Group 5 – Night sightings for which the sun was more than 10° below the horizon and which were not included in Group 4.

Group 6 – Sunrise sightings for which the sun was between 0° and 10° below the horizon.

Group 7 – Sunrise sightings for which the sun was between 0° and 10° above the horizon.

These group numbers were punched on the cards and incorporated into the coding system. The number of OBJECT SIGHTINGS in each group for each identification was then tabulated and is given in Table I.

TABLE I OBJECT SIGHTINGS

Identification	Angle of Elevation Group						
	1	2	3	4	5	6	7
Balloon	156	17	28	83	40	0	2
Astronomical	52	6	43	236	118	9	6
Aircraft	187	23	49	144	60	5	2
Light phenomena	8	2	4	25	7	0	0
Insufficient information	72	12	26	76	28	2	0
UNKNOWN	134	14	25	150	86	6	7
Other	64	8	12	50	36	3	7
Total	673	82	187	764	375	25	24

According to this table, a large majority of the KNOWN OBJECT SIGHTINGS in Group 1 (343 out of 467) were either aircraft or balloons. In Groups 4 and 5 combined, a large majority (681 out of 899) were either balloons, aircraft, or astronomical. Accordingly, a re-evaluation of the UNKNOWNS in these three groups was planned with the objective of determining which of the UNKNOWNS in Group 1 might possibly be aircraft or balloons and which of the UNKNOWNS in Groups 4 and 5 might possibly be balloons, aircraft, or astronomical objects. More will be said of this project later.

Statistical Chi Square Test

In the meantime, mirror graphs had been constructed from the frequency tabulations which seemed to show that, when the KNOWNS (total less UNKNOWNS) and the UNKNOWNS were grouped according to one of six characteristics, the percentage of KNOWNS and the percentage of

UNKNOWNS in each characteristic group showed the same general trend. In other words, on the basis of these graphs, it looked as though there was a good possibility that the UNKNOWNS were no different from the KNOWNS, at least in the aggregate. It was decided to investigate this by the use of a statistical procedure called the "Chi Square Test".

The Chi Square Test is a statistical test of the likelihood that two distributions come from the same population, that is, it gives the probability that there is no difference in the make-up of the two distributions being measured.

The method is outlined as follows:

(1) Adjust the distributions by multiplying the KNOWNS in each characteristic group by the ratio of the total number of UNKNOWNS to the total number of KNOWNS. (The Chi Square Test is applicable only to distributions which have the same total number of elements.)

(2) Take the difference between the number of UNKNOWNS and the adjusted number of KNOWNS in each characteristic group.

(3) Square the remainder from Step 2.

(4) Divide the result of Step 3 by the corresponding number of adjusted KNOWNS.

This is the chi square for the particular group. Summing the individual chi squares over the groups of a characteristic gives the chi square for that characteristic. This number is then compared with a table of the distribution of chi square which can be found in many texts on elementary statistics.

It will be noted that chi square is tabulated in terms of degrees of freedom which in this case is one less than the number of groups of sightings for each characteristic.

The tabulations of KNOWNS and UNKNOWNS against the six characteristics and the Chi Square Test as it was applied are shown in Tables II through VII. In each case, the number of degrees of freedom is given, as is the value of chi squares corresponding to probabilities of 5 per cent and 1 per cent that two distributions with this number of degrees of freedom come from the same population. Since the greater the value of chi square the smaller the probability of homogeneity of two distributions, a calculated value of chi square greater than either the 5 per cent or 1 per cent values will indicate a probability less than 5 per cent or 1 per cent, respectively, that the two distributions are homogeneous. The term homogeneity is used here to indicate that two distributions could have come from the same population.