FREQUENCY OF OCCURRENCE OF BIRDS ON THE BERKELEY CAMPUS, UNIVERSITY OF CALIFORNIA

WITH THREE GRAPHS

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Daily species lists gathered over a period of time in a restricted locality can be utilized in making a useful analysis of the bird population of the area. It has been shown that species lists so gathered are comparable to sample plots, of ecologists, and that data derived from a large number of them usually conform with Raunkiaer's Law of Frequence (Linsdale, Condor, vol. 30, 1928, pp. 180-184). This has proved to be an especially useful type of analysis when it is desired to compare the frequency of occurrence of birds of one area with their frequency of occurrence on another. This has been pointed out by Linsdale (Condor, vol. 34, pp. 221-226, and Wilson Bull., vol. 48, 1936, pp. 158-163) and Linsdale and Rodgers (Condor, vol. 39, 1937, pp. 108-111).

Lists of species gathered on the Berkeley campus of the University of California further serve to demonstrate the usefulness of such data. It is also expected that this analysis will be helpful to students becoming acquainted with the birds of the area.

The Berkeley campus of the University of California is in the eastern edge of the city of Berkeley, at the mouth of Strawberry Canyon. It is two and one-quarter miles from the eastern shore of San Francisco Bay, about opposite the Golden Gate. The area on which this study was made is the western end of the campus, west of the Campanile, between Hearst Avenue on the north and Allston Way on the south. It covers about 85 acres. There are eleven large buildings on the area, yet there are extensive lawns over which are scattered large trees. There is shrubbery around the buildings, and trees and shrubbery line some of the roadways. The north and south branches of Strawberry Creek flow into the area from the northeast and southeast and unite in a grove of 105 tall eucalyptus trees near the southwest corner of the area. South of this are 30 tall Monterey pines. The creeks are usually dry by August or September, and remain so for one to three months. They are lined with shrubbery, much of it native, which is allowed to form thick tangles in many places. Along the north fork of Strawberry Creek, about 200 yards from where it enters the area, there is a grove of 21 redwood trees, and extending east from this is a vale that is not planted in lawn and is covered with deciduous trees. To the northeast, and along the south edge of this vale are scattered large trees (eucalyptus, Monterey pine and Monterey cypress). In the northwestern corner of the area and midway along the south border are two more areas (4 and 1 acres respectively) that are not planted in lawn, but on which there are no trees.

Though the area is 13 miles from the actual ocean coast, it does not have the extremes of temperature typical of the inner coast range valleys, and being back from the immediate coast, it is not subject to constant winds typical of the coast. The Bay has a moderating effect on the climate. Average temperatures are about 62.5 degrees in summer and 50.2 degrees in winter, and temperatures as high as 85 degrees are of infrequent occurrence and brief duration. The lowest temperature recorded within the last 40 years was 24.9 degrees. The annual rainfall is 25.13 inches, of which about three-fourths comes in the four months, December to March, inclusive. In this period rain falls approximately one day out of three. There is seldom any rain in June, July, or August. There are about 100 days a year in which the sky is overcast for more than half of the daylight hours.

The data for this analysis consist of 120 lists of species, 10 for each month of the year. They were gathered by the authors over a period of two years (1938, 1939). The

