

Temporal Change of an Adelie Penguin Population in the Crèche-Forming Period

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クレイシ形成期におけるアデリーペンギン集団の経時的变化

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要旨: 1978-79年夏期、ロス島ケープバード、北ルッカリーのB4コロニーにおいて、アデリーペンギン集団の経時的变化を観察した。1978年12月下旬から予備調査を行い、1979年1月1日から1月24日までの間、少なくとも1日1回、コロニー内の繁殖巣数、繁殖個体数、未繁殖個体数、雛数、およびその位置を観察し地図上に記録した。この時期は雛のクレイシ形成期であり、繁殖個体が巣を離れるのに従って、雛も巣を離れクレイシを形成した。1月9日から10日の間に、繁殖個体と雛の巣離れが完了した。同時に、これまでコロニーの外にいた未繁殖個体が繁殖個体に代わってコロニーに入った。巣を離れた雛はクレイシのところどころに密集し小集団を造ったが、その大きさ、形、場所は常に変化した。クレイシ形成の初期に雛は元の巣に戻って給餌を受けたが、次第に巣の外で給餌されるようになり、1月10日以後はコロニーの外で給餌を受けるようになった。

Abstract: The temporal change of an Adelie penguin population was observed in the B4 colony, Northern Rookery, Cape Bird, Ross Island in the 1978-79 summer season. Between January 1 and 24, 1979, after the preparatory observation in late December, the number and position of occupied nests, occupying birds, re-occupying nonbreeders and chicks were observed and recorded on a map at least once a day. Upon abandonment of the nests by the occupant birds, the chicks left their nests to form a crèche in the colony. The nest abandonment and the crèche formation were completed on January 9 and 10. Simultaneously, the free-nonbreeders entered the colony from the outside of it. Part of the chicks that left their nests gathered closely to form huddles in the crèche. The size, shape and position of the huddles varied temporally. The feeding place of chicks changed from their nests to the outside of the nests and then to the outside of the colony with the progress of crèche formation.

On the occasion of participating in the 17th Cape Bird Expedition, University of Canterbury, New Zealand, in the 1978-79 summer season, the present writer observed the temporal change of an Adelie penguin (*Pygoscelis adeliae*) population in a colony in the Northern Rookery of Cape Bird in conjunction with the crèche formation. According to DAVIS (1982) a crèche was defined as an aggregation of chicks within a restricted area of a colony. This observation was carried out to provide the basic information for the writer's primary aim, the investigation of vocal communication between parent and its chicks. However, it seems that the data obtained are useful to deepen the understanding of the Adelie penguin behavior during the crèche-forming period in the latter part of their breeding season, because there are few detailed documentations of the population change in this period.

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For the present observation, the B4 colony was selected in the Rookery (KNOX and ENSOR, 1978). The colony was almost circular in shape; 10 m in the longest diameter and 9 m in the shortest. It was situated at the foot of a morainic mound of 5 m high in the foreshore flat. All birds in and around the colony were observable from the mound. As the counting of birds was made with the naked eye from the outside of the colony, it seemed that the penguins were not disturbed by the observation.

On December 21, 1978, prior to the serial observation described below, the arrangement of nests together with the presence of occupying birds (= breeders), re-occupying nonbreeders, chicks and eggs was examined at the sites in the colony. To identify the individuals the adult bird was marked by the flipper band and the chick by the colored vinyl tape. As shown in Fig. 1, there were 109 nests, of which 76 were occupied by the breeders and 5 by the re-occupying nonbreeders. 115 chicks and 26 eggs were observed.

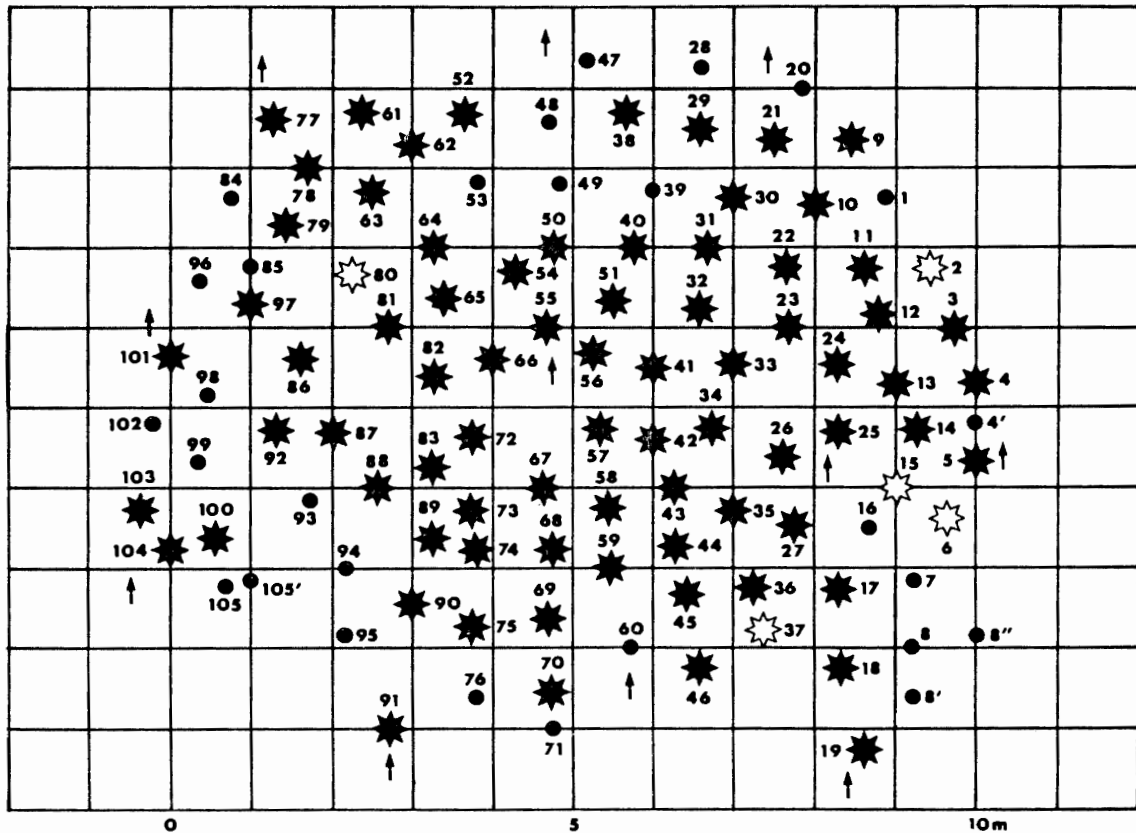
The temporal change of the Adelie population was observed from January 1 to 24, 1979, at least once a day at arbitrary time (Fig. 2). The number of occupied nests was 58 on January 1 and it continued to decrease at a rate of 6 per day toward January 9. 57 nests except for one which was occupied by a free-nonbreeder till January 12 were abandoned by January 10. The number of occupying birds gradually decreased but 70 % of them remained in the colony till January 9. However, most of them and the re-occupying nonbreeders left the colony for the sea to feed on January 10. Simultaneously, the free-nonbreeders which were somewhere out of the colony began to enter the colony on January 9. The number of free-nonbreeders in the colony became 48 on January 10 and 58 next day.

The chicks' leaving their nests to form the crèche was first observed on December 26, before the commencement of the serial observation. However, the increase of the number of the chicks which left their nests was gradual until January 2, when the number of chicks outside the nests was 13 and 86 chicks remained still in the nests. After this day, the number of the outside-chicks increased at a rate of 7 per day and reached a maximum of 91 on January 10.

The chicks which left their nests were fed in their original nests by their parents till the beginning of January. But with the progress of time and the increase of chick number, the feeding place was shifted to the outside of the nest within the colony. On January 8, it was first observed that the chicks were fed at the outside of colony by their parents. Thereafter, this feeding behavior which was named the shepherded feeding by AOYANAGI and TAMIYA (1981) became popular.

The process of the nest abandonment by the occupant birds is illustrated in Fig. 3, 1-14. The number of chicks which left their nests is shown in Fig. 3, 1-11. In Fig. 3, 12-26 the number and position of chicks and free-nonbreeders are shown. As shown in Fig. 3, 12-26, part of chicks gathered closely to form huddles in the crèche but the size, shape and position of huddles varied temporally. DAVIS (1982) reported that the form of huddles changed depending upon the weather conditions.

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Dec. 21. 1978 Arrangement of nests. (Cape Bird B4 Colony)

- Vacant nest. (Half ruined)
- ★ Nest with successful breeders.
- ⊛ Nest with reoccupied pair.
- ↑ Points for nest surveying.

The dashed nests (e.g. 8'; 8'') are occupied after Jan. 1. 1979, when the first core crèche was formed.

Fig. 1. Arrangement of Adelie penguin nests in the B4 colony, Northern Rookery, Cape Bird, Ross Island; December 21, 1978.

