; on the 25th: 15° , 133° ; on the 26th: $15\frac{1}{2}^{\circ}$, 130° ; on the 27th: 16° , $127\frac{1}{2}^{\circ}$; on the 28th: 16° , 125° ; and on the 29th: 17° , 123° .

In the afternoon on the 29th this typhoon recurved. The following are some of the principal observations made at noon. The barometer was falling at all the stations in China:—

COAST STATIONS.

Steep Island,	N	750	30.14	-.03	NNW	4	cm.
Ockseu,	NNW	550	29.99	-.05	NE	6	c.
Fisher Island,	NW	400	.84	-.12	NNE	9	cmq.
Anping,	NNW	400	.84	-.10	N by E	5	of.
Hongkong,	WNW	550	.98	-.08	N by E	3	b.
South Cape,	NNW	300	.82	-.14	NE	8	cm.
Hoihow,	W by N	700	30.08	-.01	NE	3	c.
Bolinao,	WSW	200	29.55	-.12	WNW	7	ogr.
Manila,	SW	200	.72	-.01	SW	4	c.

VESSELS.

S.S. <i>Esmeralda</i> ,	Past Capones.	SW	250	29.66	WSW	5	pq.
„ <i>Bombay</i> ,	$26^{\circ} 18'$ $120^{\circ} 30'$	NNW	550	30.09	NNE	5	
„ <i>Kowshing</i> ,	Manila.	SW	200	...	WSW	5	
Bq. <i>Xenia</i> ,	$19^{\circ} 20'$ $126^{\circ} 3'$	NE	200	29.80	E	4	ouq.
S.S. <i>Cosmopolit</i> ,	$16^{\circ} 27'$ $109^{\circ} 48'$	W	750	29.97	N	5	c.

At Bolinao it blew at intervals during the night in furious gusts of wind and rain especially between 3 a. and 4 a. on the 29th.

The *Xenia* had a heavy cross swell. She had proceeded straight for Hongkong without further reference to the typhoon, and ran in consequence again into the left hand semi-circle after the centre had recurved. She was now to the N of the centre and had at 11.30 p. a strong NE gale and mountainous NE sea. She was hove to on the starboard tack, and had therefore to go through the typhoon again. However it seems it did not blow so hard as before as the centre was now moving against the NE monsoon. The lowest barometer 29.79 was registered at 6 p. at South Cape after which the fresh NE gales gradually decreased in force.

At noon on the 30th October the centre appears to have been in about 19° , 125° :—

COAST STATIONS.

Oekseu,	NW	500	29.98	-.01	NNE	5	c.
Fisher Island,	WNW	400	.88	+.04	NNE	7	cm.
Hongkong,	WNW	600	30.01	+.03	N by E	1	b.
South Cape,	NW	300	29.89	+.07	NNE	5	c.
Bolinao,	SW	350	.79	+.24	N	7	c.
Pta. Santiago, .....	...	...	.80	...	NW	5	c.
Manila,	SW	350	.76	+.04	W	2	b.

VESSELS.

S.S. <i>Esmeralda</i> ,	16° $52'$	118° $1'$	29.80	NNE	9	q.	
Bq. <i>Xenia</i> ,	20 21		.75	NE	10	oq.	
„ <i>Altair</i> ,	35 59	124 2	.88	NW	8		high sea.

At noon on the 31st the centre may be estimated to have been in about 20° , 128° . The *Xenia* at 2 p. in 20° $20'$, 121° $59'$ had NNE 7, a very rough sea and great quantities of water on board. The weather was cloudy and squally. The barometer was rising at all the stations and there was a regular NE monsoon, blowing hard in from 6° to 15° latitude in the China Sea, where the ships *Dorothea* and *Continental*, and the barques *Nicoya* and *Harvard* had moderate NE gales.

NOVEMBER.

On the 5th November the barque *Nicoya* in $12\frac{1}{2}^{\circ}$ N, $115\frac{1}{2}^{\circ}$ E had a fresh NE breeze, squally weather, a rapidly falling glass, and increasing sea. The lower topsails were reduced. On the 6th November there was a depression forming over the neighbourhood of Palawan in 10° N, but it was not well defined. The barometer in that latitude read about 29.75, and 29.95 in 15° N, and 29.90 in 4° N. There was a swell in the southern part of the China Sea, hazy horizon, squally and wet weather. The *Nicoya* in 13° N, 116° E registered strong NE wind, squally weather and high cross sea. On the 7th fine weather was experienced on board all vessels south of 10° N with SW monsoon. Vessels north of 13° N had moderate NE monsoon. On the 8th fine weather continued with moderate NE monsoon north of 14° N, W wind south of 5° N, and variable light breezes between these latitudes. On the 9th a very light NE monsoon appeared to extend itself to the southward. On the 10th the barque *Harvard* in 13° N, $116\frac{1}{2}^{\circ}$ E had increasing N by E wind and squally weather.

