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SUMMARY OF TESTS CARRIED OUT AT THE INTERNATIONAL BEN GOURION AIRPORT (LOD) WITH "BIRD REPELLENT RETA"

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As a result of observations carried out from September 1974 at the Ben Gourion International Airport at LOD we were able to note that out of all the species of birds in the area surrounding the runways partridges and seagulls, and to a lesser extent Lapwings, could be of greatest danger in collision with aircraft landing or taking-off.

Partridges

Flocks of 8-12 partridges (Perdrix Bartavelle, Rock Partridge, Alectoris graeca) move around in the runway areas and sometimes cross the runways without being noticed from a distance; this has been observed several times using field-glasses and it seems likely that if a jet aircraft were to land or take-off while these relatively heavy birds were present, they could be sucked in by the engines.

Seagulls

Different types of seagulls spend the winter in Israel; they usually arrive from Eastern and North-eastern Europe from October/November and remain at this time by the sea; only the Black-headed gull (Larus ridibundus) leaves the shores during the day and searches for food inland, mainly on rubbish dumps; these gulls are often seen in very large flocks - several hundreds on smaller dumps and several thousands and more on large dumps. The flight of several hundreds of gulls at altitudes of several metres, several tens and even hundreds of metres certainly presents a very great danger to aviation. More so in winter the gulls land and even rest on the runways themselves and in nearby fields. The Black-headed gulls return each evening to the sea-shore for the night.

These findings have enabled us to set up two quite distinct experiment projects.

The first series of tests was intended to see whether at least the use of one of our "bird repellent Reta" formulas over parallel strips on the runways could prevent the presence of ground birds near to the runways and especially prevent the partridges from crossing the runways in their search for food.

The second series of tests was intended to see whether the treatment of rubbish dumps using the same "bird repellent Reta" product could reduce the size of the daily population of gulls at these refuse dumps.

The tests were carried out during the periods 1974-1975 and 1975-1976. The observations were made periodically by the author during the winter of 1974-75 and daily by S Birnbaum (agronomer) and the author during the 1975-76 period.

Location of the tests

For ease of observation the first series of tests (A) was carried out the length of the main runway 26-08 and on the North side, and the second series (B) on the municipal dump near to Yahoud which enabled movement

between the two observation posts without too great loss of time.

(A) The length of runway 26-08.

The runway 26-08 runs East-West over 4000 metres; on its North side it is bordered by a 50 metre wide strip which is given over to fodder crops, tares and oats. This strip was treated and the crop was about 10cm high at the start of treatment.

(B) The municipal refuse dump - Yahoud.

This dump is situated alongside a drainage canal with V-shaped banks and to the North; to the South and to the West is a fenced off radio transmission station with 2 directional antennae (Log periodic antenna); the dump consists of 2 sections: the first is a strip 140 metres in length by 25 metres and the second is in the shape of a trapezium of almost $4000m^2$. The refuse trucks dump the refuse from the town in piles, side by side, and the refuse is not treated or moved at all, at least not during the duration of the tests. Most of the refuse is household rubbish, food scraps and kitchen refuse with a great deal of packaging of all kinds, cardboard boxes, plastic containers and cloth containers; also to be found is workshop refuse and scraps from slaughterhouses and butcher shops.

1974-75 period

The treatment was carried out on the 6 February 1975 by means of a Bell 47 helicopter with 30kg of "Reta" per hectare diluted in 150 litres of water over the strip parallel to the runway and with 90kg per hectare (ie 1 kg of "Reta" in 5 litres of water) on the refuse dump and the Northern edge of the canal. The sky was slightly overcast during the morning when the treatment was applied and heavy rain followed after the treatment at the end of the afternoon, during the night of the 6th and all day on the 7th.

Parallel to the 26-08 runway treatment was carried out on two strips each 45 metres wide by 1000 long and separated by a space of 1000 metres which was not treated. Observations were made intermittently 3-4 times per week at different times of the day for one month until the 6th March.

Results and findings from the 1974-75 test period

During the month 6 February to 6 March no partridges were seen at all alongside the runway or on the two areas treated and some were seen several times on the sample non-treated areas and on the cultivated fields round about.

On the municipal dump: it seemed that the number of gulls generally had diminished, that the time spent by the gulls above the dump was considerably reduced and that the times at which the gulls visited the dumps had become very irregular.