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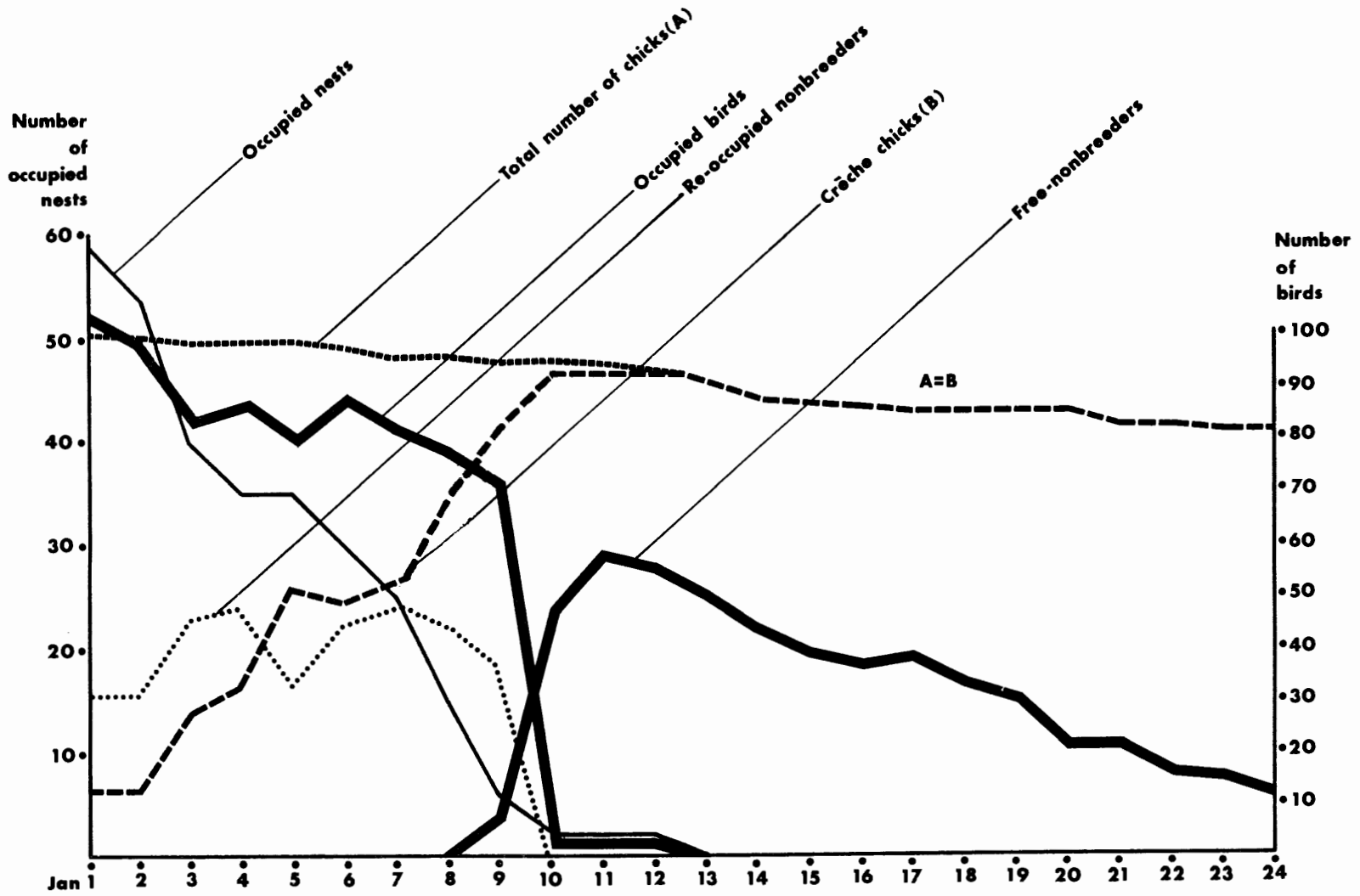
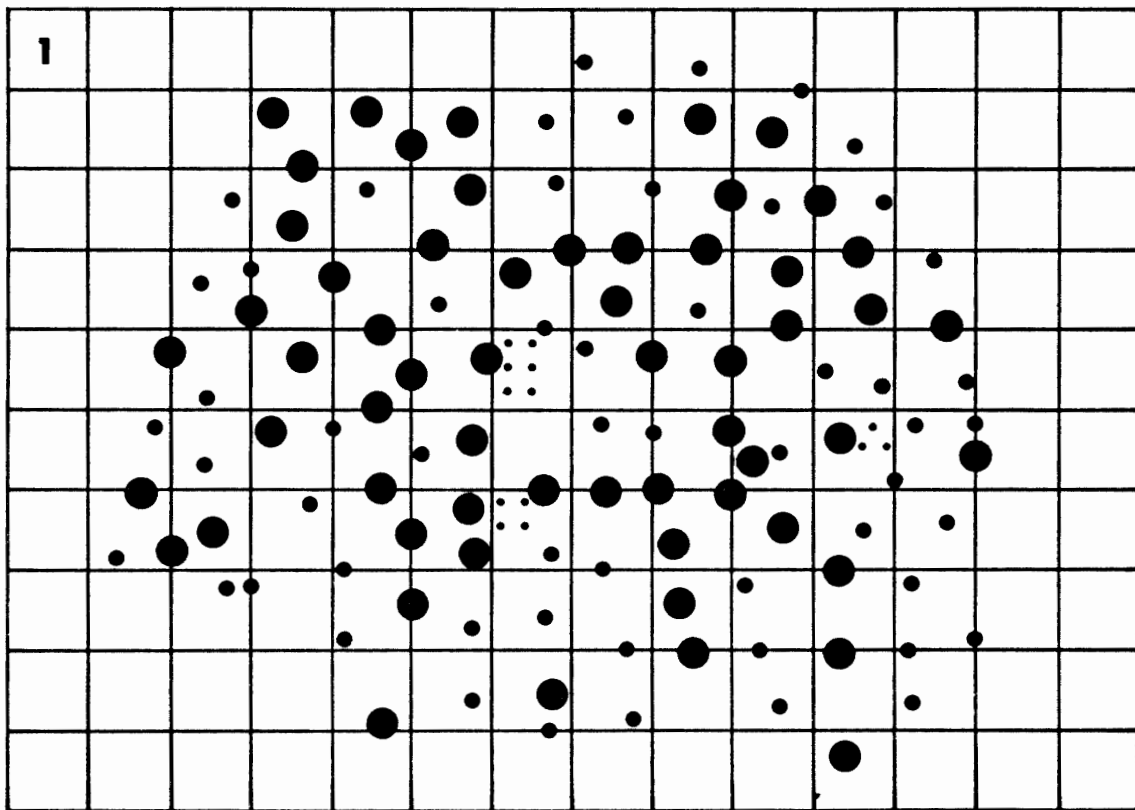
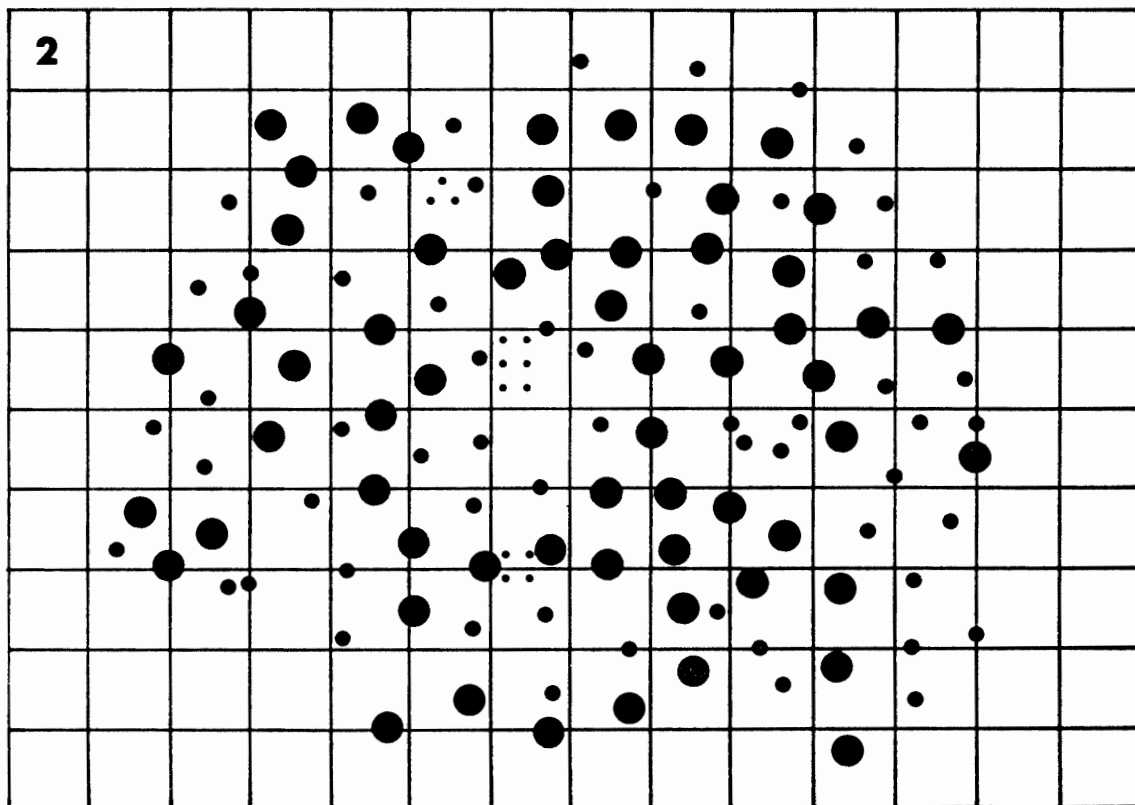


Fig. 2. Temporal change of an Adelie penguin population in the B4 colony, Northern Rookery, Cape Bird, Ross Island; January 1 to 24, 1979.

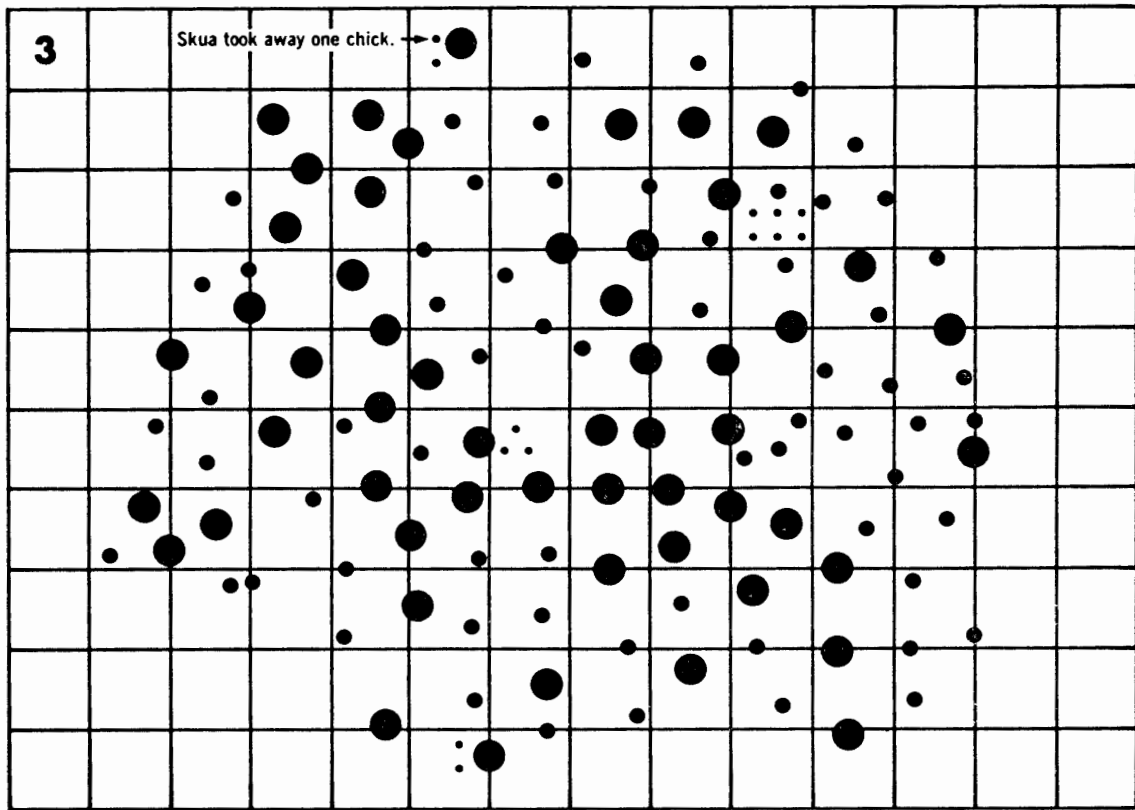
Fig. 3 (opposite). 1-14: Process of the nest abandonment by occupant birds.
 1-11: Number of chicks which left their nests.
 12-26: Number and position of chicks which left their nests and free-nonbreeders.



