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Federal Aviation Agency

ADVISORY CIRCULAR

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	AIRCRAFT
EFFECTIVE:	7/27/66

SUBJECT: ANALYSIS OF BIRD STRIKE REPORTS ON TRANSPORT CATEGORY AIRPLANES OPERATING IN CONTINENTAL LIMITS OF THE UNITED STATES

1. PURPOSE. This circular provides information to the public on the results of a statistical study dealing with the frequency of bird strikes on transport aircraft and the conditions of damage sustained.

2. INFORMATION. An analysis has been made of reports of collisions of birds with transport category aircraft in scheduled operation from August 1963 to January 1966. The reporting system used for bird strikes was established with the cooperation of the Air Transport Association.

   a. It is of importance to consider the limitations of the data obtained. All of the data desired for each bird strike were not available in each report, so that analysis of the various factors cannot be based on all the incidents reported, and therefore the various factors are not completely correlated.

   b. A significant factor is the large variation in frequency of bird strikes with the season of the year. The greatest frequency occurs during the spring and fall, at a time when migration of birds is at a maximum. This can readily be seen in figure 1 of the Appendix representing the average monthly bird strike frequency.

   c. Figure 2 describes the geographic distribution of reported bird strike accidents, also shows (by arrows) the bird migration routes in the United States.

   d. In this report, only the general size of the bird was identified and figures 3 and 4 reflect this as: Small (0-1 lbs.), medium (1-6 lbs.), and large (6-38 lbs.). Of the reported strikes for this period, totaling approximately 1,075, approximately 37.5 percent of those identified were of the small type; 30.3 percent medium; 6.5 percent large; and 25.7 percent unknown.

   e. It is interesting to note from figure 4 that in cases of reported strikes when the altitude of the airplane was reported, 69 percent of

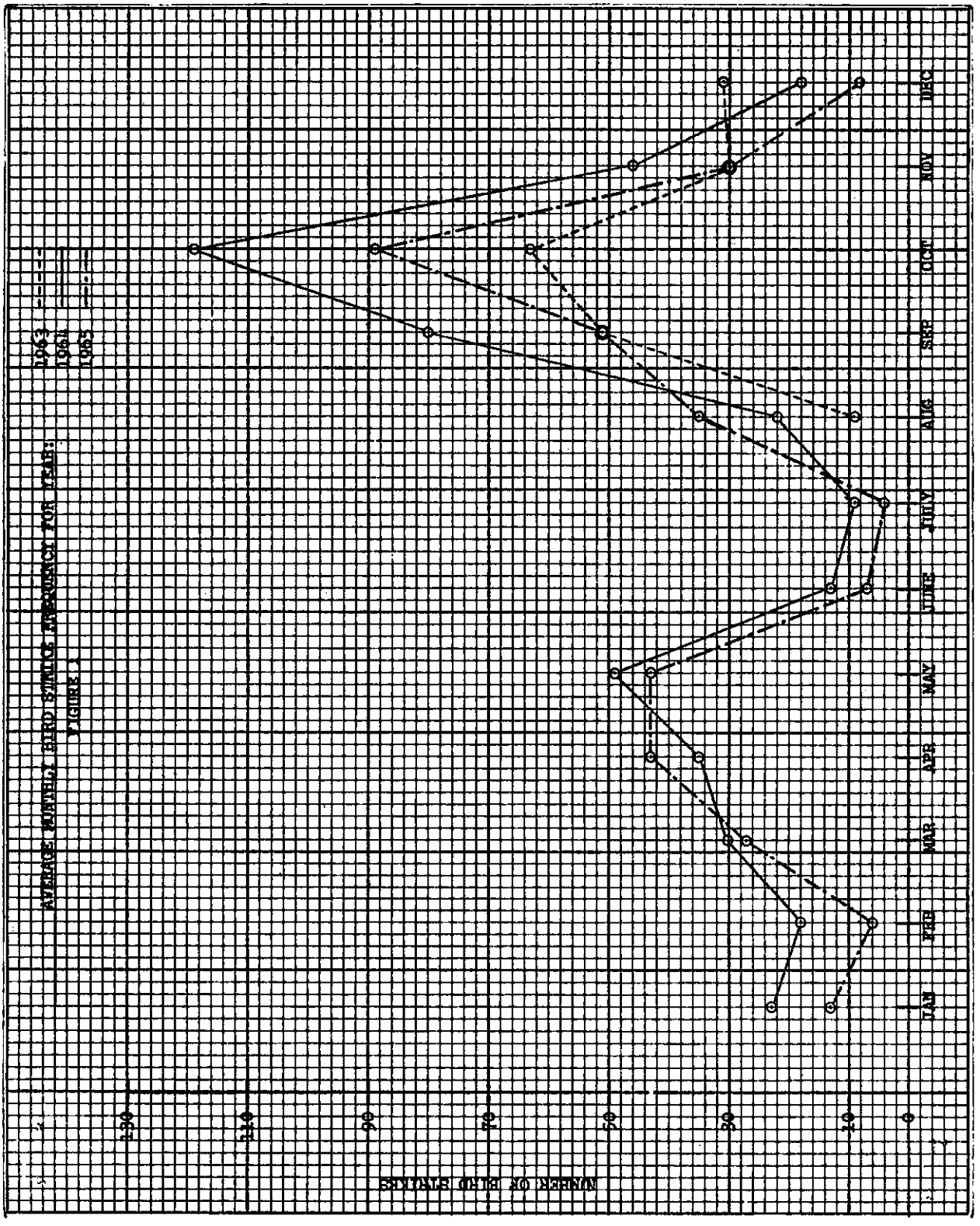
all strikes occur at altitudes less than 4,000 feet. However, strikes have been experienced at altitudes as great as 14,000 feet above sea level.