At noon on the 11th November the Captain of the barque *Harvard* remarked the appearance of a typhoon but the barometer was "not falling" *i. e.* the readings are not entered in the log-book and therefore the fall was not ascertained. The barque was in 12° $59'$, 118° $2'$. The centre of the typhoon was probably 250 miles to the SW. The wind was NE 7 and hauled to the E the following midnight. The centre of the typhoon which may have been in the neighbourhood of Palawan about the 10th or 11th was at noon on the 12th in about 11° $40'$, 112° $15'$ and at noon on the 13th in about 14° $2'$, 110° $20'$. It then moved towards SW Hainan, but it seems it ceased to blow before it reached the Gulf of Tongking. On the 12th the barometer was high and had risen a tenth in southern China. The weather was cloudy, cool and dry. Fresh NE breezes prevailed. On the 13th the barometer had fallen a tenth. A fresh NE gale blew throughout the day at Hoihow with occasional showers of rain (barometer 30.08 at 10 a. in Hongkong 30.16 at 10 a.) It moderated during the following night. Gentle SE breezes prevailed in Luzon. At Cape S. James it blew a moderate SW gale accompanied by a high sea and squally weather. At sea it appears to have blown a strong breeze within 400 miles towards the N of the centre, and within 300 miles towards the S, and it blew a moderate gale at least within 100 miles of the centre. There was a more or less heavy swell everywhere in the China Sea.

The following are some of the principal observations copied from ships' log books concerning this typhoon :—

S.S. HONGAY.

Nov.	11, Noon	12° $33'$	120° $48'$	29.83	NE	4	high sea.
	Midt.			.89	ENE	4	
	12, Noon	15 36	118 45	.94	ENE	6	confused swell.
	13, Noon	18 27	117 3	30.00	ENE	6	„

S.S. DONAR.

Nov.	11, Noon	18° $12'$	111° $36'$	30.02	NNE	5	
	Midt.			.05	NE	6	rising sea.
	12, Noon	19 36	112 30	.06	NE	8	
	Midt.			.04	NE	9	
	13, Noon	20 31	113 19	.02	NE	8	opq. high sea.

S.S. DON JUAN.

Nov.	11, Noon	16° $34'$	119° $15'$	29.90	NE	5	
	Midt.			.94	...		
	12, Noon	19 39	116 39	30.05	NE	5	

S.S. *ESMERALDA*.

Nov.	12, Noon	13° 7'	119° 18'	29.87	N	5	o.	high sea.
	Midt.			...	NE	4	oqrm.	heavy N swell.
	13, Noon	18 55	117 3	29.96	NE	7	oqrm.	

BARQUE *HARVARD*.

Nov.	11, Noon	12° 59'	118° 2'	...	NE	7		
	12, Noon	13 24	117 47	...	ESE		oqr.	strong wind.
	13, Noon	14 13	118 0	...	ESE			fine.

S.S. *LIGHTNING*.

Nov.	11, Noon	4° 16'	106° 12'	29.86	WNW	5	oq.	
	Midt.			.84	NNW	5		clear.
	12, Noon	7 28	108 12	.82	WNW			heavy NE swell.
	Midt.			.74	WNW	6	og.	
	13, Noon	10 39	110 7	.69	SW	5	oqr.	high cross sea.
	Midt.			.80	SE	4		"
	14, Noon	13 43	112 9	.90	ESE	4		"
	Midt.			.94	ENE	4		"

S.S. *GLAMORGANSHIRE*.

Nov.	12, Noon	90° 42'	110° 15'	29.88	NNW	5		High cross sea.
	4p.			.78	NW	5	od.	"
	8p.			.60	WSW	8	oq.	"
	Midt.			.55	SW	8	"	"
	13, 4a.			.56	SSW	8	"	"
	8a.			.60	S	7	"	"
	Noon	13 05	111 56	.72	SSE	7	"	"
	4p.			.78	SSE	6	"	"
	8p.			.82	SE	6	"	"
	Midt.			.81	SE	6	"	"
	14, Noon	16 33	113 50	.94	ESE	4	"	"

S.S. *GLENORCHY*.

Nov.	12, Noon	12° 28'	111° 20'	29.51	NW	9		High cross sea.
	4p.	going southwards			N/W			
					6p. W/N, 7p. W.			(at 7p. going northwards).
	8p.			29.55	WSW			(9p. full speed).
	Midt.			.46	SW			
	13, 4a.				SE	7		
	Noon	13 38	112 5	.75	SE	4		Heavy N swell.

This steamer was very near the centre but was saved by running S. in time.

S.S. *PETERSBOURG*.

Nov.	11, Noon	17° 07'	114° 18'	30.08	ENE	6	b.	
	Midt.			29.96	NNE	5	c.	
	12, Noon	13 00	111 36	.72	N/E	8	or.	
	4p.			.57	N/W	8	"	
	8p.			.53	NW	9	"	
	Midt.			.61	WSW	8	"	
	13, 4a.			.61	SW	7	c.	
	8a.			.73	SW/S	7	b.	
	Noon	10 14	110 07	.76	SW	6	b.	