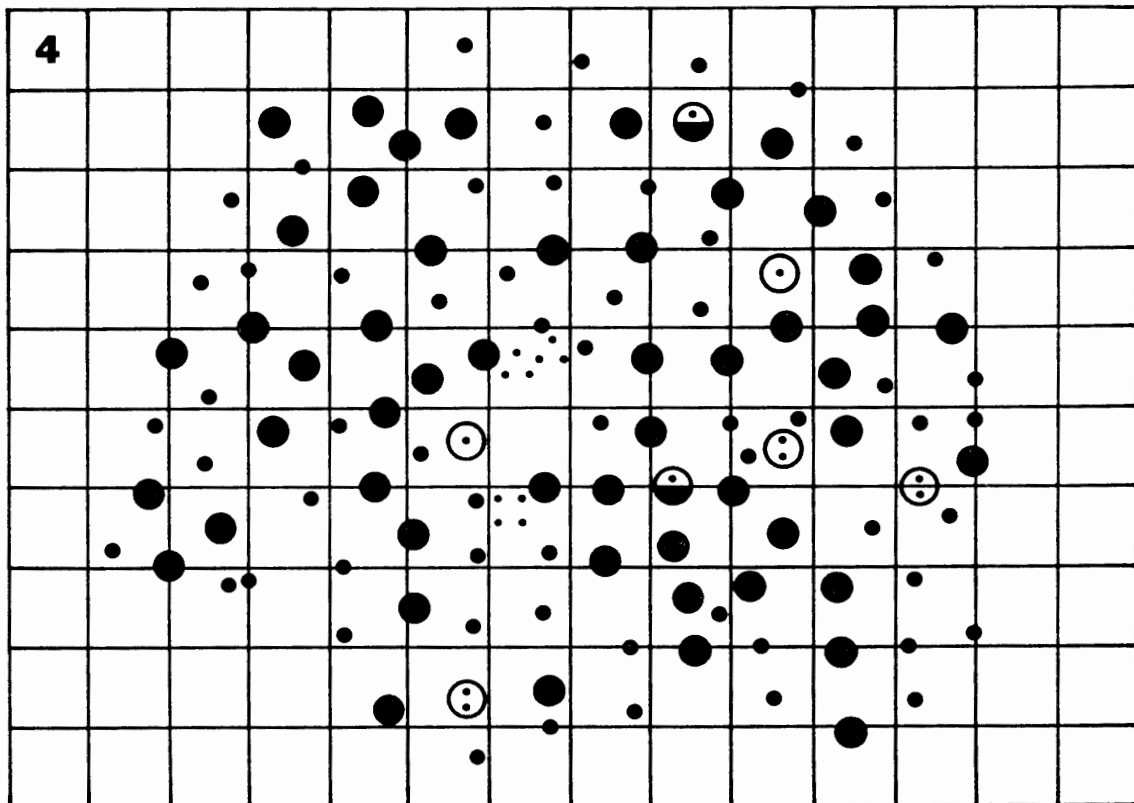
Jan. 1. 1979 16:00 • A chick. ● The nest with Adults, eggs or chicks.
● The nest with nonbreeders or vacant nests.



Jan. 1. 1979 24:00

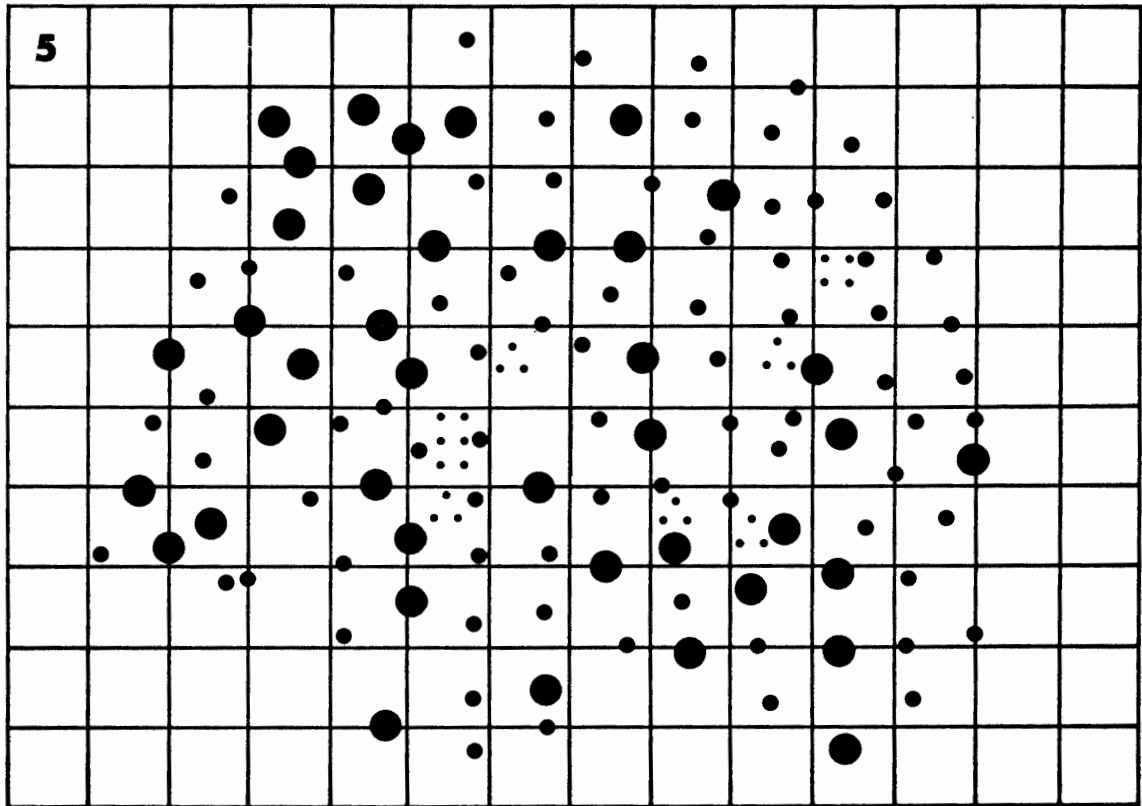


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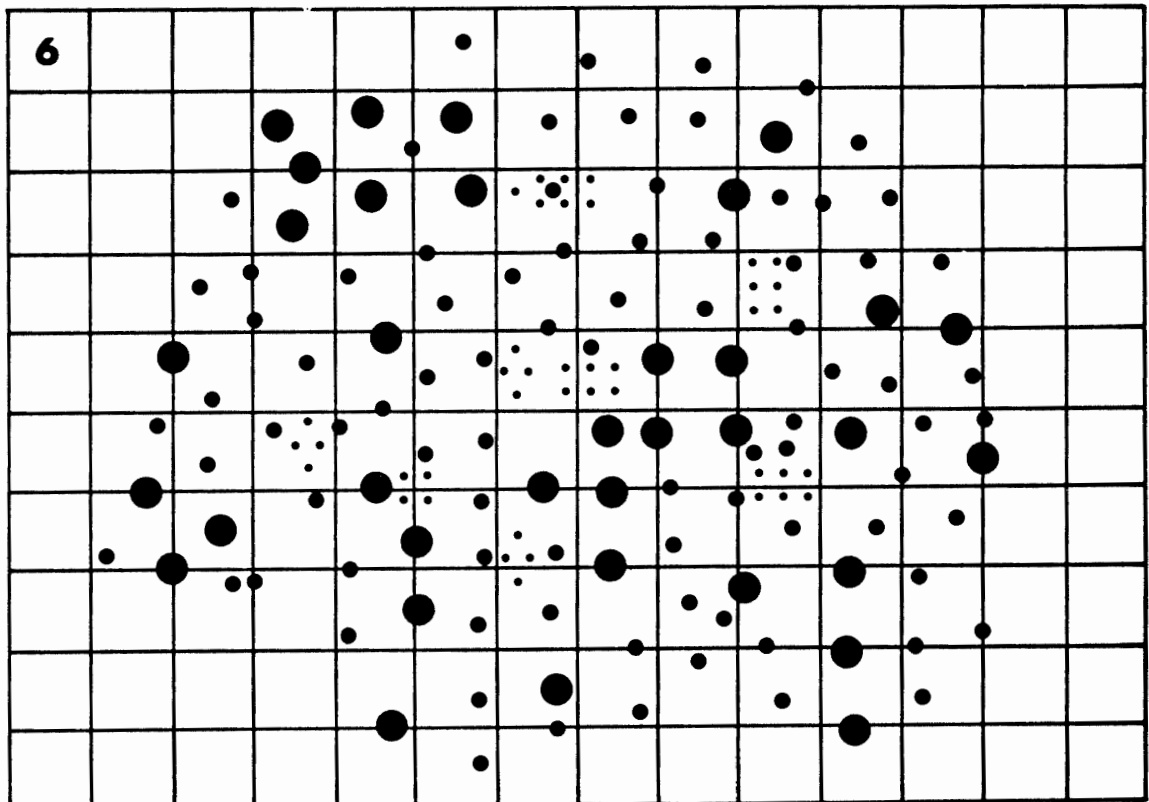


Jan. 2. 1979 11:00

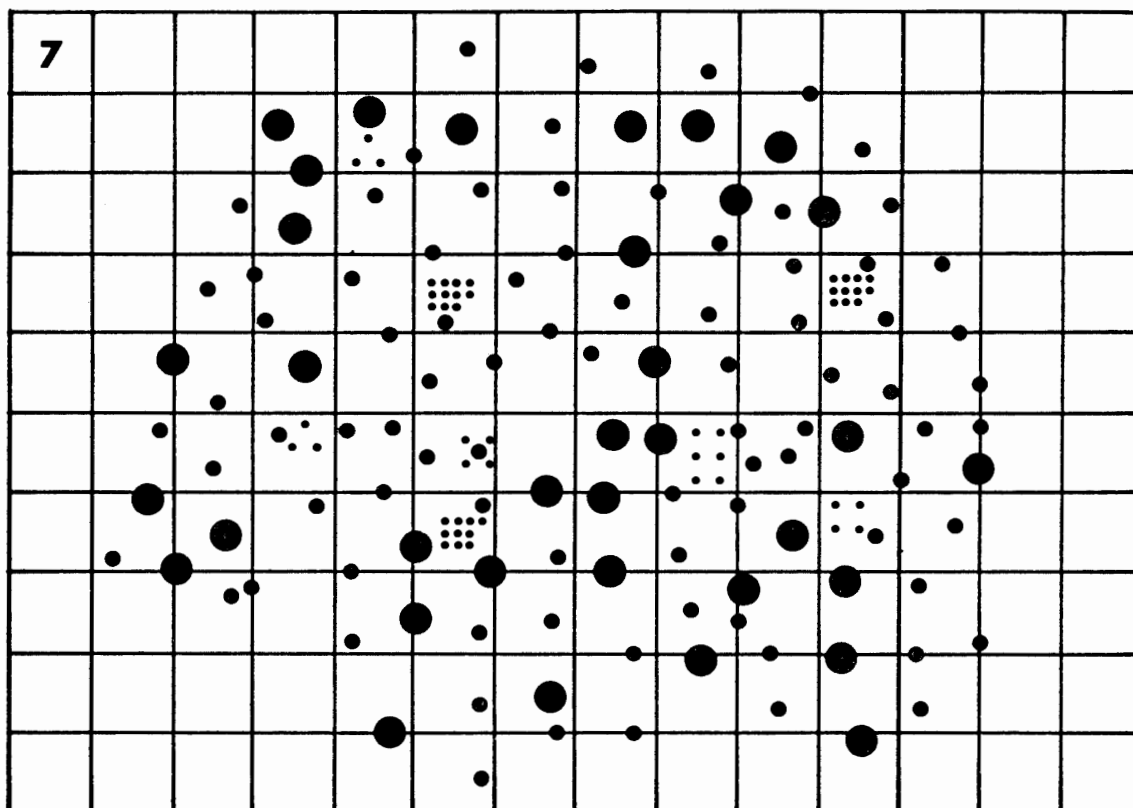
- ⊙ The nests with chicks without adults.
- ◐ The nests with nonbreeders.