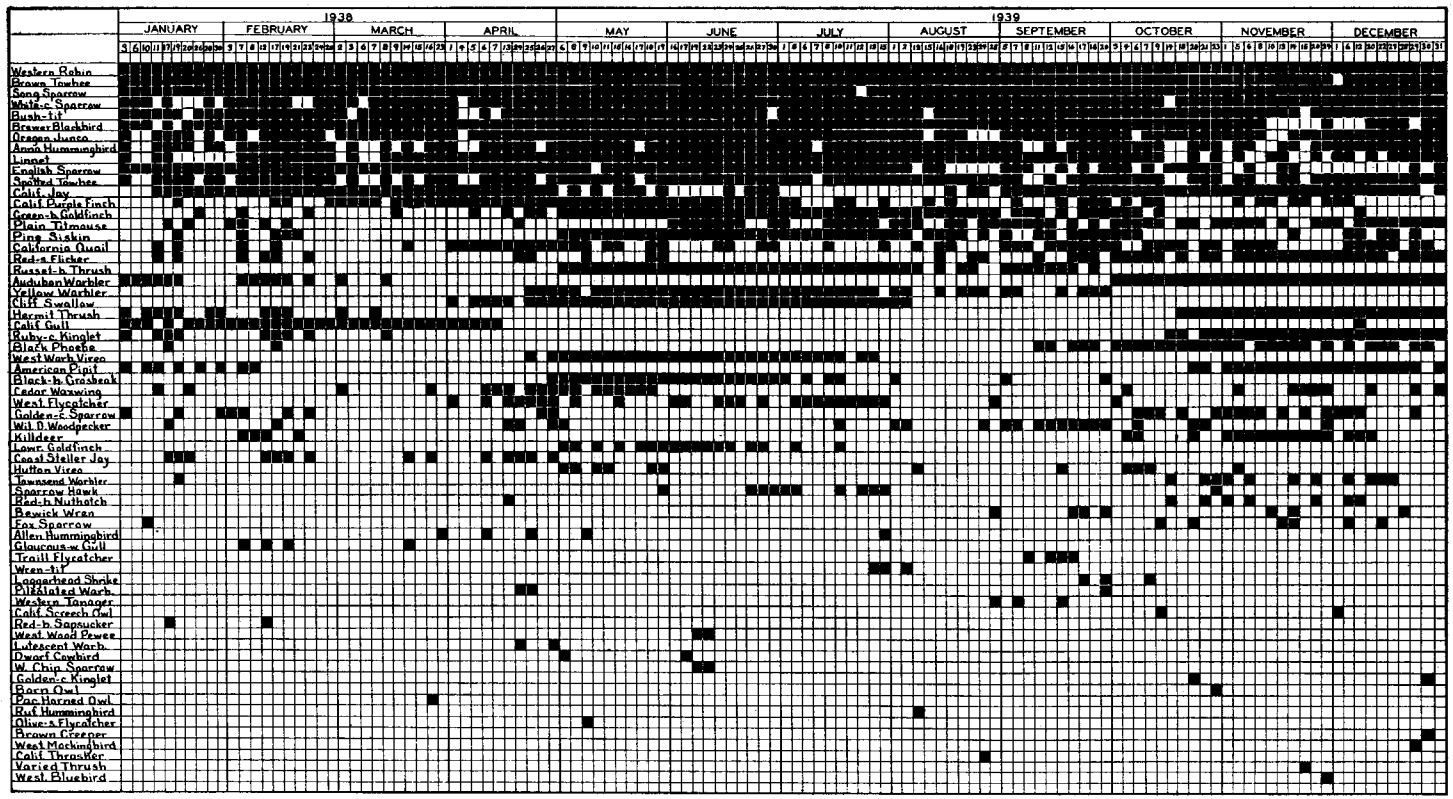

Fig. 55. Days (marked in black) on which each species was recorded.

lists were made at different times of day. In fact, they represent almost all hours of the day. The majority of them were made on a plan much as follows. An indirect approach to the Life Sciences Building was made some time between 7:30 and 8:30 in the morning. A 20 to 30 minute walk around the campus at noon and occasional walks between the buildings were taken, and some species were usually listed when seen or heard from class or office windows. Between 4:30 and 7:30 in the afternoon, an indirect

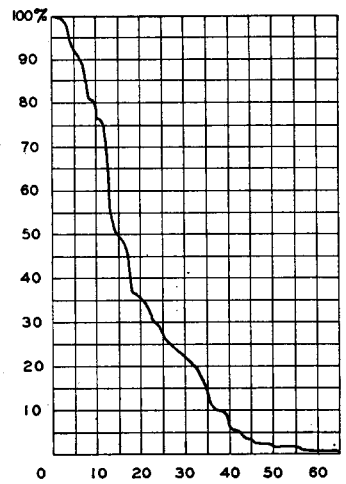

Fig. 56. Relative frequency of the 65 kinds of birds.

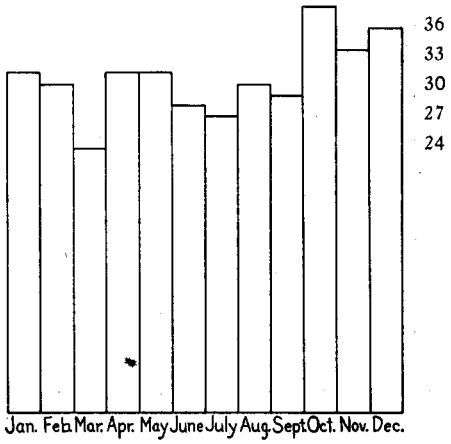

Fig. 57. Number of species observed each month.

route from the Life Sciences Building across the campus and out the north, west, or south entrances of the campus usually completed the observations for the day. Because of the casual way in which the lists were made, it is difficult to judge the time spent on each. No list was used unless it was made on the basis of visits to all major parts of the area described, and unless at least one hour was spent by one or both of the observers. The time spent in making each list probably averages nearly two hours.