At 7 p. on the 12th this Russian Steamer in about 12° 25', 111° 10' was very near the centre. At 7 p. the entry was made: NW 10, 29.49; but the barometer has not been compared here. There was a heavy and continuous downpour of rain without thunder and about 7 p. a calm of 3 or 4 minutes duration.

At 10 a. on the 19th November the barometer reached a maximum 29.97 at Bolinao, where light land and sea breezes (SE in the morning and NW in the evening) prevailed. At 10 a. on the 20th the barometer had fallen (Bolinao: 29.84 SE 1 c.) The barometer was steady in southern China (Hongkong 30.10 E 4 ov) The weather was cloudy, warm and rather dry.

At noon on the 19th the ship *Helen Brewer* in 15° 50', 127° 36' had a fresh NE gale, which sprung up during the morning. At 1 p. (barometer 30.02) it rose to blow a strong NE gale. She was hove to under spanker, foretopmast staysail and mizen topmast staysail. At noon on the 20th in 16° 15', 127° 13' (barometer 29.54) there was a high cross sea. At 3.15 p. the sea and gale becoming so violent, that it was no longer possible to lay to (the ship being insufficiently ballasted and loaded all over with kerosine oil from America for Hongkong) and the ship labouring heavily and the decks being full of water they took in the spanker and mizen topmast staysail and ran across the path of the typhoon in front of the centre directly for Luzon under bare poles and foretopmast staysail heading NW/W (? SW/W). The wind gradually backed to the N and W and the ship was quite properly kept with the wind on the starboard quarter. The barometer fell at the rate of $\frac{1}{2}$ tenth an hour. It blew a terrific typhoon with fierce squalls and occasional lulls. The ship was heading WSW at midnight

and running $7\frac{1}{2}$ knots. The barometer fell at the rate of $1\frac{1}{2}$ tenths per hour which indicates a gradient of about 0.50 inch in 15 miles. At 2 a. on the 21st the foretopmast staysail blew away. She was then heading SW (barometer 28.74) in $14^{\circ} 30'$, $125^{\circ} 0'$. They tried to keep her before the wind but at 4 a. (barometer 28.44) she broached to and was hove down on her beam ends so far that the lee yard arms of the fore and mainyard were half under water. The port lifeboat, the cutter and everything moveable on deck went overboard, and the sea broke in under the topgallant forecabin and filled every cabin forward with water. They cleared away the jib to pay her off but it blew away. The outer jib blew away afterwards. They set the maintopmast staysail—same fate. They loosed the lee clew of the forelowertopsail but it blew away at once, clean torn from the boltrope. The weather side of the foresail was loosed and the whole sail blew away. These were all new sail. The ship was on her first voyage out. At 4.30 a. the barometer began to rise, after a slight lull lasting a few minutes. Then the typhoon began with increased fury from SW. At 6 a. the barometer (28.94) had risen $\frac{1}{2}$ inch in 2 hours. The ship remained on her beam ends, in a most critical situation, the hatches being likely to wash away as they were all under water. At 7 a. they cut away fore and maintopgallant mast and began to clear away the wreck. They bent a new foretopmast staysail and jib to try and pay her off. But she would not answer her helm. They cut away the rigging of the mizentopgallant mast but the mast did not carry away. At noon on the 21st (barometer 29.24) it was reckoned that the ship had been carried 104 miles in the past 24 hours in her circular course round the centre. In the afternoon it blew with great violence and the sea was tremendous. The ship remained on her beam ends. It began to moderate at 4 p. At midnight barometer 29.34. The topgallant yards and masts were under the ship and striking heavily, though all hands had been trying to clear away the wreckage. At daylight on the 22nd there were 11 inches of water in the hold. The lee rail was out of the water and the gale abating. At noon she was in $15^{\circ} 49'$, $124^{\circ} 41'$. At noon on the 23rd she was in $16^{\circ} 19'$, $124^{\circ} 34'$ with a list to port of 6° . There was a moderate S to SSW wind but a heavy confused sea (barometer 29.64) She ran for Cebu as the rudder pintles were damaged.

At noon on the 19th the centre must have been in about 14° , 129° , at noon on the 20th in $14\frac{1}{2}^{\circ}$, $126\frac{1}{2}^{\circ}$ and at noon on the 21st in $15\frac{1}{2}^{\circ}$, $124\frac{1}{2}^{\circ}$. It blew with typhoon force within 50 miles of the centre, and a strong gale within 100 miles. To the north of the centre it blew a strong breeze within 600 miles.