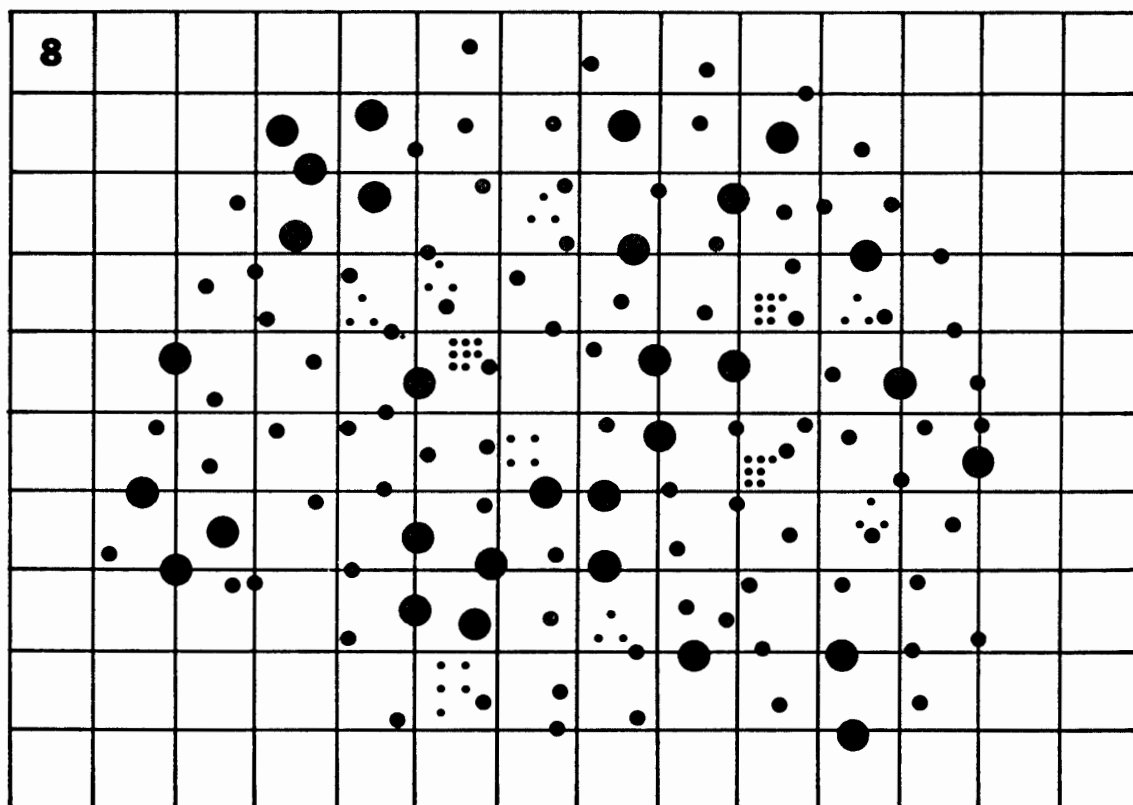
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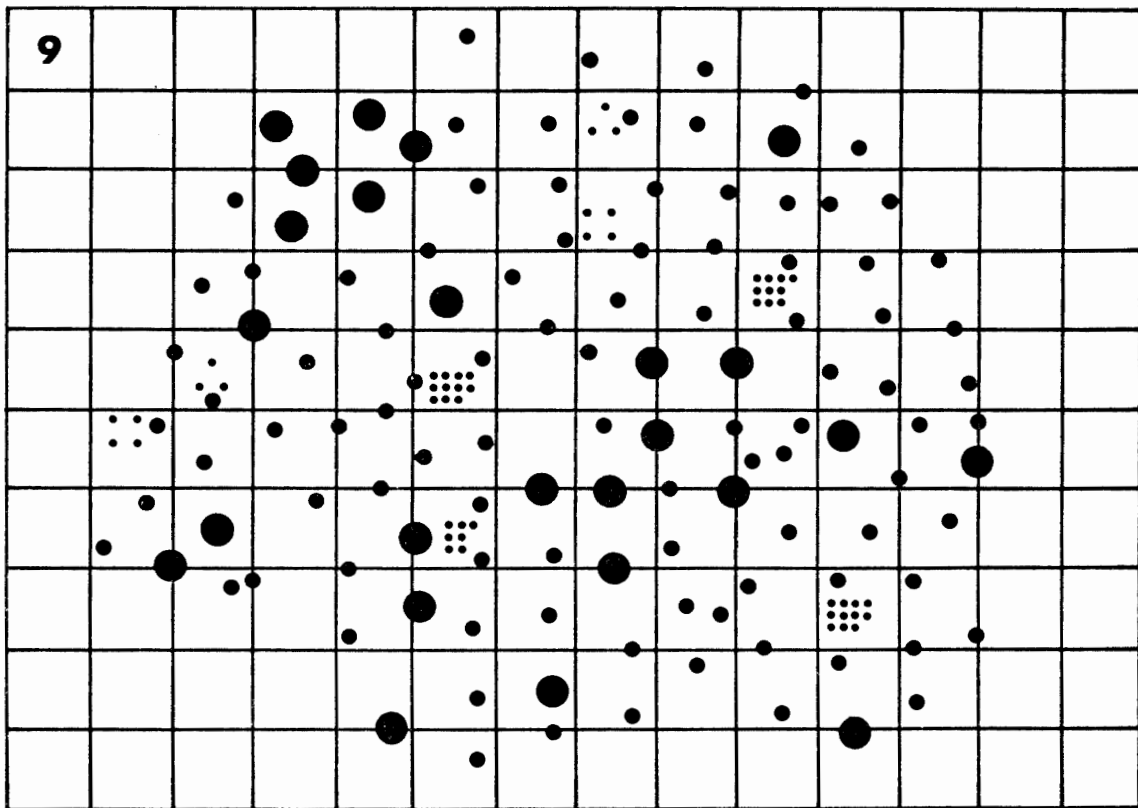
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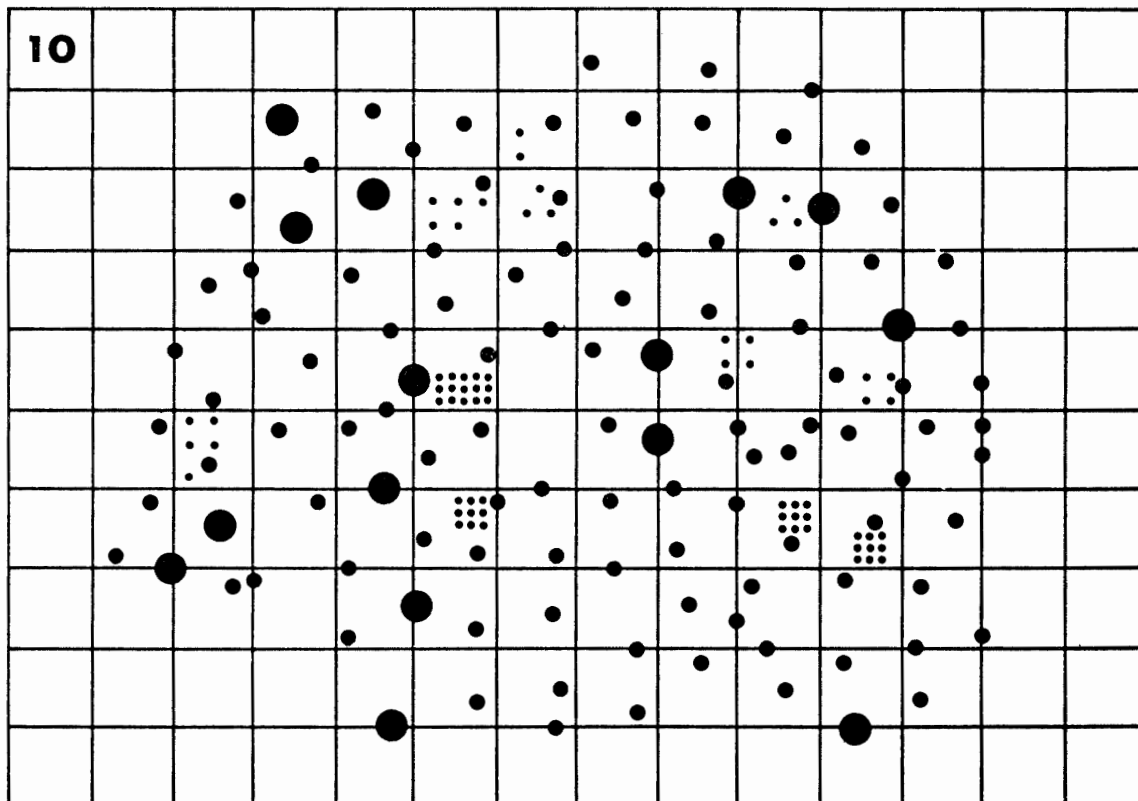
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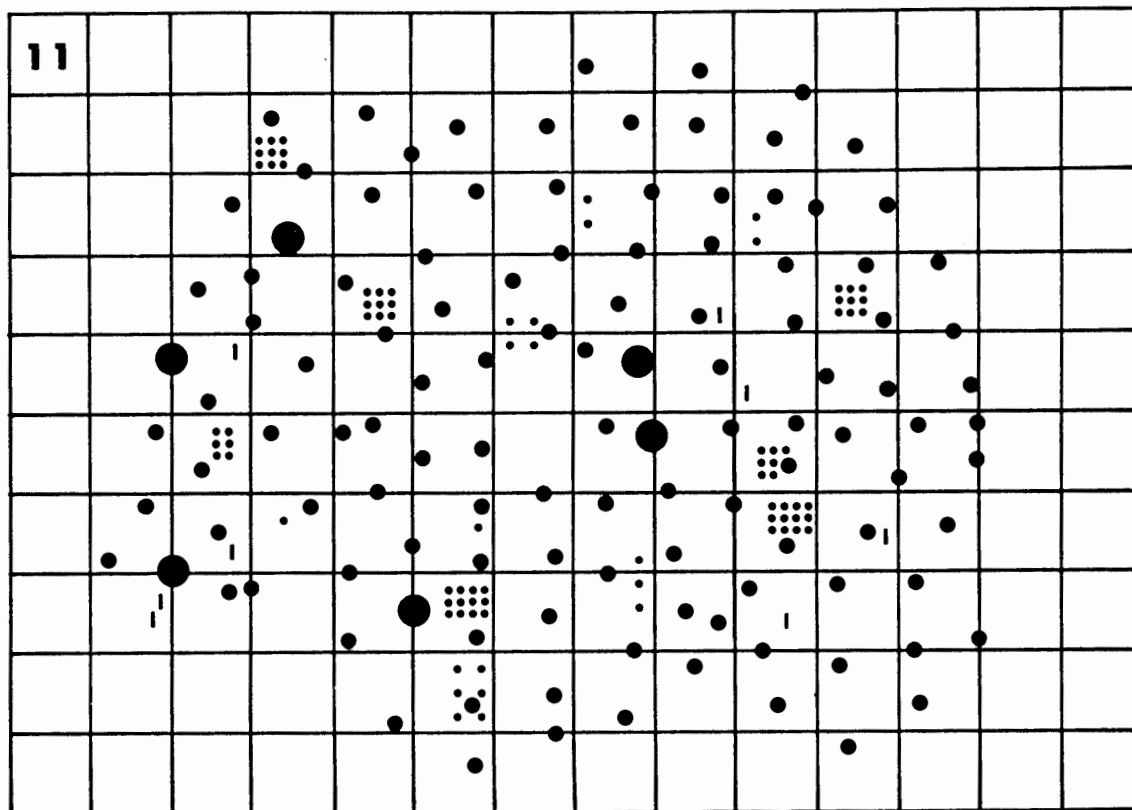