The results of tests carried out in this period seemed sufficiently interesting and promising to encourage further testing during the following year, on a larger scale with daily continuous observation and with as exact recording as possible.

1975-76 test period

An initial treatment was carried out over the length of the 26-08 runway on the 27 and 28 January over an uninterrupted area of 3000 metres by 46 metres using a Leland Snow S-2 crop spraying plane with 30kg of "Reta" in 150 litres of water per hectare. A second treatment was carried out on the 17 February on the same strip using a Bell 47 helicopter with 33.3 kg of Reta in 200 litres of water per hectare. Both treatments were carried out in good weather conditions, the first in wind which was within the norm for aerial treatments.

On the refuse dump, on the 15 February a treatment was carried out using a Bell 47 helicopter with 200 kg of Reta per hectare (ie 7.5 litres of water for 1 kg of Reta) over a total area of 2 hectares; from the 18 February daily dumps of refuse were sprayed daily, firstly using a sprayer mounted on the back with a Holder engine and later, for simplicity, using a manual Lêhavot spray with pre-set pressure and at a rate of 0.5 to 1 kg of Reta per truck load depending on circumstances and a concentration of 1 kg of the product in 10 litres of water; on wet days the spraying was replaced by a powdering of the area which the rain fixed to the refuse.

Findings from the 1975-76 period

(A) Test alongside the 26-08 runway; the strip treated was divided into 4 numbered areas from 1 to 4 East to West. The number of birds was noted, mostly Lapwings (Vanellus vanellus), and the time they remained on the area; to compare the findings with one another the coefficient C was taken so that -

$$C = \frac{\text{number of birds X time spent on the area in minutes}}{\text{hours of observation}}$$

The first aerial treatment was carried out on the 27 and 28 January; it was interrupted on the 27th after the first load due to mechanical problems and resumed the following day. This treatment was not successful although the reason for this is not known with any certainty but it is likely that it was not carried out correctly; the second treatment was carried out on the 17 February by helicopter and was effective from all points of view. The findings which followed were not continued because observation was transferred to the Yahoud refuse dump. After this second treatment the number of Lapwings and Partridges decreased notably, down to zero on the area treated, whereas the number of Lapwings remained constant and the number of Partridges increased on the surrounding areas, allotments, roads and fallow ground; at this time the flocks of partridges divide and partridges are most often seen in pairs, cf. drawing and table "A".

(B) On the Yahoud municipal dump the number of gulls in the air and on the refuse dumps was noted as accurately as possible: the number of birds of other species was estimated: starlings, (Sturnis Vulgaris) Cattle Egrets (herons Ardeola ibis), bulbuls (Pyenotus capensis), sparrows, doves and pigeons and swallows at the end of the period.

The behaviour and the number of birds of different kinds during a typical day at the end of January and the beginning of February can be described as follows:

6.30 Arrival from SE, in large waves, of starlings reaching in 15-20 mins a population of 1000-1200 and setting down on antennae and various cables and antenna braces.

6.45 Arrival from the West in groups of 4-6 of herons up to 7.00 reaching a number of 12-20.

6.50-7.00 Arrival from the West in waves of 30-50 of gulls reaching between 200-400 in 15-20 mins. Gulls land unfailingly and directly on the refuse of the morning and of the previous day. (Each refuse skip was marked and dated with coloured ribbons).

At the same times we noted about 50 pigeons and doves, a few dozen sparrows and between 10 and 20 bulbuls.

From 9.00 the number of starlings goes down to 400 and increases to 1000-1200 towards the end of the day from 14.30-15.00. Towards 16.00 the starlings leave the area. The number of doves, pigeons, herons, sparrows and bulbuls remains static until about 16.00.

During the day groups of gulls leave the area and come back after 20-30 mins. So this means that there are always 150-400 up to 16.00 according to the weather. From time to time large groups of gulls 100,200,300 settle either on the nearest antenna (never on the second antenna which is 150m away) or inside the enclosed area of the radio transmission station, or on the banks of the canal. Resting time may be more than half an hour.

From 16.30 there are practically no more birds in the area. This typical timetable is a few minutes earlier every day whilst the time of departure of the birds remains more or less constant, a bit earlier in bad weather and a bit later in fine weather.

On the 15 February the whole area was treated with "Reta" in quantities of 20 kg per 1000m^2, that is both dumping areas and the North bank of the canal over a distance of 250m; the bank is covered with dense grass 10-15cm high.

