APPENDIX A

DEFINITIONS AND ABBREVIATIONS

1. CERTAIN WORDS THAT APPEAR FREQUENTLY IN THIS REPORT ARE ABBREVIATED AS FOLLOWS:

FEET - FT

KNOT(S) - KT(S)

MILLIBAR OR MILLIBARS - MB

NAUTICAL MILES - MI

WEATHER RECONNAISSANCE SQUADRON - WRS

2. POINTS OF THE COMPASS ARE ABBREVIATED: N, SE, WNW, ETC.

3. LATITUDE AND LONGITUDE ARE ABBREVIATED: 30N 140E, ETC.

4. AN INVESTIGATION IS THE TRAVERSE OF A RECONNAISSANCE AIRCRAFT OVER AN AREA CONTAINING A SUSPECTED CIRCULATION THAT HAS BEEN ASSIGNED A CYCLONE NUMBER.

5. A FIX IS THE DETERMINATION OF THE POSITION OF A TROPICAL CYCLONE AT A PRECISE TIME. GENERALLY, THE TERM "FIX" IS USED WHEN THE POSITION OF THE CYCLONE HAS BEEN DETERMINED BY A RECONNAISSANCE AIRCRAFT PENETRATION OR BY AIRBORNE, LAND OR SHIP RADAR. IN THE CASE OF A RECONNAISSANCE AIRCRAFT PENETRATION, THE ACTUAL FIX MAY BE BASED ON ONE OR ALL OF THE FOLLOWING: VISUAL OBSERVATION, RADAR, SURFACE PRESSURE, SURFACE OR UPPER LEVEL WINDS, CONSTANT PRESSURE HEIGHT, AND TEMPERATURE/DEW POINT.

6. A SORTIE IS DEFINED AS A FLIGHT BY ONE AIRCRAFT WITH ONE OR MORE OBJECTIVES, I.E., IT MAY MAKE ONE OR MORE FIXES AND/OR ONE OR MORE INVESTIGATIONS ON ONE OR MORE TROPICAL CYCLONES.

7. THE TERM "TROPICAL CYCLONE" OR "CYCLONE" AS USED IN THIS PUBLICATION HAS TWO DEFINITIONS DEPENDENT UPON USAGE.

A. "TROPICAL CYCLONE" OR "CYCLONE" IS USED TO DESCRIBE A SUSPECTED TROPICAL CYCLONIC CIRCULATION WHICH APPEARS CAPABLE OF INTENSIFICATION, AND TO WHICH HAS BEEN ASSIGNED A "CYCLONE NUMBER" FOR THE PURPOSES OF RECONNAISSANCE AND TO ASSURE THAT RECORDS REGARDING IT ARE NOT CONFUSED WITH THOSE OF ANOTHER CIRCULATION.

B. "TROPICAL CYCLONE" OR "CYCLONE" IS USED IN THE GENERAL SENSE, E.G., "TYPHOON JOAN WAS THE MOST INTENSE TROPICAL CYCLONE OF 1959," OR, "TROPICAL CYCLONES MOST FREQUENTLY DEVELOP DURING AUGUST AND SEPTEMBER."

8. A TROPICAL DEPRESSION IS A TROPICAL CYCLONE WITH A CONFIRMED CYCLONIC CIRCULATION, FOR WHICH WARNINGS ARE BEING ISSUED AND WHOSE SURFACE WIND SPEEDS DO NOT EXCEED 33 KTS. THE NUMBERING OF TROPICAL DEPRESSIONS IS NOT RELATED TO THE NUMBERING OF TROPICAL CYCLONES.

9. THE FOLLOWING DEFINE AND CLARIFY CERTAIN WORDS AND PHRASES THAT APPEAR IN THE TABLES, "LAND RADAR AND AIRCRAFT FIXES," CHAPTER IV.

A. FIX NO. - THIS NUMBER CORRESPONDS TO THE NUMBER OF THE FIX PLOTTED ON THE "BEST TRACK CHART."

B. TIME - THE DATE-TIME GROUP OF THE FIX.

C. LAT. - LATITUDE OF THE FIX.

D. LONG. - LONGITUDE OF THE FIX.

E. UNIT METHOD & ACCY -

(1) UNIT - THE UNIT THAT MADE THE FIX: 56 - 56TH WEATHER RECONNAISSANCE SQUADRON; 315 - 315TH AIR DIVISION; VW1 - VW-1 EARLY WARNING SQUADRON.