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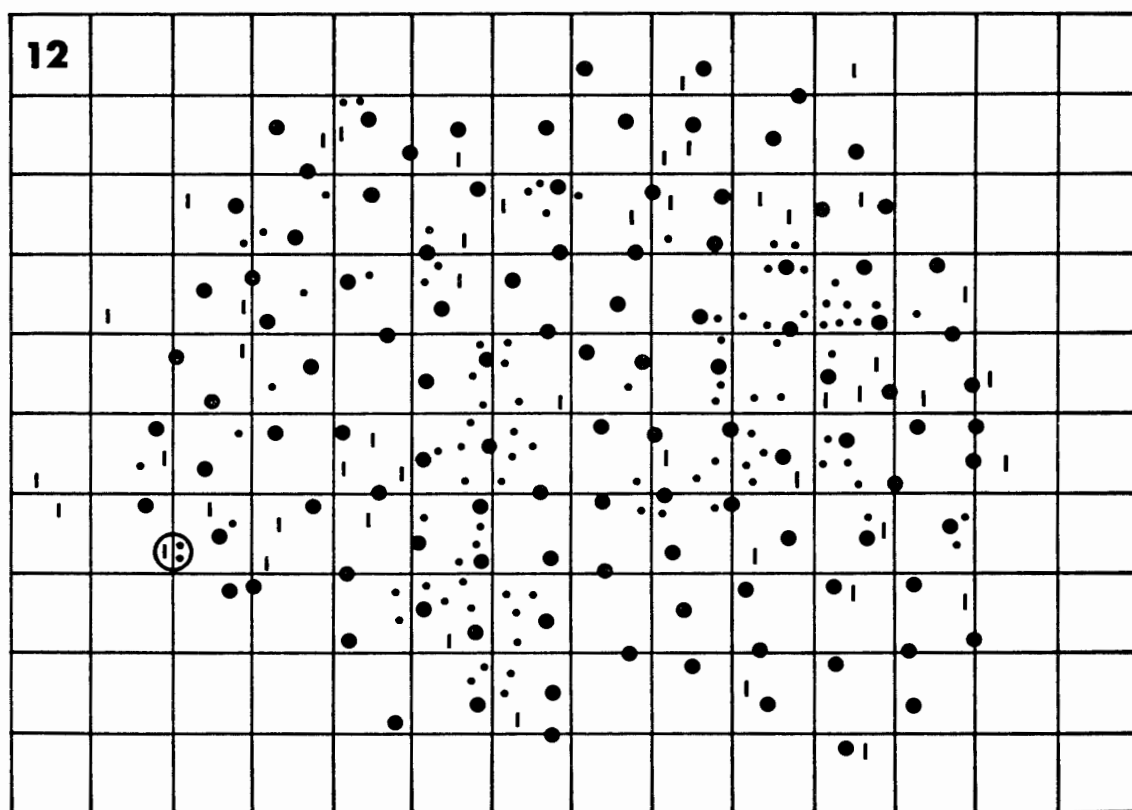
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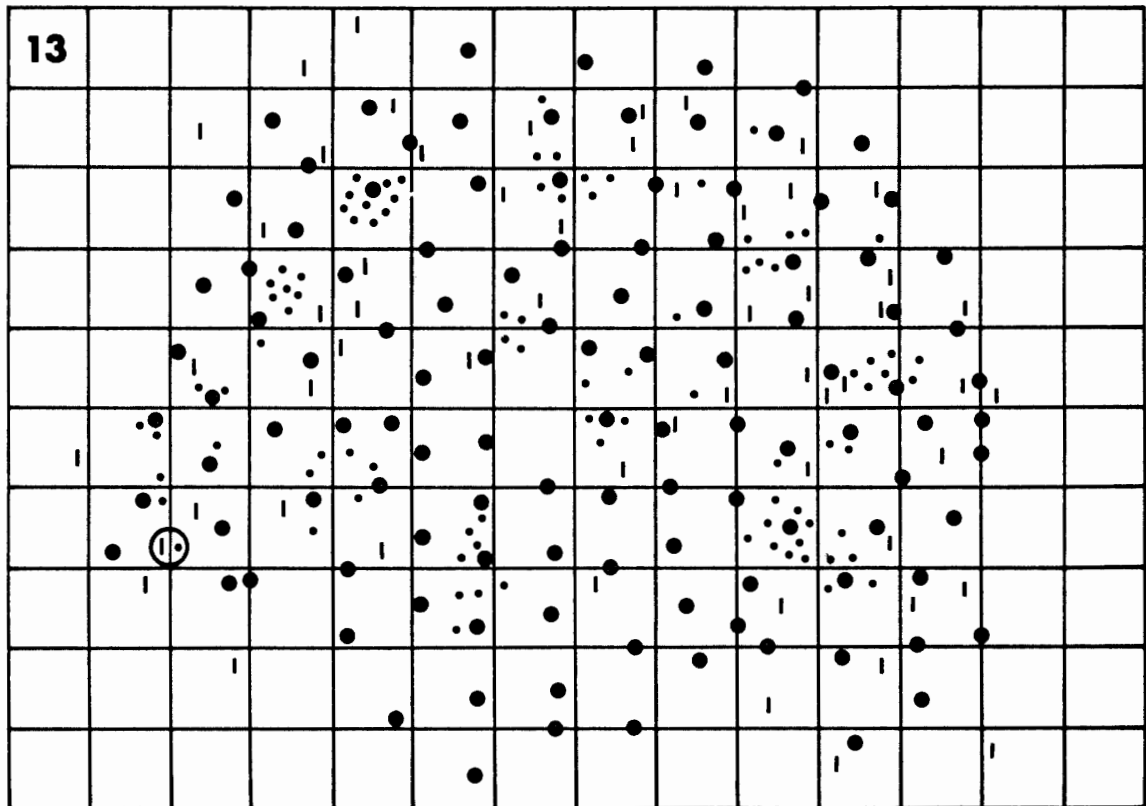
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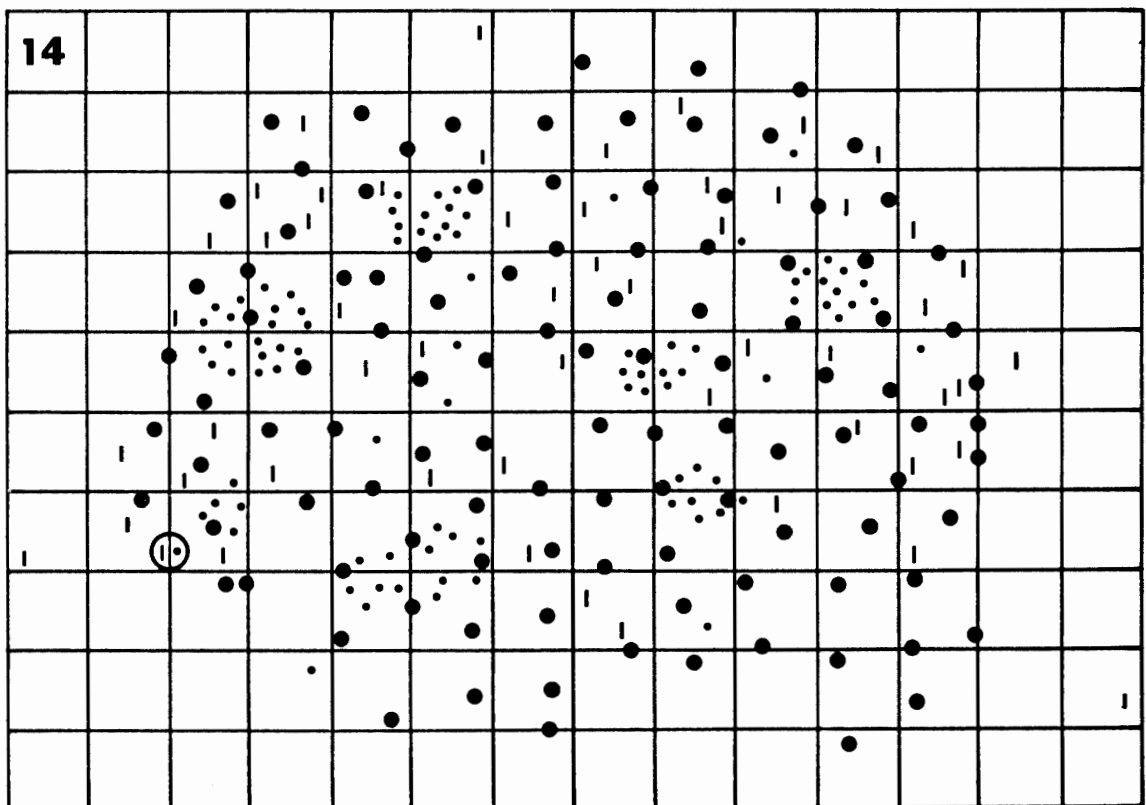
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| Free-nonbreeders