We have the following observations made at 10 a. and 4 p. on the 21st and at 10 a. on the 22nd in Luzon:—

	10a. on 21st.			4p. on 21st.			10a. on 22nd.		
Lavag,	18° 13'	120° 37'	29.67? NNW 3 o.	29.27? NW 3 o.	29.63 NW 3 o.				
Vigan,	17 34	120 24	.57 N 3 o.	.48 NE 4 o.	.64 NNW 3 c.				
Bayombong,	16 29	?	.53 SSW 1 o.	.39 SW 1 o.	.52 SSW 2 o.				
Bolinao,	16 23	119 55	.58 N 5 o.	.54 N 7 o.	.71 NNW 5 o.				
S. Isidro,	15 22	?	.57 S 1 o.	.48 W 2 c.	.69 WSW 1 o.				
Pta. Restinga,	14 16	?	.62 SW 3 o.	.57 SW 5 o.	.74 SW 4 o.				
Pta. Santiago,	13 46	120 40	.65 W 6 o.	.59 W 6 o.	.76 W 6 o.				
Tayabas,	14 1	121 35	.56 SSW 1 o.	.50 SW 2 o.	SW 2 c.				
Antimonan,	14 2	121 56	.57 W 2 o.	.50 WSW 2 o.	.69 SW 1 c.				

On the 21st a strong SW gale was experienced on board the S.S. *Cosmopolit* moored at double anchor in Iloilo. The barque *Harvard* at noon on the 20th in 20° , 118° had strong NE wind and very bad sea continuing next day. On the 22nd in $20^{\circ} 48'$, $118^{\circ} 50'$ she experienced a moderate gale from NE/E with cloudy and squally weather and drizzling rain. At midnight it had backed to WNW and blew a fresh gale (strongest at 1 a. on the 23rd). On the 23rd it blew moderately from W and the barometer rose.

SOUTH CAPE.

November 22, Noon	29.58	N	6	empd.	November 23, 9a.	29.57	WNW	8	cpq.
3p.	.53	N	5	"	Noon	.62	WNW	8	"
6p.	.50	N	5	cm.	3p.	.60	WNW	8	cmq.
9p.	.54	NNW	4	"	6p.	.66	WNW	8	"
Midt.	.54	NNW	4	"	9p.	.76	WNW	6	cm.
23, 3a.	.50	NW	6	"	Midt.	.82	NW	3	"
6a.	.52	WNW	7	cpq.					

H.M.S. *Pallas* was at anchor in Tatsang Bay (Northern Pescadores), which is exposed chiefly to winds between NNW and NNE. The following observations were made:—

Nov. 21,	4 p.	29.81	NNE	5	oq.	Nov. 23,	4 a.	29.63	NNW	9	od
21,	Midt.	.78	...	7	...	23,	8 a.	.73	N	4	...
22,	4 a.	.74	...	7	...	23,	Noon	.78	NNW	2	...
22,	Noon	.66	...	8	...	23,	4 p.	.74	NW	1	b
22,	4 p.	.55	N/E	8	...	23,	8 p.	.72	SW	1	...
22,	8 p.	.59	...	8	...	23,	Midt.	.86	W	1	...
22,	Midt.	.61	N/W	8	...						

S.S. TOONAN.

Nov. 23,	Noon	32° 37'	123° 00'	29.72	NE	orm.
23,	Midt.			.88	NNW	strong wind.
24,	Noon	29 05	122 28	30.16	NNW	8 high sea.
24,	Midt.			.30	NNE	

S.S. CANTON.

Nov. 23,	Noon	30° 22'	122° 36'	29.71	W	5 heavy SE swell.
23,	6 p.			.75	NW/N	9 oqd.
23,	Midt.			.87	NW	8 high sea.
24,	Noon	29 12	122 25	30.19	NW	6 oq.

The observations made at the same time on board the S.S. *Thales*, moored in Battery Bay (Pescadores), agree closely with those made on board H.M.S. *Pallas*. The S.S. *Kwanglee* coming down from Shanghai had a fresh N gale in about 28°, 122° in the afternoon on the 23rd. The S.S. *Woosung* at 8 p. on the 23rd had a fresh W gale (barometer 30.05), near Chinkiang. The sailing vessel *Altair* in 38°, 121° at 4.20 a. on the 23rd encountered a terrific NNE gale which threw the ship on her beam ends, shifting the cargo. They cut away all sails, stays and rigging and then she partly righted. The seas washed away boats and did great damage to the deck-rooms. The tarpaulins got off the hatches and the water poured into the main hatch. They attempted to wear but the sails were blown out of the gaskets. There was a tremendous snow-storm and mountainous sea at noon. At 3.30 p. the gale moderated. It blew steady from NNE.

At noon on the 22nd the centre of the typhoon was in about 18°, 123°. In the evening it appears to have passed northwards to the E of South Cape within probably 100 miles. About that time it recurved and at noon on the 23rd it was in about 27°, 125°.