During the 3 days following the treatment no significant modification in the number of birds was observed nor any modification in the behaviour of the starlings, pigeons, doves, bulbuls and herons; but this was not the case for the gulls; on the 16 February the doves settled on the banks of the canal as on previous days but as from 17 February the gulls no longer settled on the banks and this continued to the end of the season.

From the 18 February the daily refuse was treated with "Reta" each heap was only treated once. As from the 18 February we noted a very significant decrease in the number of gulls settling on the refuse heaps, but the gulls continued to fly low, skimming over the refuse. We observed that the gulls almost certainly did not eat any longer; on several occasions we noted with field glasses, a gull pick up a piece of refuse in its beak, fly with it for a few seconds, drop it and land immediately on a puddle to drink. At the same time the gulls became sensitive to different noises: the arrival of the refuse truck, the taking-off of an aircraft or the working of the engine-driven sprayer; they then disappeared for a much longer time; before treatment these noises did not have any effect on the gulls' behaviour.

On several occasions the official in charge of the anti-bird campaign in the aerodrome transmitted by loud speaker cries of distress (using a Dutch tape); before the treatment the effect of these transmissions was temporary to begin with, the gulls left the area for about 20 mins and then hardly at all; after treatment the effect of these transmissions was more constant but always temporary.

From the 23 February we used a very noisy reaction fog-emitter (pulsefog) and the gulls left the area immediately but came back after periods ranging from $\frac{1}{2}$ hour to 2-3 hours.

From the 2 March we met the first gulls between 6.30 and 6.45 by turning on the pulsefog and by directing the nozzle at the gulls. These first gulls (scouts) then departed Westwards and no more returned. The area remained empty of gulls to the end of the day and this continued to the 3 April. As from the 3 March the gull-scouts no longer came in groups of 10-30: one gull would come alone and leave as soon as the pulsefog was set in operation. Several times the mere sight of the equipment, painted in violent red and blue, even before its sometimes laborious starting-up, was enough to cause the gull to leave.

From the 2 of March also the number of starlings fell drastically from more than 1000 to about 50. About the same time as the almost total disappearance of the gulls. In the region in general the number of starlings remained constant for another 2-3 weeks.

The last daily treatment of the refuse heaps was carried out on the 26 March and continuous observation ceased on the 28 March. From the 29 March we carried out intermittent observation. On 3 April we observed 50 gulls on the site at 10.30. On the 4/5 April between 60-80 at 9.30 and on the 6 April we observed 75-200 gulls between 7.00 and 8.30. Observation ceased finally from the 7 April.

On the various public dumps in the region we observed no significant modification in the number of gulls until the 26 March; as from the 26 March the number of gulls on these dumps diminished visibly although no count was carried out of drawings and table "B".

This report was written taking into account the observations, counts and the report made by the agronomer S Birnbaum.