(2) METHOD - THE METHOD USED TO MAKE THE FIX: P - PENETRATION; R - RADAR; T - TRIANGULATION.

(3) ACCY - THE ESTIMATED ACCURACY OF THE FIX IN NAUTICAL MILES.

F. MIN SLP MB - THE MINIMUM SEA LEVEL PRESSURE IN MILLIBARS.

G. MAX SFC WND - THE MAXIMUM OBSERVED SURFACE WIND IN KTS.

H. MIN 700 MB HGT - THE MINIMUM 700 MB HEIGHT IN FT.

I. MAX 700 MB WND - THE MAXIMUM 700 MB WIND IN KTS.

J. 700 MB TT/TD (°C) - THE MAXIMUM 700 MB TEMPERATURE AND DEWPOINT IN DEGREES CENTIGRADE.

K. EYE CHARACTERISTICS - SELECTED REMARKS ON THE CHARACTERISTICS OF THE EYE.

SC - STRATO-CUMULUS	DIA - DIAMETER
CIRC - CIRCULAR	ELLIP - ELLIPTICAL
CLD(S) - CLOUD(S)	ELONG - ELONGATED
CTR - CENTER	INDEF - INDEFINITE

ORIEN - ORIENTED

QUAD(S) - QUADRANT(S)

RAD - RADIUS

SFC - SURFACE

WND - WIND

10. A "STIDD DIAGRAM" IS A CHART ON WHICH A CONTINUOUS PLOT OF SURFACE OBSERVATIONS IS MAINTAINED FOR A SERIES OF STATIONS. THE OBSERVATIONS FOR EACH INDIVIDUAL STATION ARE PLOTTED IN EITHER A HORIZONTAL OR VERTICAL LINE.

11. THE "M2 FIELD" IS THE CORRECTION FOR THE CORIOLIS PARAMETER APPLIED TO THE 500 MB DOUBLE SPACE MEAN.

12. THE "BAR" IS THE HEAVY BANK OF CLOUDS THAT APPEARS ON THE HORIZON WITH THE APPROACH OF AN INTENSE TROPICAL CYCLONE.

13. RECURVATURE - THAT POINT AT WHICH THE CYCLONE CEASES MOVEMENT TO THE W OF N AND COMMENCES MOVING TO THE E OF N.

14. SEVERAL COMMANDS, ORGANIZATIONS, AND AREAS THAT APPEAR FREQUENTLY IN THIS REPORT ARE ABBREVIATED AS FOLLOWS:

JMG PACOM - JOINT METEOROLOGICAL GROUP, PACIFIC COMMAND

NMC - NATIONAL METEOROLOGICAL CENTER (FORMERLY JNWP, JOINT NUMERICAL WEATHER PREDICTION)

FWC/JTWC - FLEET WEATHER CENTRAL/JOINT TYPHOON WARNING CENTER, GUAM, M. I.