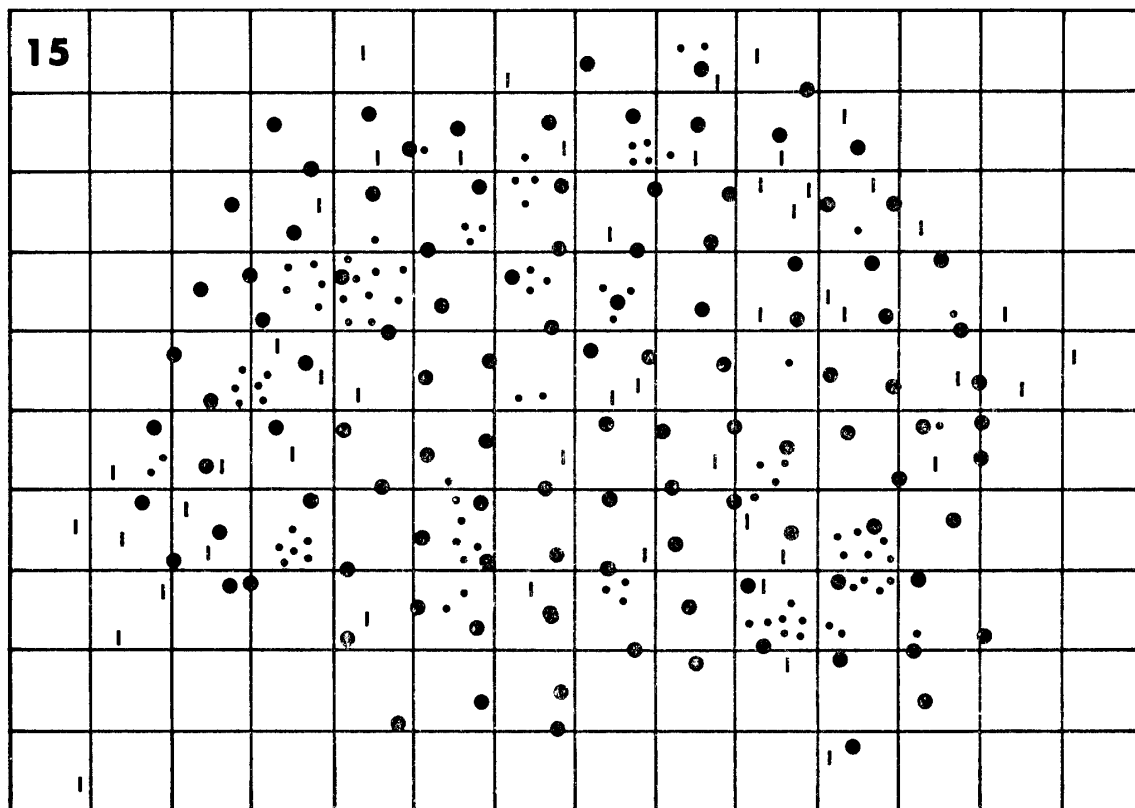
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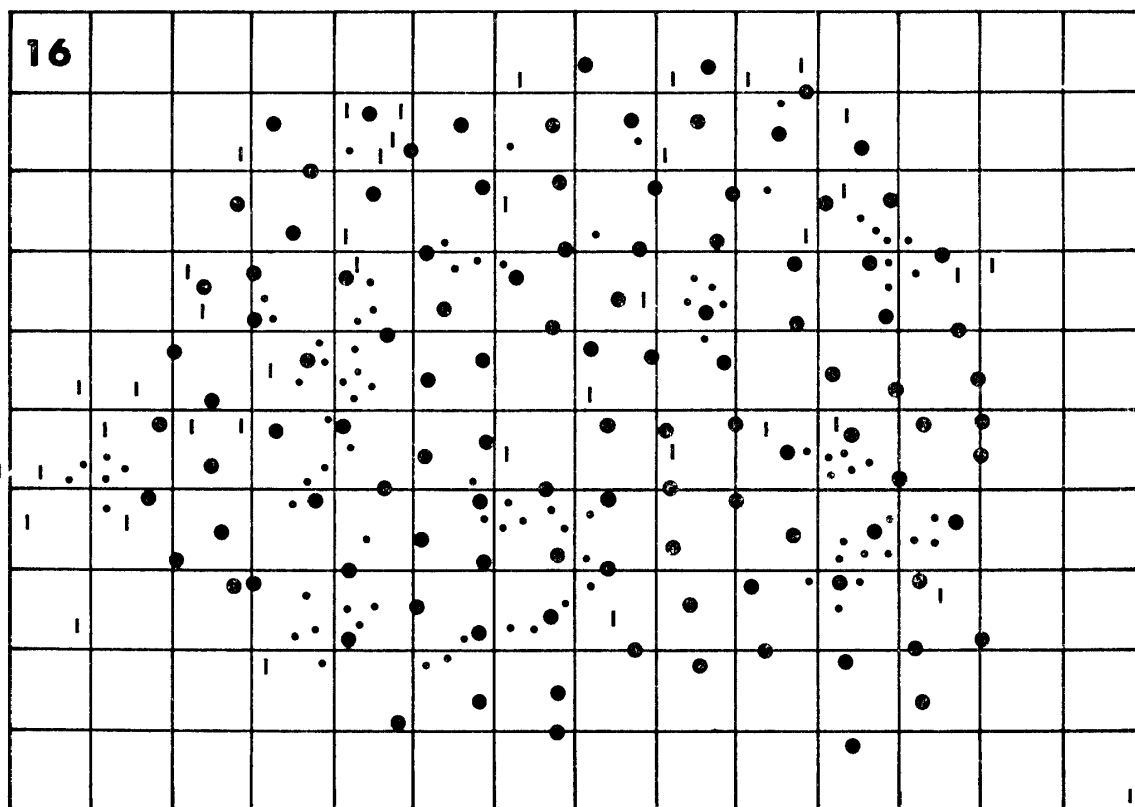
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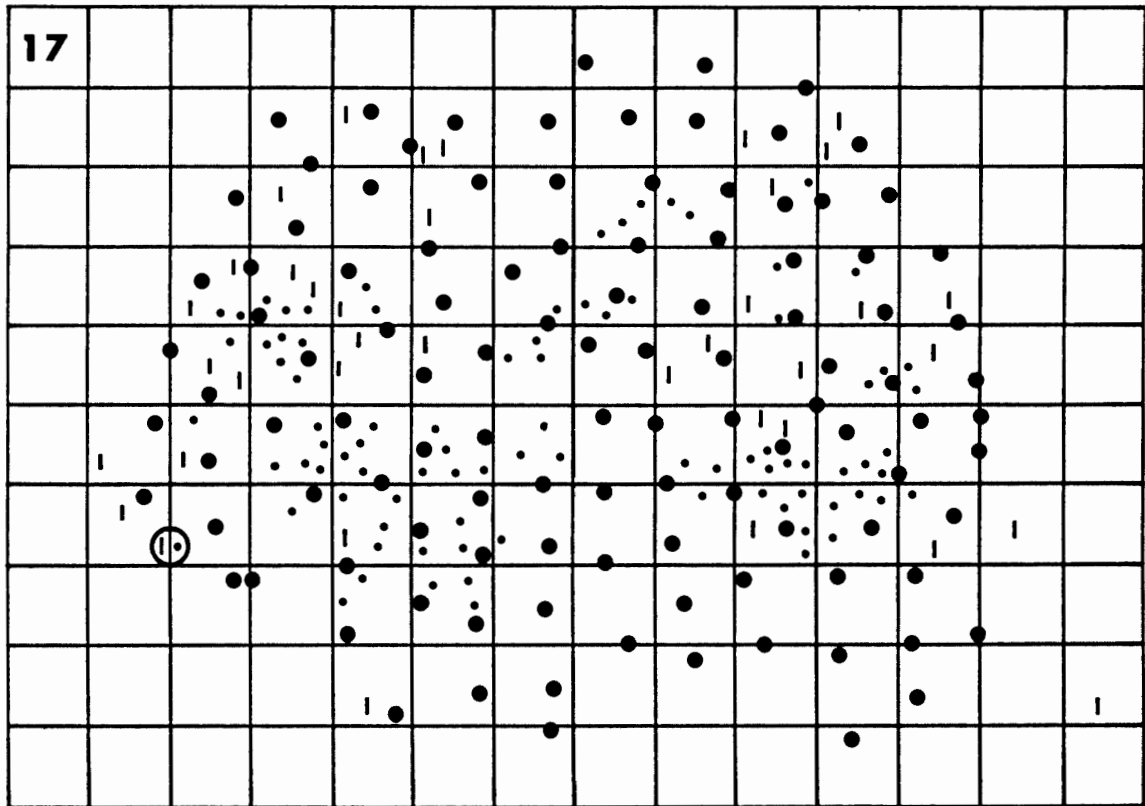
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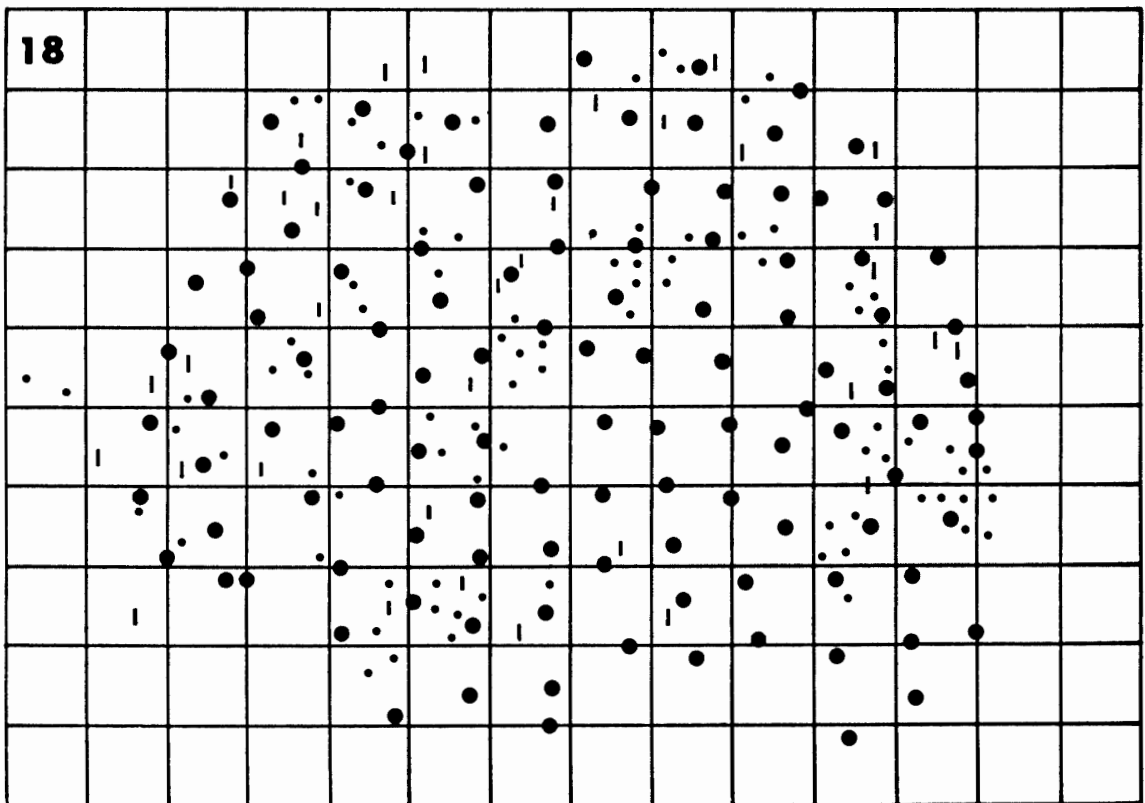
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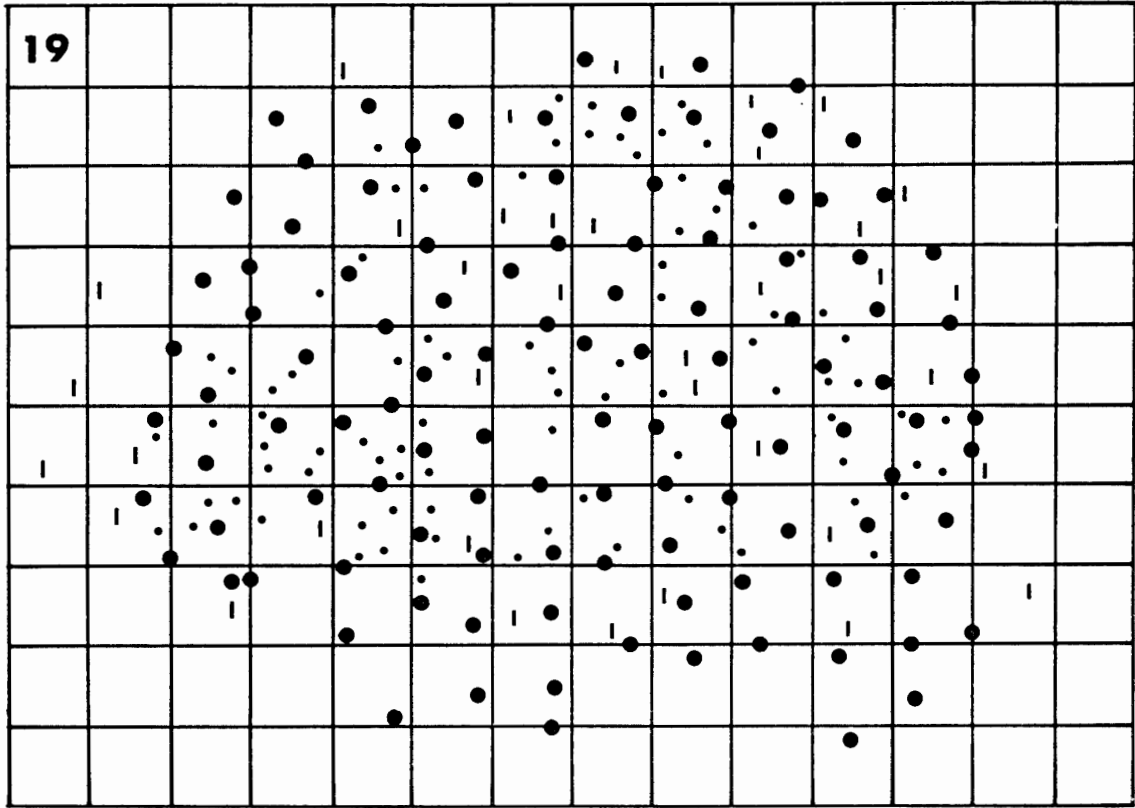