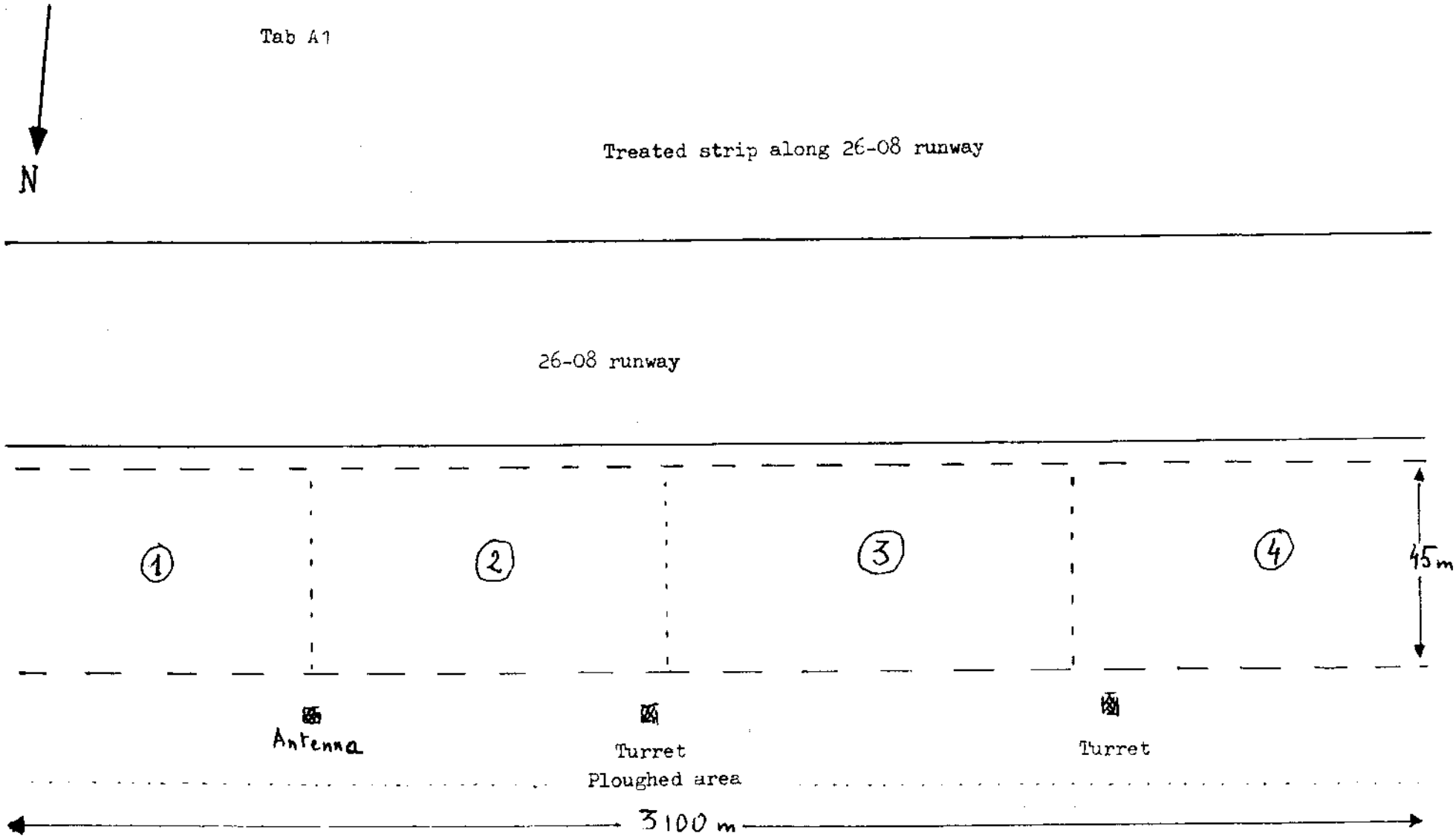
Tel-Aviv, May 1976

Guyora Dar

Agronome
Assia Maabarot