FAFWC - FUCHU AIR FORCE WEATHER CENTRAL, FUCHU AIR STATION, JAPAN

FNWF - FLEET NUMERICAL WEATHER FACILITY, MONTEREY, CALIFORNIA

WESTPAC - WESTERN NORTH PACIFIC AREA

APPENDIX B

LIST OF ILLUSTRATIONS, CHARTS AND GRAPHS

Surface Streamline Chart - NANCY ---------- 6
Checkerboard or Stidd Diagram - NANCY ---------- 7
Time Cross Section - NANCY ---------- 8
Space Cross Section - NANCY ---------- 9
Reconnaissance Data - VIOLET ---------- 10
Easterly Wave Continuity Graph ---------- 11
Long Wave Analysis and 48 Hour Prognosis ---------- 12
Fixes Made, Hours Flown by 56 WRS and AEWRON One ---------- 18
Radar Fixes - TILDA ---------- 21
Monthly and Annual Frequency of Typhoons, 1952-1961 ---------- 26
Points of Origin of Typhoons, 1952-1961 ---------- 29
Points of First Typhoon Intensity, 1952-1961 ---------- 30
Composite Chart of Tropical Depressions and Storms, 1961 ---------- 31
Six Hourly Positions, Tropical Depressions, 1961 ---------- 32
Six Hourly Positions Tropical Storms, 1961 ---------- 35
Composite Chart of Typhoon Tracks, 1961 ---------- 38
Typhoon Tracks, March 1961 ---------- 40
Typhoon Tracks, May 1961 ---------- 41
Typhoon Tracks, June 1961 ---------- 42
Typhoon Tracks, July 1961 ---------- 43
Typhoon Tracks, August 1961 ---------- 44
Typhoon Tracks, September 1961 ---------- 45
Typhoon Tracks, October 1961 ---------- 46
Typhoon Tracks, November 1961 ---------- 47
Typhoon Tracks, December 1961 ---------- 48
Typhoon Data Summary, 1961 ---------- 51
Summary of Typhoon Forecast Errors, 1961 ---------- 52

TESS
Best Track ---------- 56
Radar and Reconnaissance Fixes ---------- 57
Position and Forecast Verification Data ---------- 59
24 Hour Forecast Posits ---------- 60

ALICE
Best Track ---------- 62
Radar and Reconnaissance Fixes ---------- 63
Position and Forecast Verification Data ---------- 64
24 Hour Forecast Posits ---------- 65

BETTY
Best Track ---------- 68
Radar and Reconnaissance Fixes ---------- 69
Position and Forecast Verification Data ---------- 70
24 Hour Forecast Posits ---------- 71

CORA	BEST TRACK	73
	RADAR AND RECONNAISSANCE FIXES	74
	POSITION AND FORECAST VERIFICATION DATA	75
	24 HOUR FORECAST POSITS	76
ELSIE	BEST TRACK	78
	RADAR AND RECONNAISSANCE FIXES	79
	POSITION AND FORECAST VERIFICATION DATA	80
	24 HOUR FORECAST POSITS	81
HELEN	BEST TRACK	84
	RADAR AND RECONNAISSANCE FIXES	86
	POSITION AND FORECAST VERIFICATION DATA	88
	24 HOUR FORECAST POSITS	89
IDA	BEST TRACK	93
	RADAR AND RECONNAISSANCE FIXES	94
	POSITION AND FORECAST VERIFICATION DATA	95
	24 HOUR FORECAST POSITS	96
JUNE	SKEW-T DIAGRAMS	99
	BEST TRACK	100
	RADAR AND RECONNAISSANCE FIXES	101
	POSITION AND FORECAST VERIFICATION DATA	103
	24 HOUR FORECAST POSITS	104
KATHY	BEST TRACK	107
	RADAR AND RECONNAISSANCE FIXES	108
	POSITION AND FORECAST VERIFICATION DATA	109
	24 HOUR FORECAST POSITS	110
LORNA	BEST TRACK	113
	RADAR AND RECONNAISSANCE FIXES	115
	POSITION AND FORECAST VERIFICATION DATA	116
	24 HOUR FORECAST POSITS	117
NANCY	RADAR PHOTO	121
	BEST TRACK	123
	RADAR AND RECONNAISSANCE FIXES	124
	POSITION AND FORECAST VERIFICATION DATA	126
	24 HOUR FORECAST POSITS	128
	DAMAGE PHOTOS	129
OLGA	BEST TRACK	132
	RADAR AND RECONNAISSANCE FIXES	133
	POSITION AND FORECAST VERIFICATION DATA	134
	24 HOUR FORECAST POSITS	135