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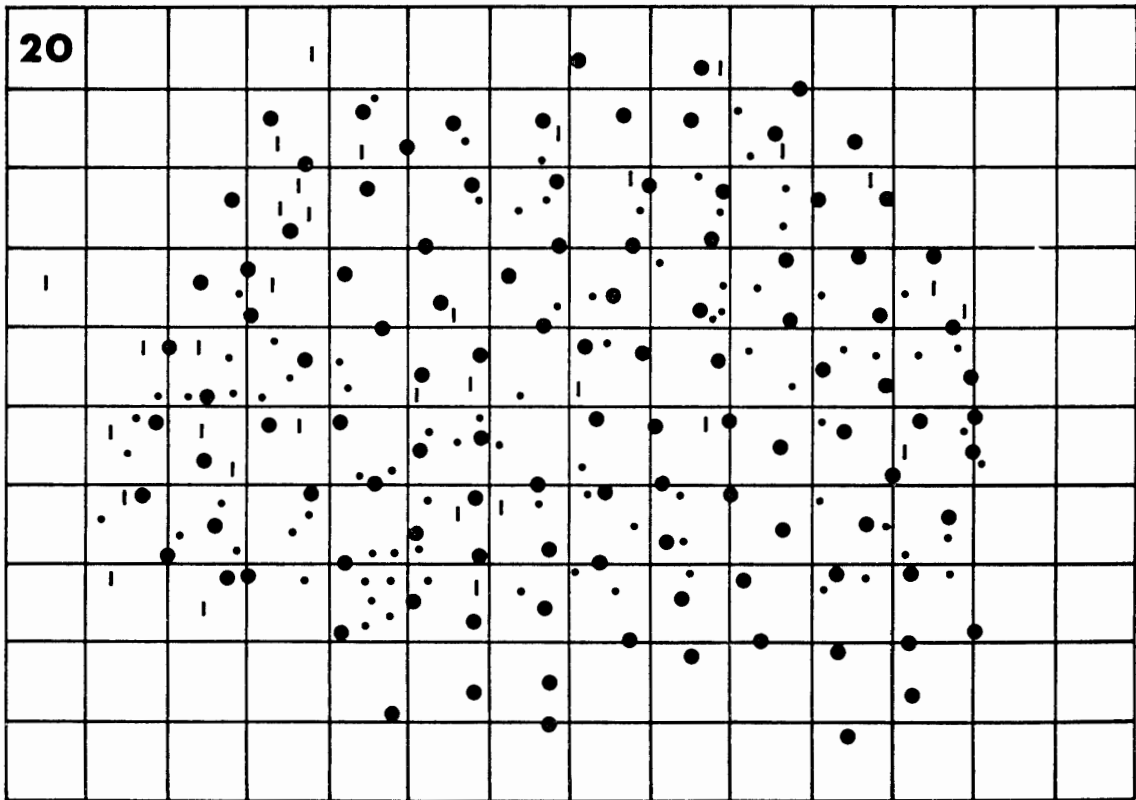
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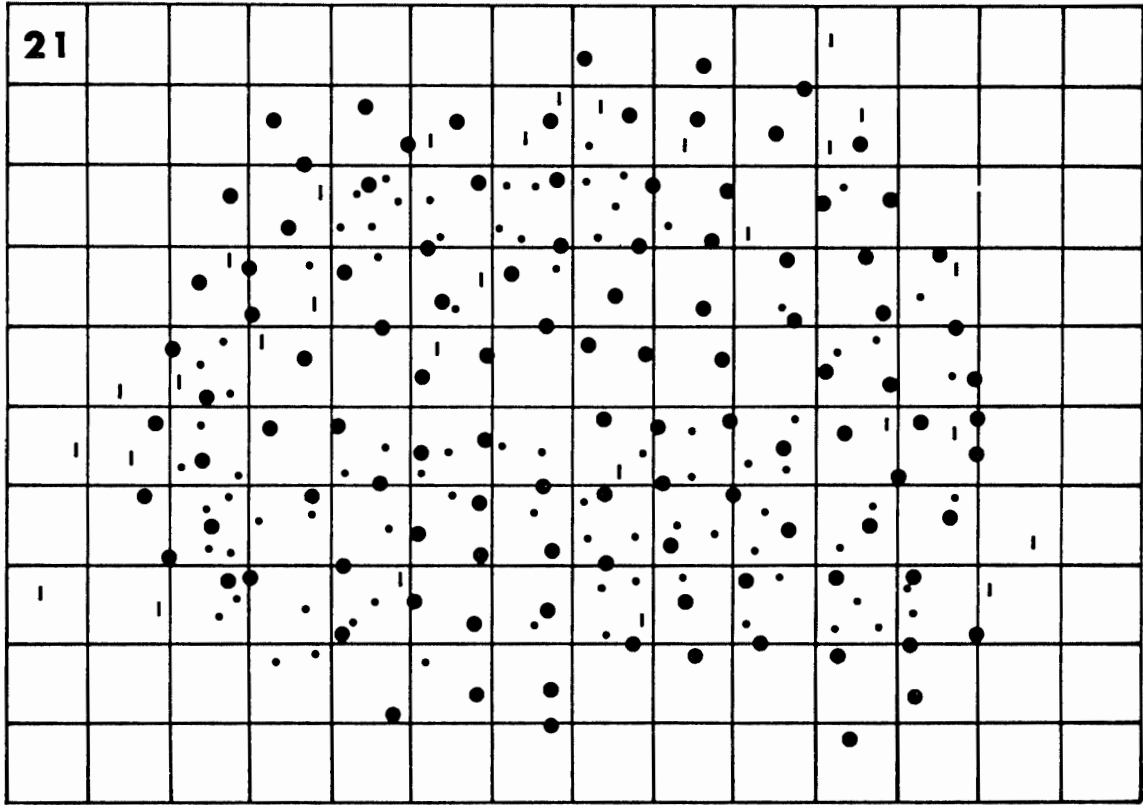
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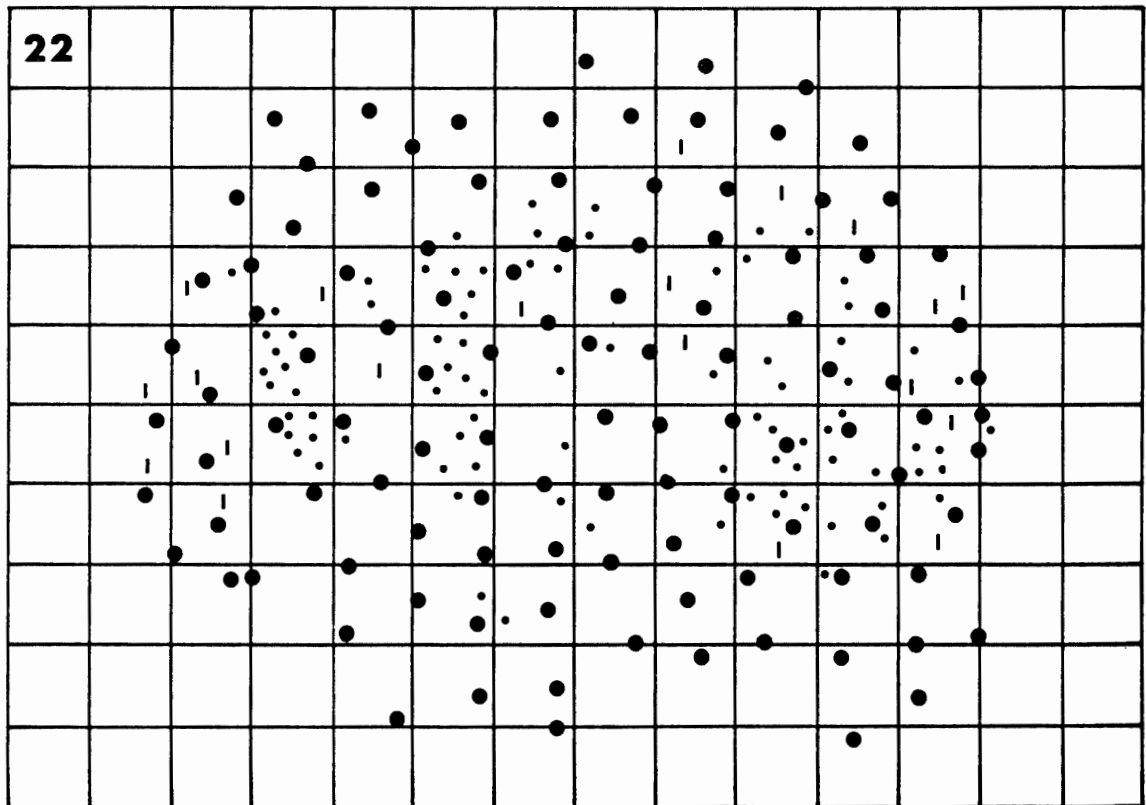
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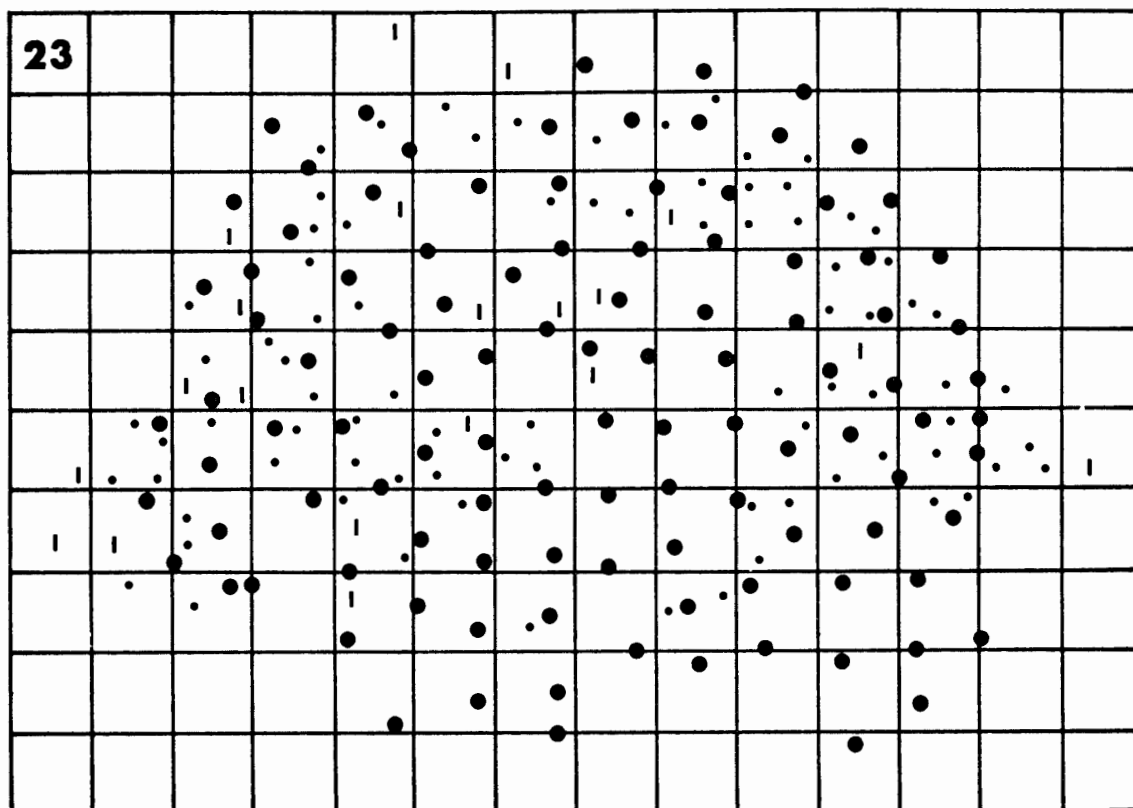