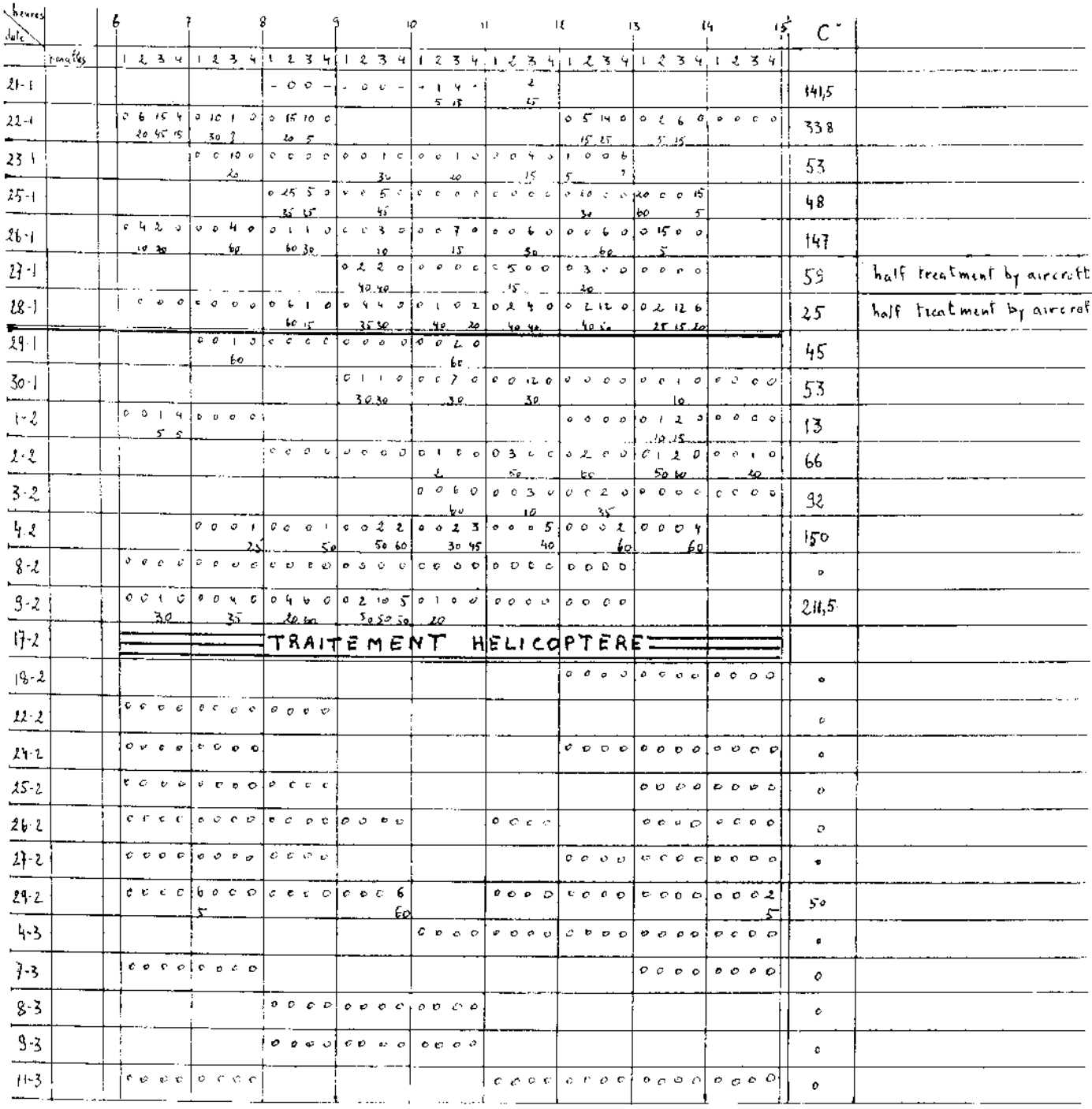
Tab A1

Treated strip along 26-08 runway



Tab. A2.

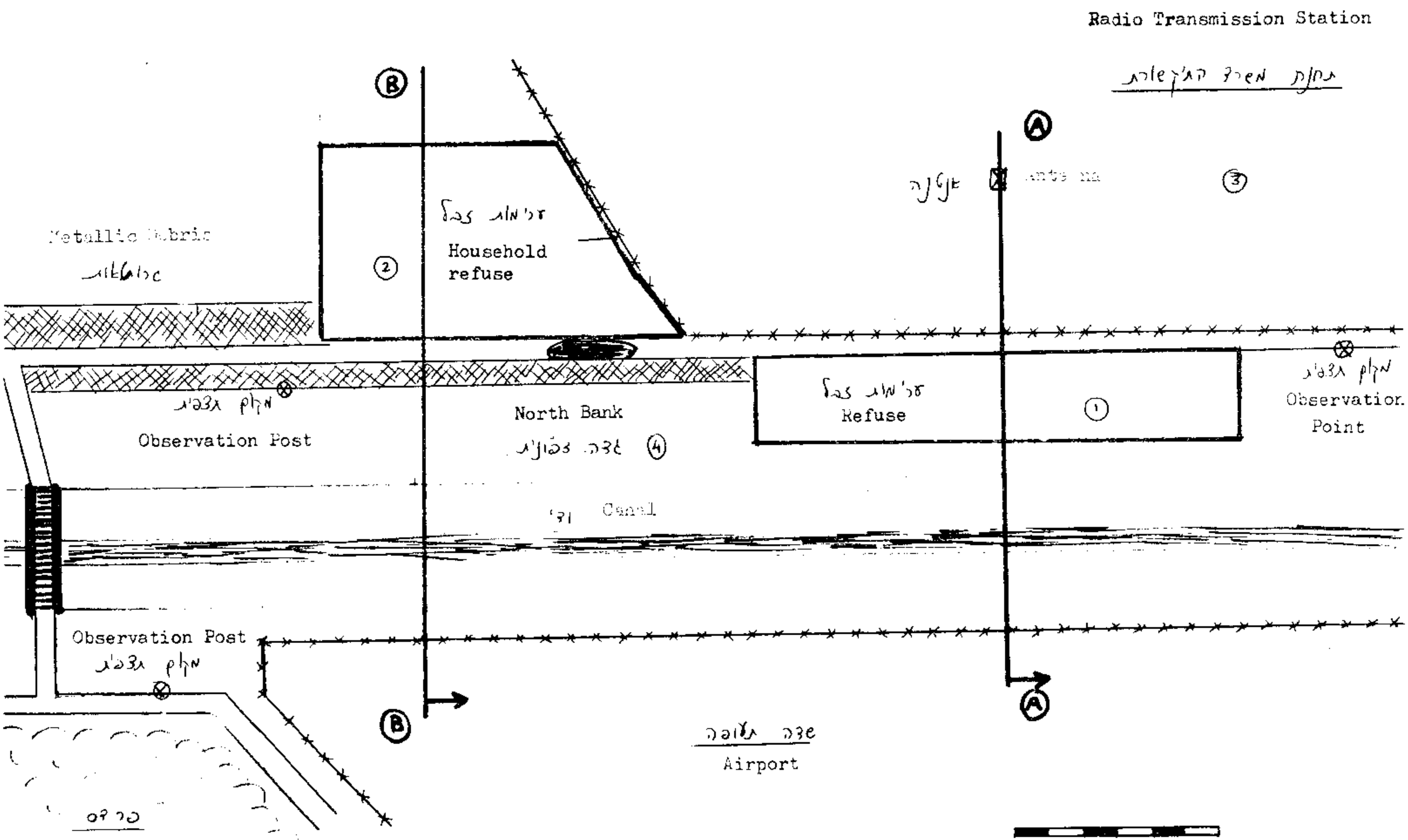
Number and behaviour of Lapwings and Partridges on the treated strip parallel to the 26-08 runway.