f. Figures 5, 6, and 7 show the severity of damage to different portions of the aircraft structure caused by various size birds.

g. Almost 31 percent and 22.5 percent of all recorded bird strikes occur on the airplane's engine/propeller and windshield respectively. Approximately 18.4 percent of all strikes result in severe local damage to some portion of the aircraft structure.

Edward C Hodam

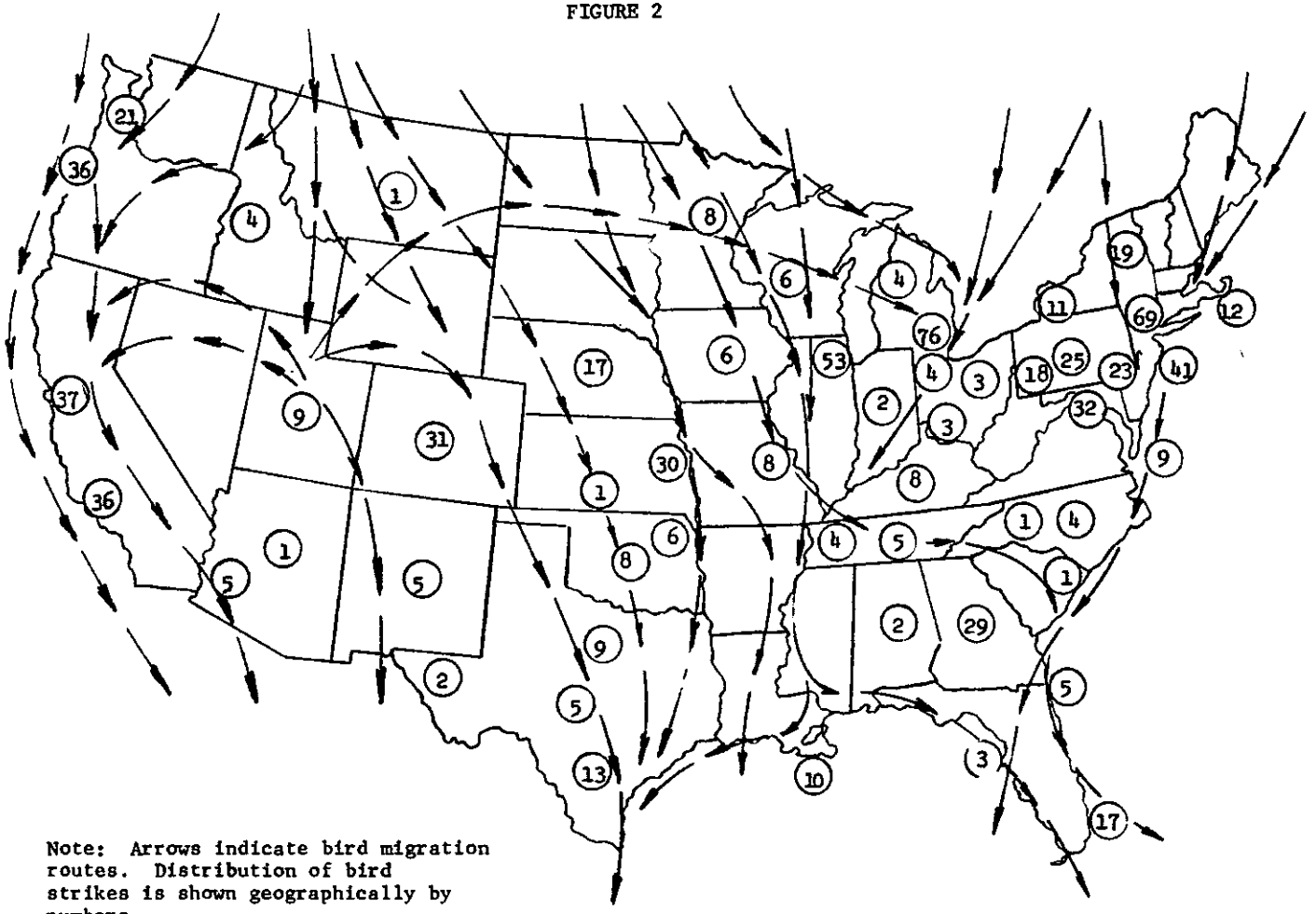
for C. W. Walker
Director
Flight Standards Service