Observations made at noon on November 23rd in Coast Ports:—

Newchwang,	-.75	NNE	8	om.	Kiukiang,	29.90	+.05	W	4	o.
Yuensan,	-.23	...	0	or.	Wenchow, .....	.60	-.19	NW	3	c.
Taku,	+.19	NE	5	cs.	Middle Dog, .....	.63	-.15	...	0	b.
Howki,	-.05	NE	9	om.	Keelung, .....	.65	-.13	WNW	2	o.
Chefoo,	29.84	N	7	os.	Oekseu, .....	.71	-.06	SW	1	c.
Chemulpo, .....	.84	N/E	2	or.	Amoy, .....	.74	-.03	W	2	b.
Shantung, .....	.79	NNE	7	od.	Fisher Island, .....	.72	+.11	WNW	3	cv.
Fusan, .....	.82	NNE	3	cg.	Swatow, .....	.75	-.02	WSW	1	b.
Chinkiang,	-.09	NNE	2	od.	Anping, .....	.72	+.12	NNW	7	c.
Wusung, .....	.71	WNW	1	om.	Takow, .....	.72	+.10	NW	6	o.
Wuhu,	+.01	W	4	om.	Hongkong, .....	.79	.00	WSW	2	b.
North Saddle, .....	.70	SE NW	4	or.	South Cape, .....	.62	+.04	WNW	8	cpq.
Steep Island, .....	.74	ESE NW	4	os.	Haiphong, .....	.70	-.04	...	0	o.
					Bolinao, .....	.85	+.14	NW	2	c.

P.M.S.S. PERU.

Nov. 22, Noon	27° 06'	124° 12'	29.93	ENE	3
Midt.			.87	SE	9
23, Noon	28 26	127 56	.76	E	9
4 p.			.61	E	8
6			.49	ESE	8
8			.39	SW	9
10			.16	SW	10
11			.06	SW	1
Midt.			28.88	SW	12
24, 1 a.			.99	W	12
2			29.16	WNW	12
4			.28	NW	12
8			.64	NW	10
Noon	29 38	131 33	.72	NW	9
25, Noon	32 20	135 31	.92	NNW	7

U.S.S. ALERT in 33°, 136°.

Nov. 24,	4 a.	29.44	S	7
	5	.37	SSE	7
	6	.30	SSE	7
	7	.19	SSE	8
	8	.04	SSE	8
	9	28.88	SSE	9
	10	.81	ESE	7
	11	.94	NE/E	11
	Noon	29.05	NW/N	8
	1 p.	.08	N/W	7
	2	.25	N/W	6
	3	.33	WNW	3
	4	.40	W	5
	5	.48	NW/W	6
	6	.54	NW/W	7

On board the *Peru* the lowest barometer was read after the calm centre had passed and when the typhoon was blowing with full force from the S. On board the *Alert* the wind hauled into the NE quarter about 8 p. on the 23rd and the barometer began to fall rapidly, passing showers increasing to steady rain. The sea was then moderate. From midnight to 4 a. on the 24th it shifted to SE and S and increased with steady rain and thick weather. About 10.10 a. the wind fell calm and then suddenly shifted to NE and blew with typhoon force, and heavy blinding rain, the old sea being beaten down by the wind. About noon it began to clear but it still blew hard in the squalls and the sea was very high and confused.

The centre was at noon on the 24th in 33° 30', 127° 50' moving ENEward at the rate of about 50 miles an hour. The S.S. *Guthrie* in 34°, 131° had 29.84 NW 11 with fierce squalls. The S.S. *Sutlej* in 29½°, 122½° had 30.06 NW 8. Strong N winds prevailed in central Japan with heavy rain. After this typhoon the NE monsoon blew with great strength over the Eastern Seas.

DECEMBER.

On the 2nd there was a very small typhoon in the Gulf of Siam, of which the following observations have reached us:—

S.S. <i>NAMYONG</i> .							S.S. <i>LOOSOK</i> .					
Nov. 30, Noon	3° 15'	104° 50'	29.93	N	4	o.	Dec. 1, Midt.	12° 00'	101° 00'	29.93	NE	3
Midt.			.89	NW	4	oqr.	2, 4 a.	11 20	101 20	.87	NE	7 oqr.
Dec. 1, 4 a.			.78	NW	4	or.	8 a.			.89	N	10
8 a.			.88	WNW	4	or.	9 a.			.81	N	10
Noon	6 04	105 51	.87	W	3	cp.	10 a.			.77	N	10
4 p.			.86	WSW	4	cp.	11 a.	10 35	102 10	.69	N	10
8 p.			.94	SW	4	cp.	Noon	10 30	102 13	.61	$\frac{N}{S}$	11
Midt.			29.95	S	4	c.	1 p.			.65	S	10
2, Noon	8 15	108 05	30.04	NE	3	oqr.	2 p.			.68	S	8
							4 p.			.77	S	6
							8 p.	10 00	102 30	.85	S	6
							Midt.			.87	S	6
							3, 4 a.			.87	SSE	7
							Noon	8 34	104 35	.93	E	6
S.S. <i>NANSHAN</i> .												
Dec. 2, 4 p.	13° 20'	100° 40'	29.99	NE	6							
8 p.			30.00	NNE	7							
Midt.			30.01	NE	10							
3, 4 a.			29.99	E/N	10							
8 a.			30.06	ENE	6							
Noon	10 23	102 16	30.06	SE	5							
Midt.			30.02	ESE	4							
4, Noon	8 45	104 23	30.05	ENE	3							