In the list which follows, the per cent of frequency was computed for each bird by dividing the number of days that the bird was recorded by the total number of days of observation. This (and figure 56) gives relative frequency of the species in terms comparable with similar rankings of the species of other localities. The number of species seen on the area each month is shown by figure 57. In all, 65 species were recorded.

	Name	Per cent of times recorded		Name	Per cent of times recorded
1.	Western Robin	100.0	13.	California Purple Finch	55.0
2.	Brown Towhee	99.6	14.	Green-backed Goldfinch	50.0
3.	Song Sparrow	98.5	15.	Plain Titmouse	49.2
4.	White-crowned Sparrow	93.5	16.	Pine Siskin	48.3
5.	Bush-tit	92.5	17.	California Quail	46.7
6.	Brewer Blackbird	91.0	18.	Red-shafted Flicker	36.7
7.	Oregon Junco	88.2	19.	Russet-backed Thrush	36.7
8.	Anna Hummingbird	80.8	20.	Audubon Warbler	36.7
9.	Linnet	80.8	21.	Yellow Warbler	35.0
10.	English Sparrow	76.8	22.	Cliff Swallow	33.4
11.	Spotted Towhee	76.8	23.	Hermit Thrush	30.1
12.	California Jay	74.2	24.	California Gull	29.1

Name	Per cent of times recorded	Name	Per cent of times recorded
25. Ruby-crowned Kinglet	27.5	46. Wren-tit	2.5
26. Black Phoebe	25.8	47. Loggerhead Shrike	2.5
27. Western Warbling Vireo	25.0	48. Pileolated Warbler	2.5
28. American Pipit	24.2	49. Western Tanager	2.5
29. Black-headed Grosbeak	23.3	50. California Screech Owl	1.7
30. Cedar Waxwing	22.5	51. Red-breasted Sapsucker	1.7
31. Western Flycatcher	21.7	52. Western Wood Pewee	1.7
32. Golden-crowned Sparrow	20.8	53. Lutescent Warbler	1.7
33. Willow Downy Woodpecker	19.4	54. Dwarf Cowbird	1.7
34. Killdeer	16.7	55. Western Chipping Sparrow	1.7
35. Lawrence Goldfinch	14.4	56. Golden-crowned Kinglet	1.7
36. Coast Steller Jay	11.7	57. Barn Owl	.8
37. Hutton Vireo	10.0	58. Pacific Horned Owl	.8
38. Townsend Warbler	10.0	59. Rufous Hummingbird	.8
39. Sparrow Hawk	9.2	60. Olive-sided Flycatcher	.8
40. Red-breasted Nuthatch	6.7	61. Brown Creeper	.8
41. Bewick Wren	5.8	62. Western Mockingbird	.8
42. Fox Sparrow	5.8	63. California Thrasher	.8
43. Allen Hummingbird	4.2	64. Varied Thrush	.8
44. Glaucous-winged Gull	3.3	65. Western Bluebird	.8
45. Traill Flycatcher	3.3		

When the species listed above are assigned to five classes of frequency (A, 1-20 per cent; B, 21-40 per cent; C, 41-60 per cent; D, 61-80 per cent; E, 81-100 per cent), the numbers of species in these classes are 34, 14, 5, 5, 7, respectively. The percentages of species in each group in the whole list recorded for the area are 52, 21, 8, 8, and 11, respectively. Thus, the distribution of species among the classes of frequency is remarkably like that revealed in similar surveys of other localities, and since $A>B>C=D<E$, the distribution is consistent with Raunkiaer's Law of Frequence $(A>B>C=D<E)$.

From the evidence presented in the chart (figure 55) it appears that the Black Phoebe is a winter visitant. Actually it is a common resident in the Bay area. It is present on the study area only in winter; the birds breed in Strawberry Canyon and stray to the lower campus only rarely in the breeding season. This is in accordance with the findings of Oberlander (Condor, vol. 41, 1939, pp. 133-151). The occurrence of the Steller Jay is similar to that of the phoebe in that the birds come to the lower campus only in winter.

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