AVERAGE MONTHLY BIRD STRIKE FREQUENCY FOR YEAR:
FIGURE 1
1963
1961
1963
NUMBER OF BIRD STRIKES
30
40
50
60
90
120
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC

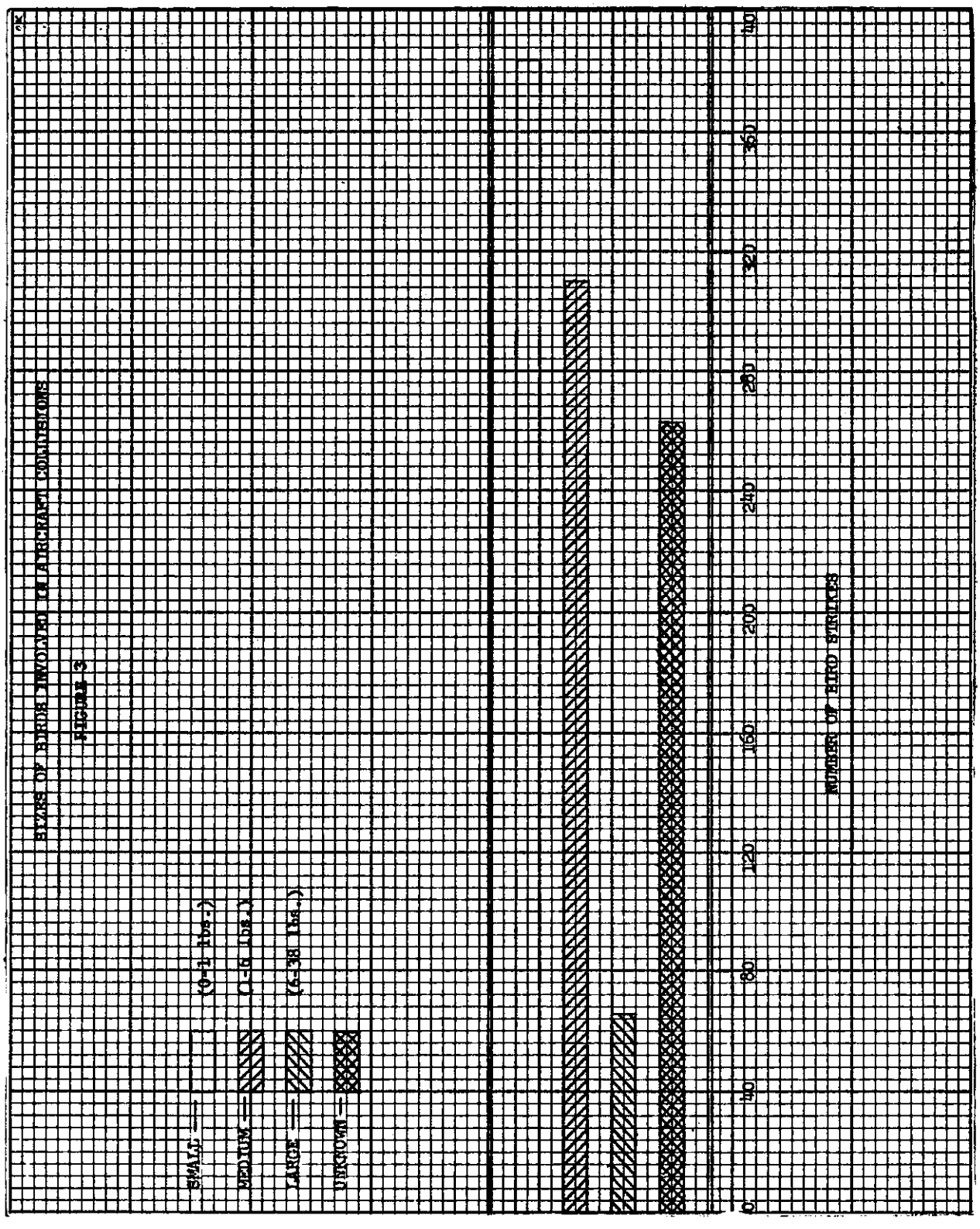