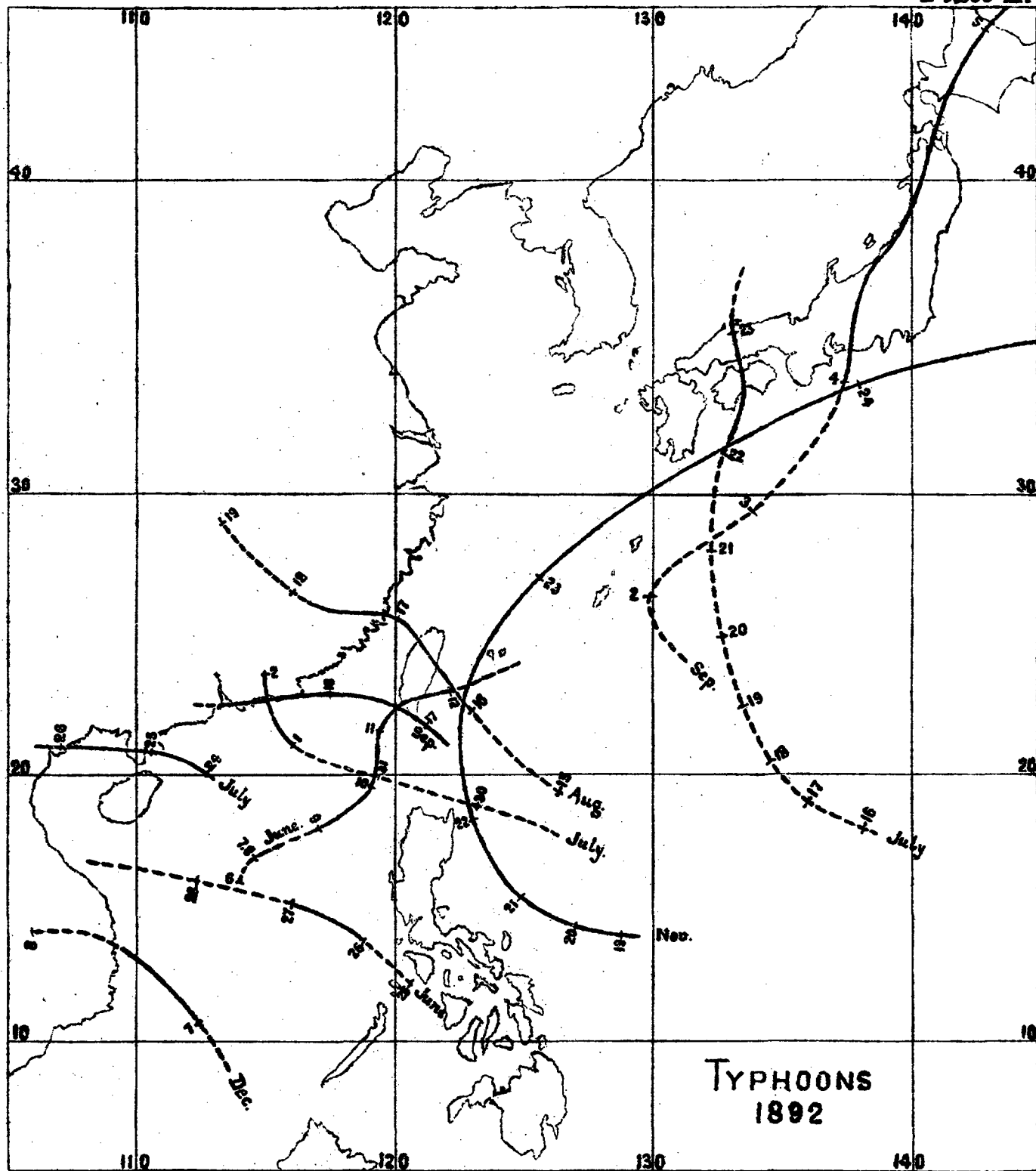
There was a tremendous cross sea in the middle of the Gulf on the 2nd and wet weather. The calm centre passed over the *Loosok* about noon. The centre appears to have come up from the S or SE. It is very unusual to have the presence of a typhoon centre in so very low a latitude as this must have been in on the 1st, but from the observations on board the *Namyong* it appears that there was a very minute depression in about 5°, 108° on the morning of the 1st. A fresh NE gale with squally and wet weather and high sea was reported from Cape S. James. At noon it was perhaps in 7°, 107½°. It must have moved up into the Gulf with a velocity most unusual in that latitude, but there was a strong NE monsoon blowing in the China Sea. At noon on the 2nd we know it was in 10° 30', 102° 13'. At that time it blew a strong gale within 200 miles of the centre. It then moved Eward towards the Isthmus of Kraw which it may have entered in a latitude of 11°.

On the 7th December the *Nanshan* experienced another typhoon in the China Sea. Cape S. James reported N 5 and slight swell at 9 a. on the 7th. NW 7 and swell at 3 p. W 7 and swell at 9 a. on the 8th and NE 4 and fine weather at 3 p.