PAMELA	Best Track	137
	Radar and Reconnaissance Fixes	138
	Position and Forecast Verification Data	139
	24 Hour Forecast Posits	140
	Damage Photos	141
SALLY	Best Track	143
	Radar and Reconnaissance Fixes	144
	Position and Forecast Verification Data	145
	24 Hour Forecast Posits	146
TILDA	Radar Photo	149
	Best Track	150
	Radar and Reconnaissance Fixes	151
	Position and Forecast Verification Data	152
	24 Hour Forecast Posits	153
	Damage Photos	154
VIOLET	Best Track	156
	Radar and Reconnaissance Fixes	157
	Position and Forecast Verification Data	159
	24 Hour Forecast Posits	160
	Damage Photos	161
BILLIE	Best Track	163
	Radar and Reconnaissance Fixes	164
	Position and Forecast Verification Data	165
	24 Hour Forecast Posits	166
CLARA	Best Track	168
	Radar and Reconnaissance Fixes	170
	Position and Forecast Verification Data	171
	24 Hour Forecast Posits	172
DOT	Best Track	175
	Radar and Reconnaissance Fixes	176
	Position and Forecast Verification Data	177
	24 Hour Forecast Posits	178
ELLEN	Best Track	182
	Radar and Reconnaissance Fixes	183
	Position and Forecast Verification Data	184
	24 Hour Forecast Posits	185
	Damage Photos	186
ARAKAWA	Grid	194
	24 Hour Forecast Error Scatter Diagram	195
	48 Hour Forecast Error Scatter Diagram	196
	24 Hour Movement and Pressure Forecast Errors	197
	48 Hour Movement and Pressure Forecast Errors	198

MILLER-MOORE — GRID ---------- 219
CONVERSION GRAPH ---------- 220

WACHHOLZ GRAPH — COORDINATION CHART ---------- 235
SURFACE AND 700 MB WIND VARIATION GRAPH ------ 236
700 MB HEIGHT AND WIND VARIATION GRAPH ------- 237
MIN. SLP AND 700 MB WIND VARIATION GRAPH ----- 238
700 MB TEMPERATURE AND WIND VARIATION GRAPH -- 239

Typhoon Nancy Hits South Japan, Kills 4

TOKYO (S&S) — Typhoon Nancy swept-up the

Typhoon Triggers Floods

S&S Taiwan Bureau

Typhoon 'Tilda' Clobbers Okin.

Tilda Enc Taiwan Exercise

By S/SGT. JACK BARR
S&S Southern Taiwan Bureau
PING TUNG AB, Taiwan—
n Tien Bing (Sky Soldier)
lied off in its sixth day
rning and an airlift of
ratroopers to their
ner began because of the
Typhoon Tilda.
More than 2,000 men
tinawa-based 2nd Airborne
Group, 503rd Inf. Combat
ere stranded on one side
ter at the base of a

Taipei Air Station Helps Typhoon Pamela Victims

TAIPEI,
Station
can neighbo
leaving
Civil
Chinese
station
Maj.
trucks and
ed food
Lt. Col.
for Air
and stopped
An Ame
were rescu
men A/1C
Houser
The 13

said to
orted
suffered
by the

tions
damage
authorit

Weather Plane Penetrates Eye Of Typhoon Nancy

Six Reported Killed; Crop Damage Hea...

NAHA, Okinawa, Oct. 3 (AP)—Typhoon Tilda roared across this U.S. military island Bastion early today, causing damage to communication lines and homes of island residents.

Six persons were reported killed, two of them crew members of a Greek ship piled on to the shore of Minami Daito island, about 200 miles east of Naha. Twenty-seven other crewmen were said to have been rescued by villagers.

The name of the ship and other details were not known immediately.

BLOWN 300 FT.

Four death... ed in a ... there a ... by the ... t 300 ... The ... ers of ... were ... rican ... r de-

Elsie Batters China

TOKYO (AP) — Typhoon Elsie battered the southern China mainland Saturday with "powerful wind ranging from fresh gale to hurricane force," the New China News Agency reported. Elsie later was downgraded to a tropical depression and was dissipating over the China mainland.

Torrential rains from Nancy hit southern Japan hard Friday. More than 10 inches fell in Oita Prefecture, Kyushu, in less than 12 hours, according to the Japan Meteorological Agency. Gifu Prefecture, just south of Nagoya, received 8.6 inches in a few hours Friday.

Japanese police said the 9 a.m. Saturday 13 persons missing in Kyushu, Shikoku, southern Honshu and 34 injured.

A spokesman for the Air Weather Central at Fuchu, Japan, predicted that Tokyo receive winds of 92 m.p.h. the peak hours of Nancy by the city at 11 p.m.