GEOGRAPHIC DISTRIBUTION OF REPORTED BIRD COLLISION ACCIDENTS

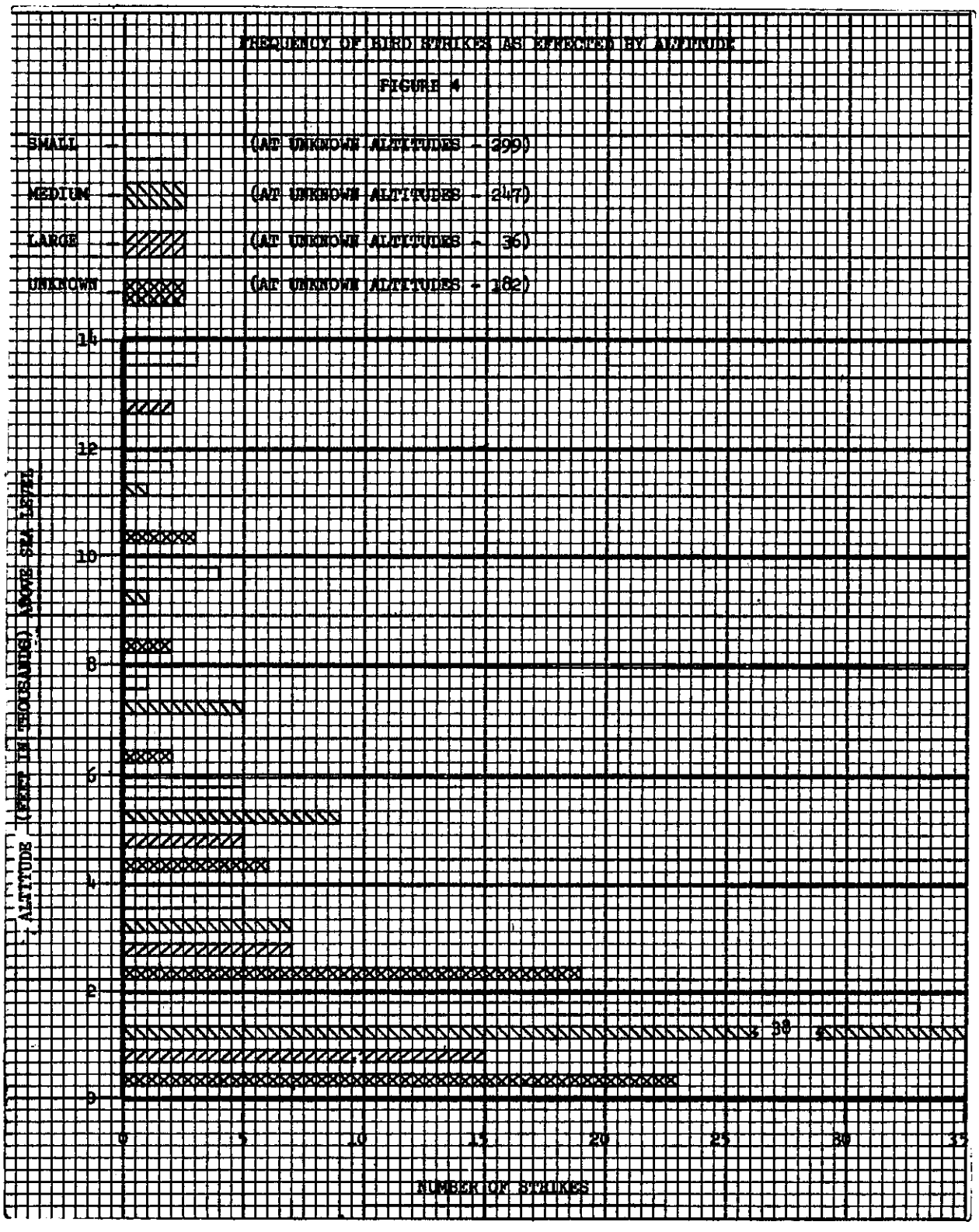
(29 MONTH RECORDING PERIOD INITIATING 8/63)

FIGURE 2



Note: Arrows indicate bird migration routes. Distribution of bird strikes is shown geographically by numbers.