S.S. <i>NANSHAN</i> .											
Dec.	5, Noon	9° 41'	107° 5'	30.03	ENE	4	oq.				
	6, Noon	11 41	109 32	.00	N	8		long N swell.			
	Midt.			.93	N/E	8		high cross sea.			
	7, Noon	13 05	110 53	.77	N	9		oil used.			
	2 p.			.64	NE	9	oq ^{r2}				
	4 p.			.63	NE	9					
	6 p.			.64	ENE	...					
	8 p.			.79	...	...		moderating.			
	10 p.			.83	ESE	...		fierce squalls.			
	Midt.			29.86	SSE	8		high cross sea.			
	8, Noon	14 18	111 39	30.00	E/S	4		ENE swell.			
	9, Noon	16 23	114 20	.07	NE	5					
S.S. <i>DONAR</i> .											
Dec.	6, Noon	12° 54'	110° 15'	29.93	NNE	7	o.				
	7, 4 a.			.87	NE	8	o.				
	Noon	14 35	110 45	.87	NNE	7	oq.				
S.S. <i>NANYANG</i> .											
Dec.	6, Noon	7° 56'	109° 36'	29.92	N	2		rough sea.			
	Midt.			.86	NNW	6		high sea or.			
	7, Noon	10 09	110 15	.86	WNW	7	oqr ²				
	4 p.			.82	SSW	8					
	8 p.			.86	SSW	8					
	Midt.			.90	S	7					
	8, 4 a.			.90	SSE	6	oq.				
	Noon	13 17	112 34	.98	SE	4					

It appears that the centre may have originated N of Borneo and W of Palawan on the 6th. At noon on the 7th it was in about 10° 40', 112° 20', and at midnight in about 13° 20', 109° 20'. Then it entered Cochin China near Quinhon and appears to have moved Wward on the 8th. It blew a strong NE gale to the north of the centre 300 miles away, but to the S of the centre only about 150 miles away.

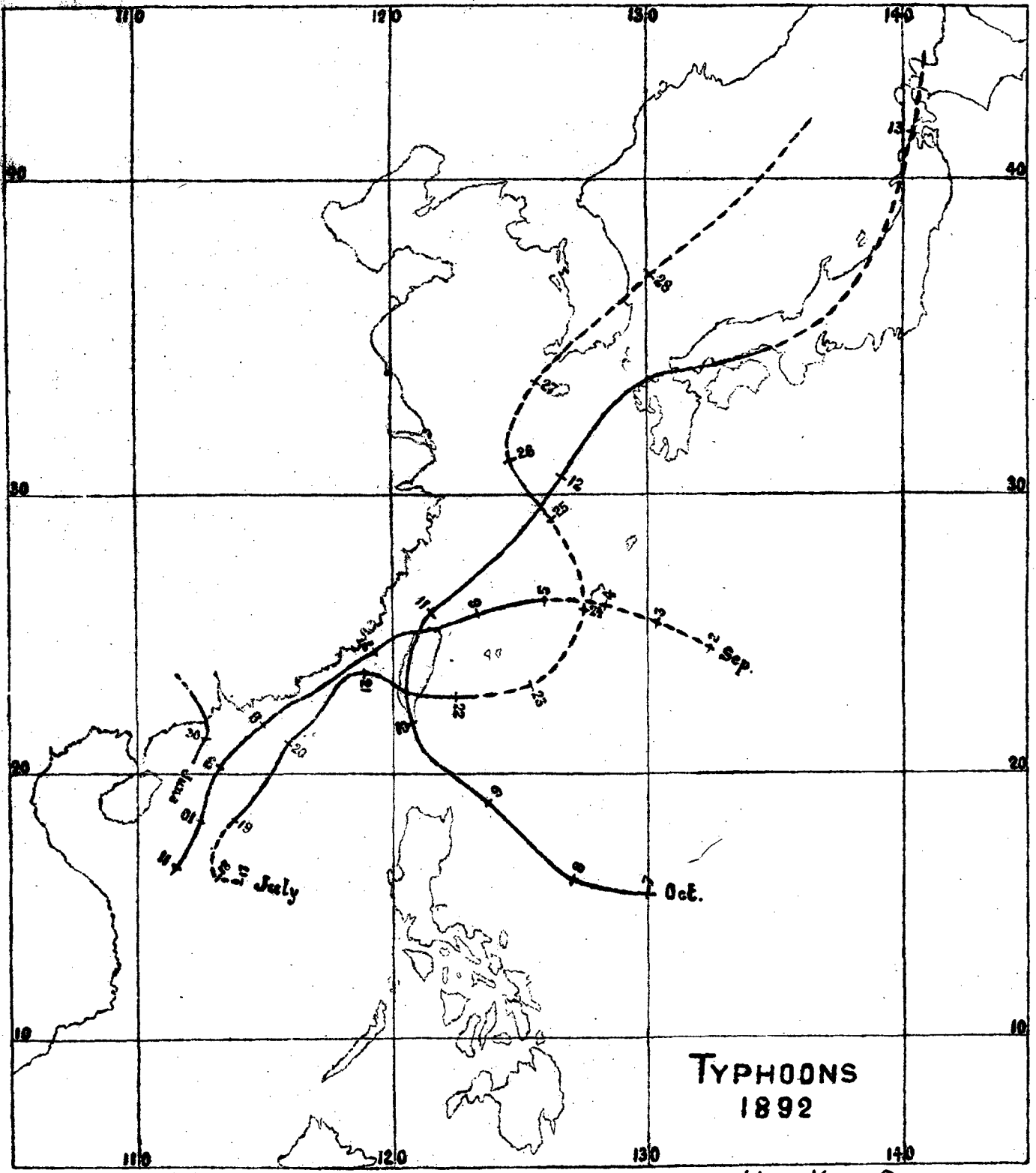
Plate I.