Nancy had a radius of 2... as it bore down on Tokyo moving at a 20 m.p.h. clip.

The U.S. Air Force canc... flights in the Tokyo are... Nancy passes. Commercial out of Tokyo International were canceled. Planes were

(Continued on Back Page.

PACIFIC STARS AND STRIPES
AN AUTHORIZED PUBLICATION OF THE U.S. ARMED FORCES IN THE FAR EAST
5c SUNDAY 10c DAILY
Vol. 17, No. 259 AIR EDITION Sunday, Sept. 17, 1961

Nancy Buffets Southern Japan

(Continued From Page 1)

down and put into protective hangars.

Weathermen said that Nancy

Roofs of more than 300 homes in Nagoya were blown away Friday afternoon and night. Nearly 800 houses were washed away in south-

Friday after Nancy passed earlier with gusts of more than 100 m.p.h.

The 300-foot Armed Forces Radio and Television Service tower

Tess Clocked At 145 MPH

TOKYO (S&S) Typhoon leading the season by ab... months, was located by A... weather planes about 6... west of Guam at 3 a.m. with center winds of 14...

The unseasonal storm was moving north at 6 m.p.h. and expected to be about 660 mi northwest of Guam at 3 a.m. Monday.

A spokesman for the Air Weather Central at Fuchu, Japan, said the storm was moving harmlessly over open sea and was not expected to near any land mass.

Typhoon On Zig-Zag Course

TOKYO (S&S)—Fickle typhoon Tilda zig-zagged her way through the Pacific Sunday and was expected to pass within 250 miles of Okinawa Monday morning with 150 m.p.h. winds.

A weather reconnaissance plane from Guam located Tilda 410 miles east southeast of Kadena AB, Okinawa, at 9 a.m. Sunday.

The storm was moving west-northwest at 10 m.p.h. and was expected to be 260 miles east-northeast of Okinawa at 9 a.m. Monday.

Storm Floods Taipei, Breaks Heat Wave

TAIPEI, Taiwan (AP)—A violent thunderstorm struck Taipei Sunday afternoon, flooding low-lying areas of the city and forcing hundreds of people to flee to higher ground.

...ne Loses Punch; ...wan Digging Out

S&S Taiwan Bureau

...EI, Taiwan—Typhoon June, ... m.p.h. winds a mere whisp... the 90 m.p.h. gales which ...d Taiwan Monday, dissipat... ...thwest of Fuchow on the ...e mainland Wednesday as ...ricken Kaohsiung began

arrived from three hard-hit areas —Orchid Island, Hsinchu and the area north of Taitung.

Communications have been out in three areas since June struck Monday.

On Taiwan, flood waters began receding Tuesday and conditions returned to normal

Billie Weakening; New Storm Forms

TOKYO (S&S)—A Navy reconnaissance aircraft located a weakening Typhoon Billie 125 miles east of Iwo Jima at 9 a.m. Friday, the Joint Typhoon Warning Center on Guam reported.

The center also reported that a new tropical storm, Clara, was 150 miles east of Wake Island at the same time and was moving northeast at 8 m.p.h. Clara, with winds of 60 m.p.h., was expected to be 275 miles east northeast of

213 MPH Winds Hit Taiwan

(Continued From Page 1)

Guam Monday, but fringe winds measured at more than 80 m.p.h. lashed the island causing $44,000 in damage, according to PACIFIC STARS AND STRIPES' Guam Bureau.

A spokesman for Guam Gov. Bill Daniel said Tuesday morning that precautions taken by civil defense officials in the face of the oncoming storm greatly reduced damages.

About 2,000 Guamanians were evacuated Monday from their village homes to permanent, reinforced buildings. Hundreds were put up in the Guam Memorial Hospital and the U.S. Navy

Typhoon Elsie Aims At Taiwan

S&S Taiwan

TAIPEI

Typhoon At Sea; Loss Light

Pictures, Pages 12, 13

TOKYO (S&S)—Typhoon Violet stormed into the North Pacific Wednesday after killing 2 persons and injuring 17 with 85-m.p.h. winds Tuesday in the Tokyo-Yokohama area

TYPHOON NANCY

By JIM LIVSEY JO1

Typhoon Nancy, packing internal winds in excess of 150 knots, slashed within 80 miles of Guam Monday, September 11, before spinning out to sea

Typhoon Nancy was still hundreds of miles from Guam when the initial Condition Three announcement was made by ComNavMar. A midnight typhoon penetration by a VW-1 "Warning Star" found winds in excess of 130 knots in the now fully developed typhoon.