TYPES OF BIRDS INVOLVED IN AIRCRAFT COLLISIONS
FIGURE 3
SMALL (0-1 lbs.)
MEDIUM (1-6 lbs.)
LARGE (6-38 lbs.)
UNKNOWN
0
40
80
120
160
200
240
280
320
360
400
NUMBER OF BIRD STRIKES


FREQUENCY OF BIRD STRIKES AS EFFECTED BY ALTITUDE
FIGURE 4
SMALL (AT UNKNOWN ALTITUDES - 399)
MEDIUM (AT UNKNOWN ALTITUDES - 247)
LARGE (AT UNKNOWN ALTITUDES - 36)
UNKNOWN (AT UNKNOWN ALTITUDES - 182)
ALTITUDE (FEET IN HUNDREDS) ABOVE MEAN SEA LEVEL
14
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
NUMBER OF STRIKES

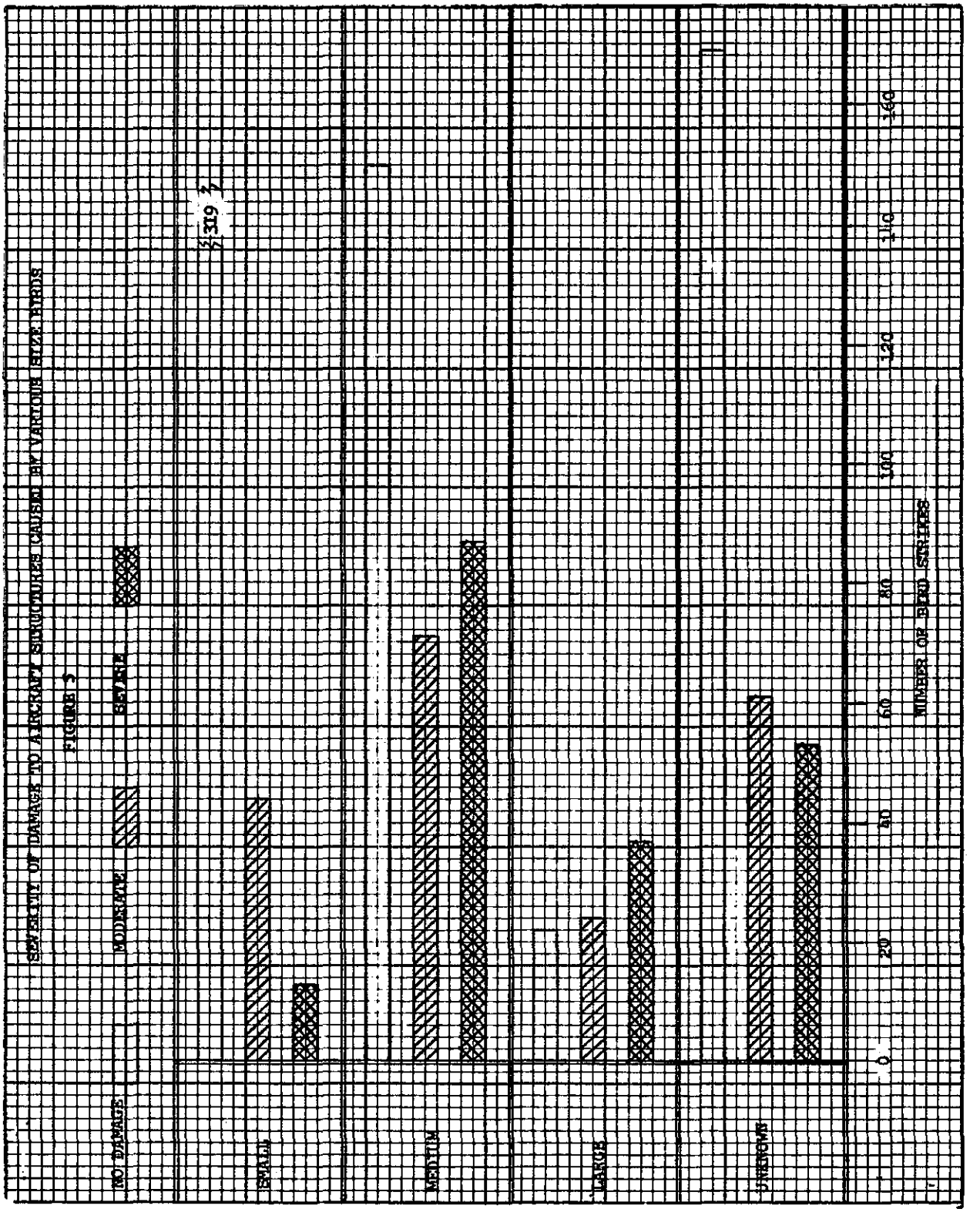
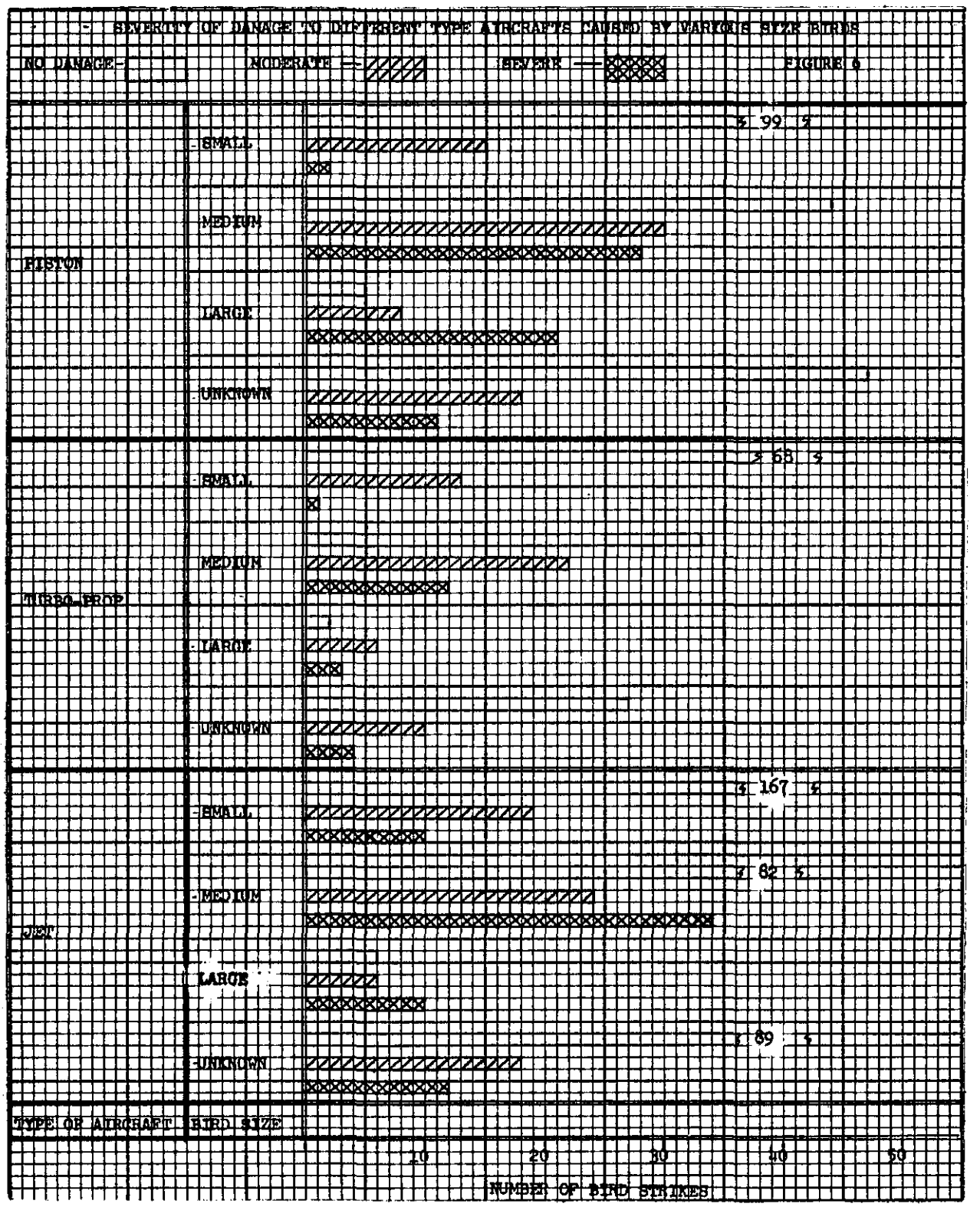
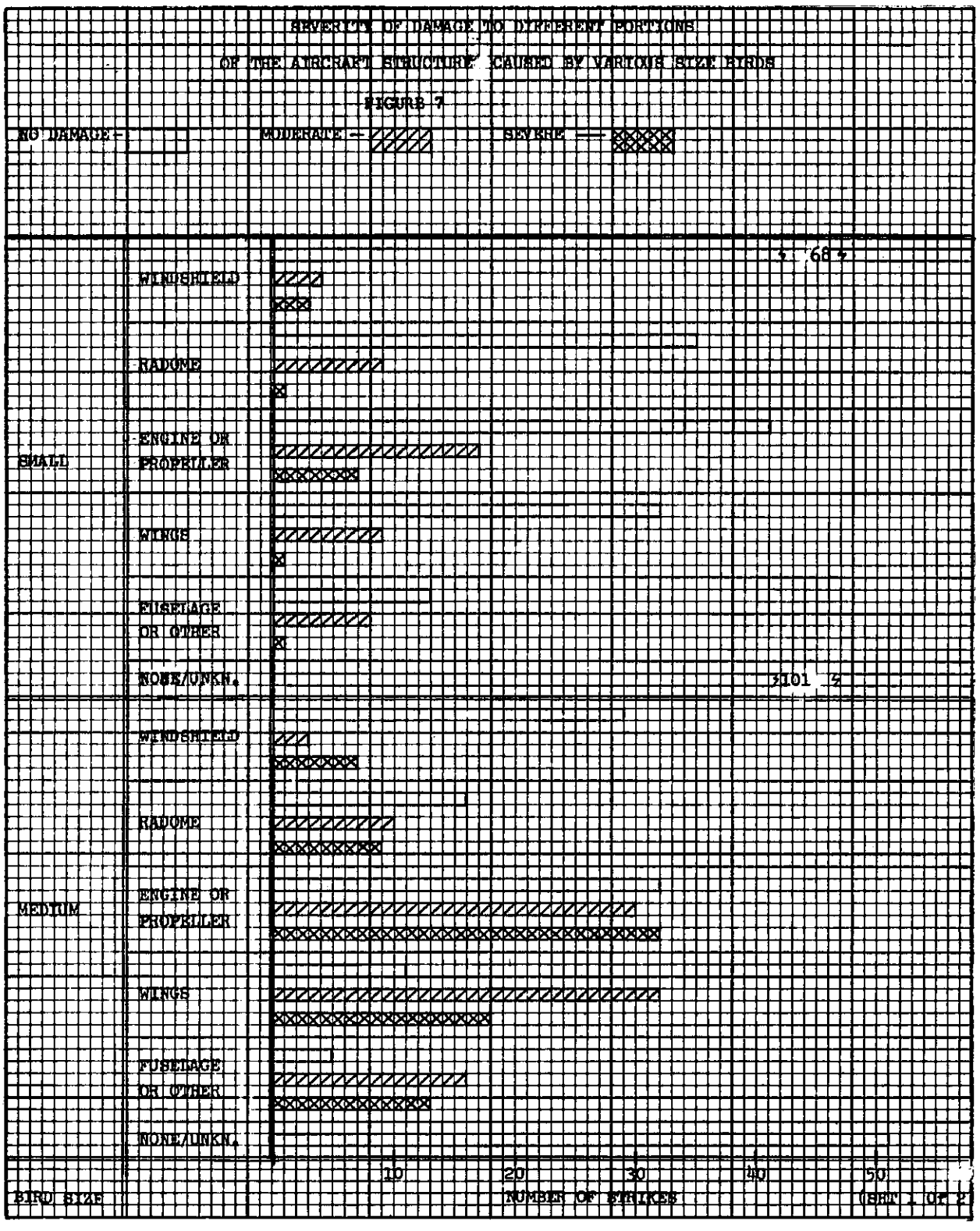