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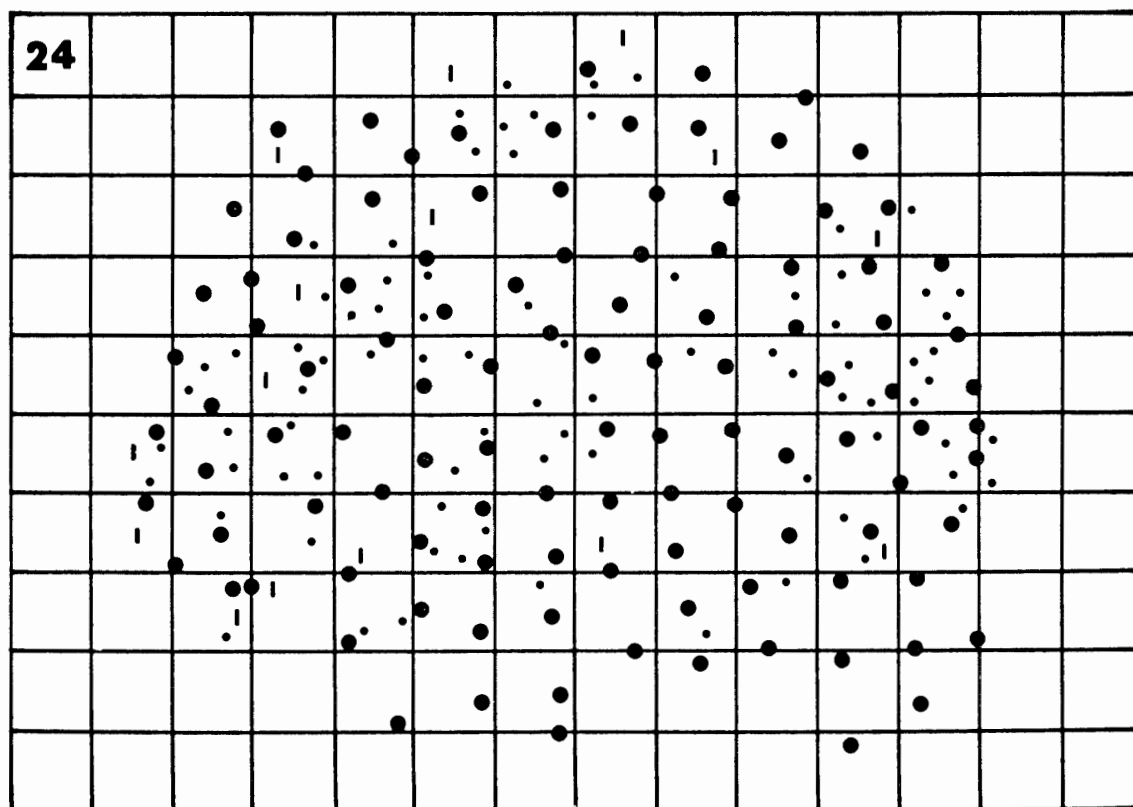
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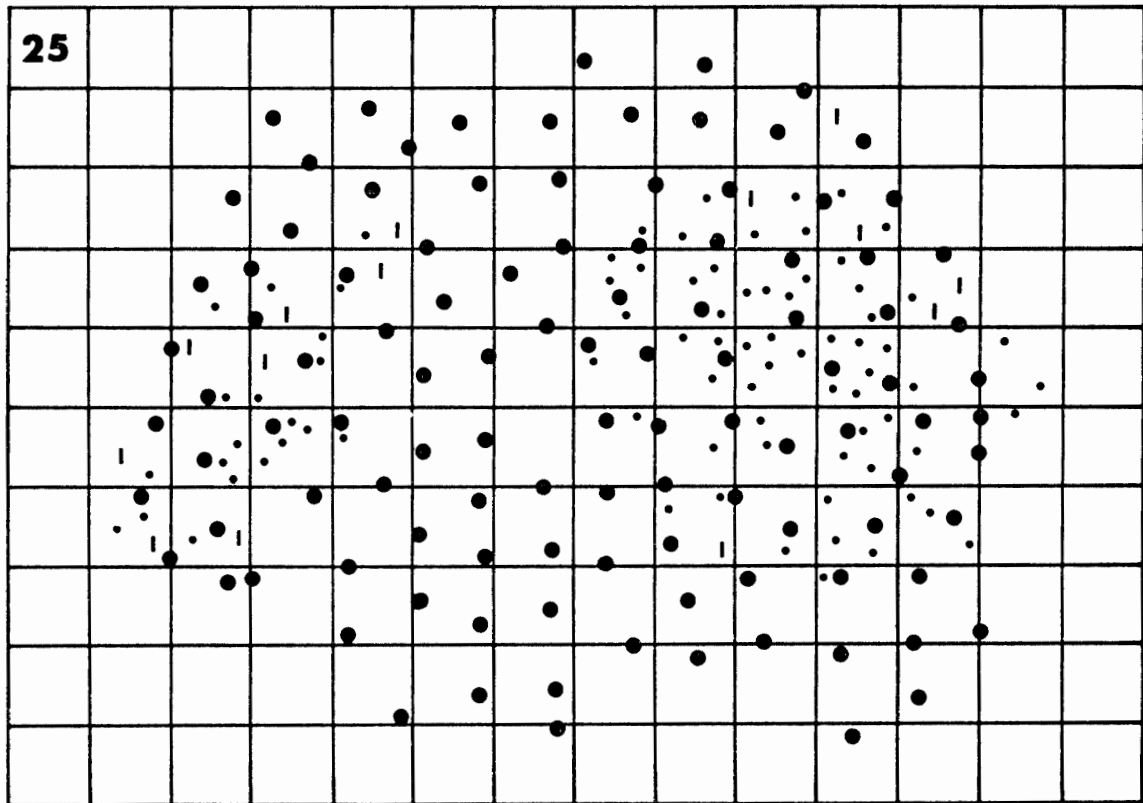
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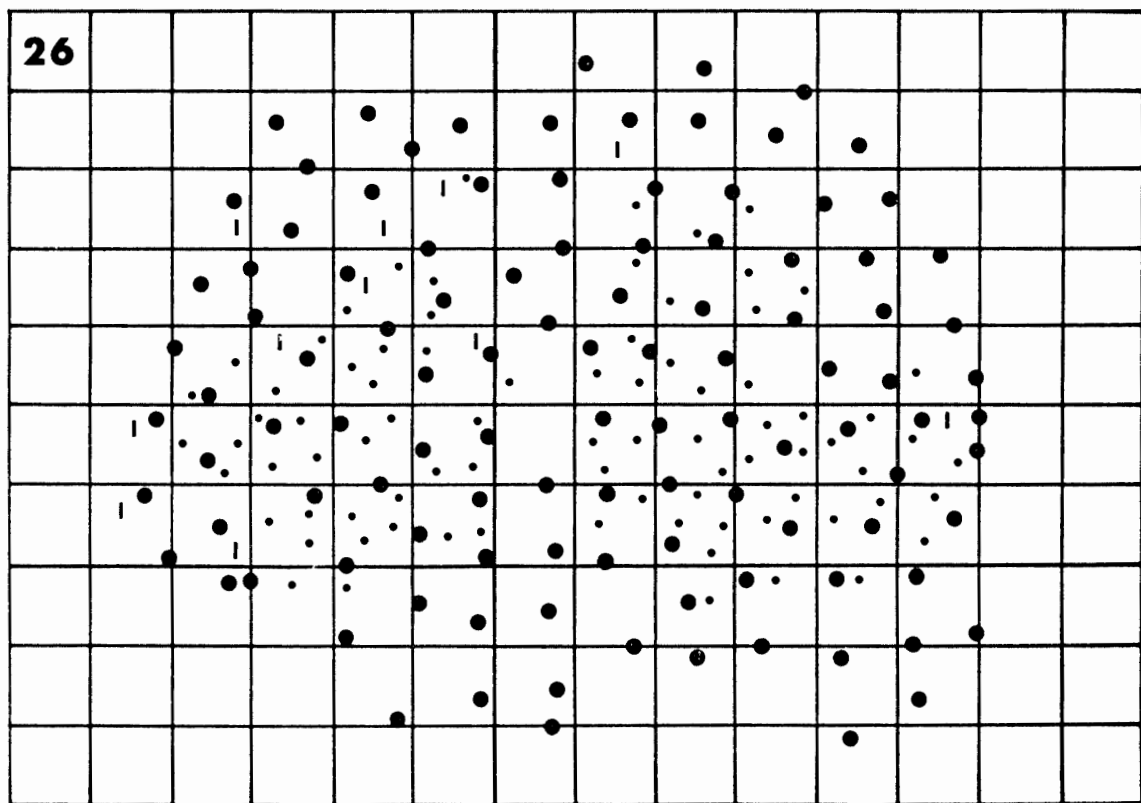
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