TYPHOONS
1892

HONG KONG OBSERVATORY.

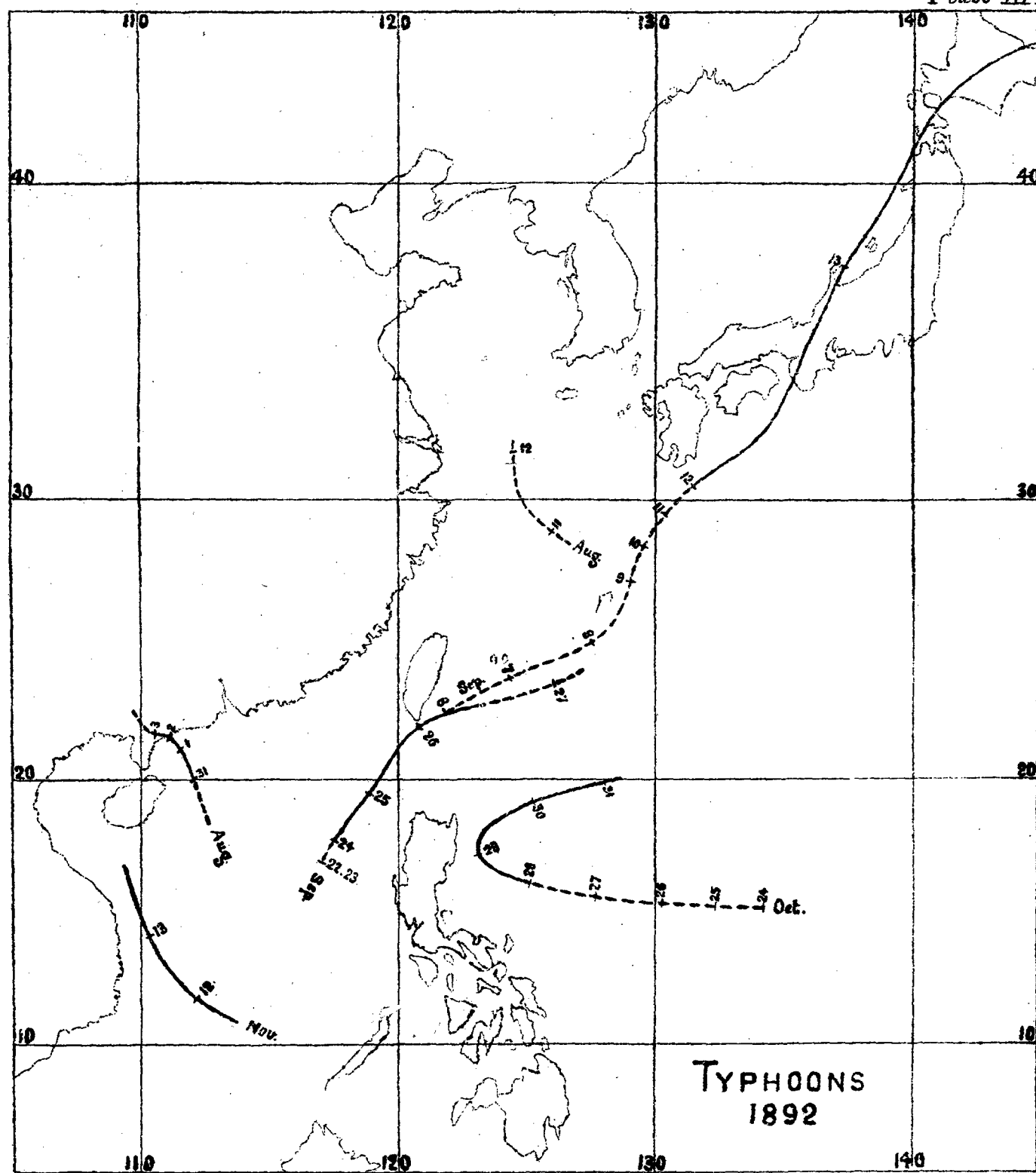
Plate II.



TYPHOONS
1892

HONG KONG OBSERVATORY.

Plate III.



TYPHOONS
1892

HONG KONG OBSERVATORY.