SEVERITY OF DAMAGE TO AIRCRAFT STRUCTURES CAUSED BY VARIOUS SIZE BIRDS
NO DAMAGE
MODERATE
SEVERE
SMALL
MEDIUM
LARGE
UNKNOWN
0
20
40
60
80
100
120
140
160
NUMBERS OF BIRD STRIKES

FIGURE 5


SEVERITY OF DAMAGE TO DIFFERENT TYPE AIRCRAFTS CAUSED BY VARIOUS SIZE BIRDS
NO DAMAGE
MODERATE
SEVERE
FIGURE 6
PISTON
SMALL
MEDIUM
LARGE
UNKNOWN
% 99 %
TURBO-PROP
SMALL
MEDIUM
LARGE
UNKNOWN
% 68 %
JET
SMALL
MEDIUM
LARGE
UNKNOWN
% 167 %
% 82 %
% 89 %
TYPE OF AIRCRAFT
BIRD SIZE
10
20
30
40
50
NUMBER OF BIRD STRIKES

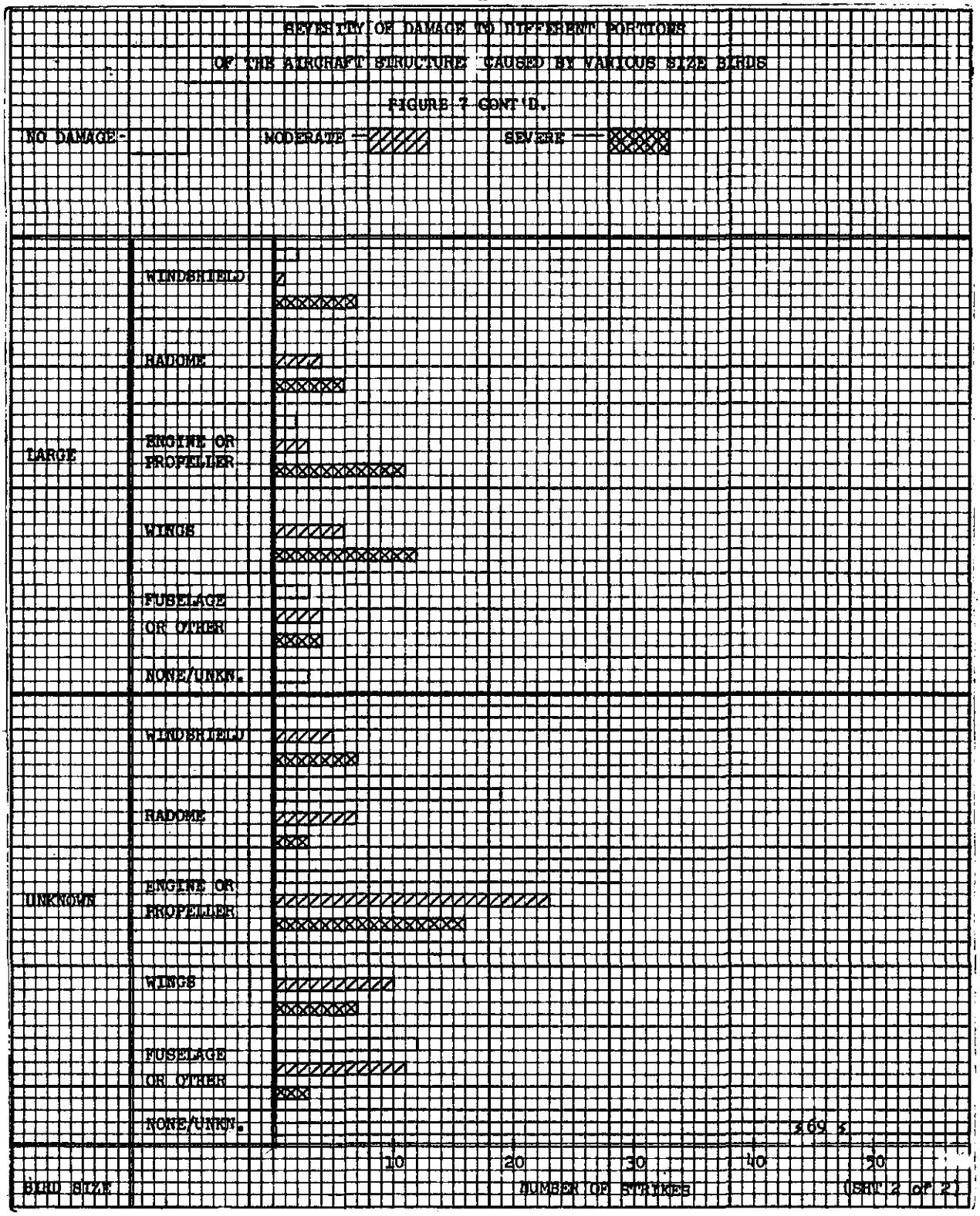
SEVERITY OF DAMAGE TO DIFFERENT PORTIONS
OF THE AIRCRAFT STRUCTURE CAUSED BY VARIOUS SIZE BIRDS

FIGURE 7



SEVERITY OF DAMAGE TO DIFFERENT PORTIONS
OF THE AIRCRAFT STRUCTURE CAUSED BY VARIOUS SIZE BIRDS

FIGURE 7 CONT'D.



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