Top Storm Alert Set On Guam

S&S Guam Bureau

...Course ...tion

...e Philippines ...ye in spon... national mo... ...amp Murphy

National ...n, a plaque ...ven him Oct. ...ee G. Luk-

To Sinking Japanese Ship

AGANA, Guam (UPI) — The Guam Rescue Center has reported that the Japanese freighter Fukusan Maru was "slowly sinking" Thursday 380 miles north of here.

According to the report, the 7,000-ton freighter radioed that it had encountered rough seas at 1:40 p.m. Thursday.

The U.S. radar picket ship Bris-

Typhoon Roaring Toward S. Japan

S&S Okinawa Bureau

KADENA AB, Okinawa—Heavy rains and gusts up to 56 m.p.h. whipped Okinawa early Monday as the island braced for violent winds from Typhoon Tilda's 150 m.p.h. punch.

Air Force weathermen here expected winds of 85 m.p.h. by noon Monday as the erratic typhoon swirled west-northwest at 11 m.p.h. They said 58 m.p.h. winds extend 110 miles from the storm's center.

If Tilda remains on her present course, strong winds should slap Okinawa's east coast, according to the Japanese Central Meteorological Agency in Tokyo. The agency also predicted heavy rains in west and south Japan as Tilda nears Japan.

The Joint Typhoon Warning Center

(Continued on Back Page, Col. 3)

Tilda Lashes Oki; 6 Killed

CONT'D FROM P. 1

slammed across the Okinawa area late yesterday and early today.

They said the Ryukyuan radio reported nine Okinawans were known dead and that there was considerable damage to crops and to homes of residents on the southern part of the island.

NO DETAILS

The Gabu River which runs through the city of Naha was said to have surged as much

'PAMELA' LASHES FORMOSA--17 DIE

BULLETIN

TAIPEI, Sept. 12 (AP)—Typhoon Pamela smashed across the island of Formosa today, leaving at least 17 persons dead, thousands homeless and inflicting millions of dollars damage before it swirled off toward the mainland.

The death toll may rise as news reports continue to come in. Seven fishermen in a fishing boat off Keelung were drowned after their vessel sank.

At least 27 persons were injured.

COMMUNICATIONS CUT

Radio telephone and other communication contacts were cut. The offices of the Formosa Central Weather Bureau, at Taipei's Pine Hill Airport, were demolish-

attaches and their dependents were marooned by flash floods.

Pamela was the fifth typhoon to hit Formosa this year and cause severe damage. It struck Taipei with winds as high as 106 M.P.H.

Police reported that 4,330 persons were left homeless in Taipei. More than 145 houses col-

Typhoon June Aims at S. Taiwan

TOKYO (S&S) — Typhoon June continued on a determined path toward southern Taiwan Friday as residents of northern Luzon girded for heavy rains and gusty winds, fringe hazards from 80 m.p.h. center winds.

Weather scouts from the Joint Typhoon Warning Center on Guam reported that June was 413 miles southeast of the southern tip of Taiwan at 9 a.m. Friday, headed northwest at about 8 m.p.h.

An Air Force weather spokesman at Fuchu AB, Japan, said Friday morning that southern Taiwan would begin to feel effects of June by late Saturday if the storm stayed on its present path.

The weatherman said that June would be about 275 miles southeast of the southern Taiwan port city of Kaohsiung at 9 a.m. Saturday.

The Air Force Weather Central spokesman said that the storm would not affect Americans stationed at Clark AB.

Meanwhile, tropical storm Helen was redesignated a "tropical depression" by Air Force weathermen as she dissipated over north Korea Thursday night with diminished winds of about 25 m.p.h.

Formosa, Hard-Hit by 'Pamela', Braces As 'Nancy' Approaches