N.B. In each case the upper figure gives the number of lapwings and/or partridges in the corresponding area and the lower figure gives the time in minutes the same birds have spent on the same area.

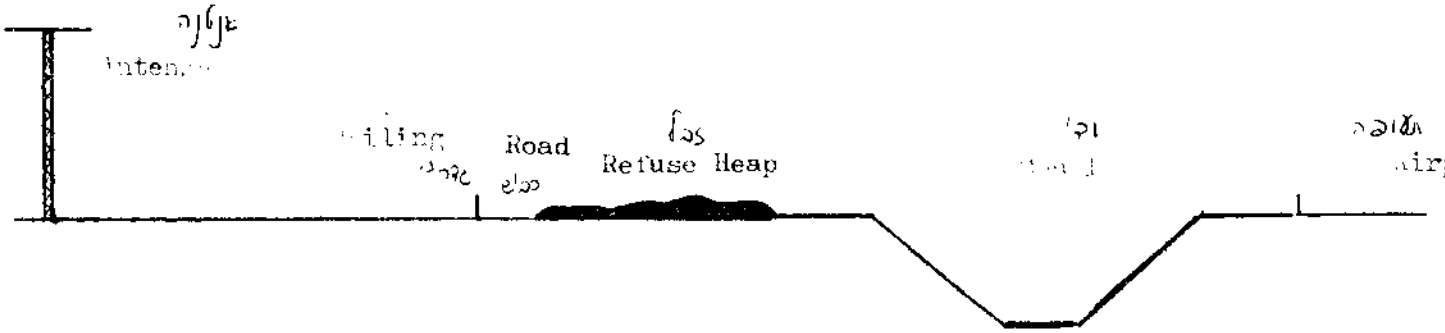
מפה 1 : מזבלה יהוד. ט. עוקיע

Tab B1: Municipial Dump - Yahoud

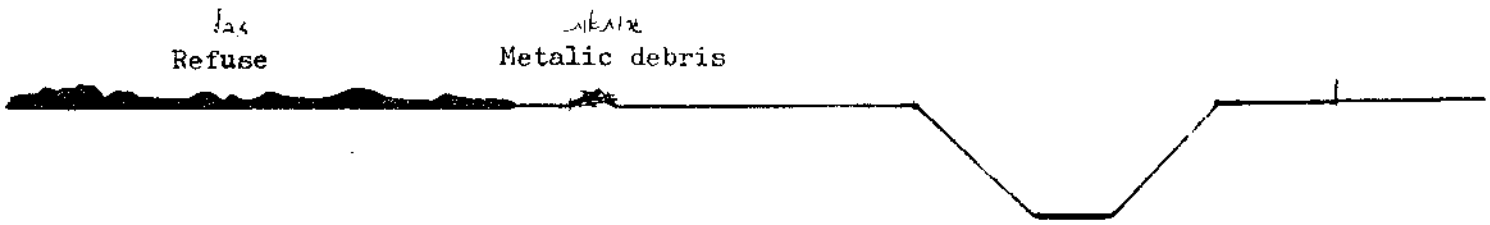


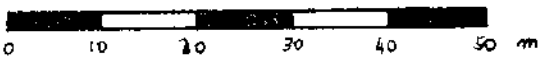
Tab B2

Ⓐ - Ⓐ



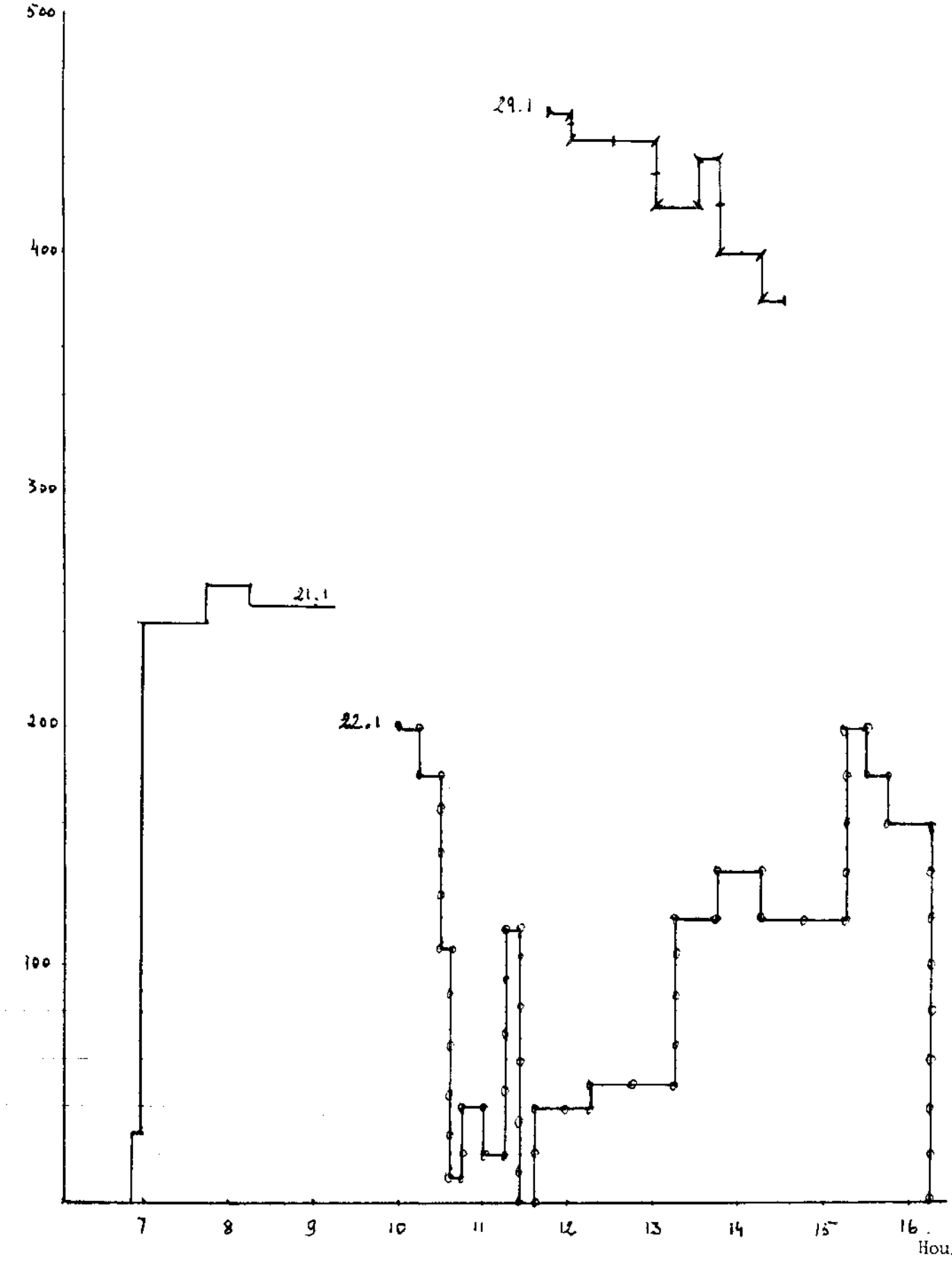
Ⓑ - Ⓑ





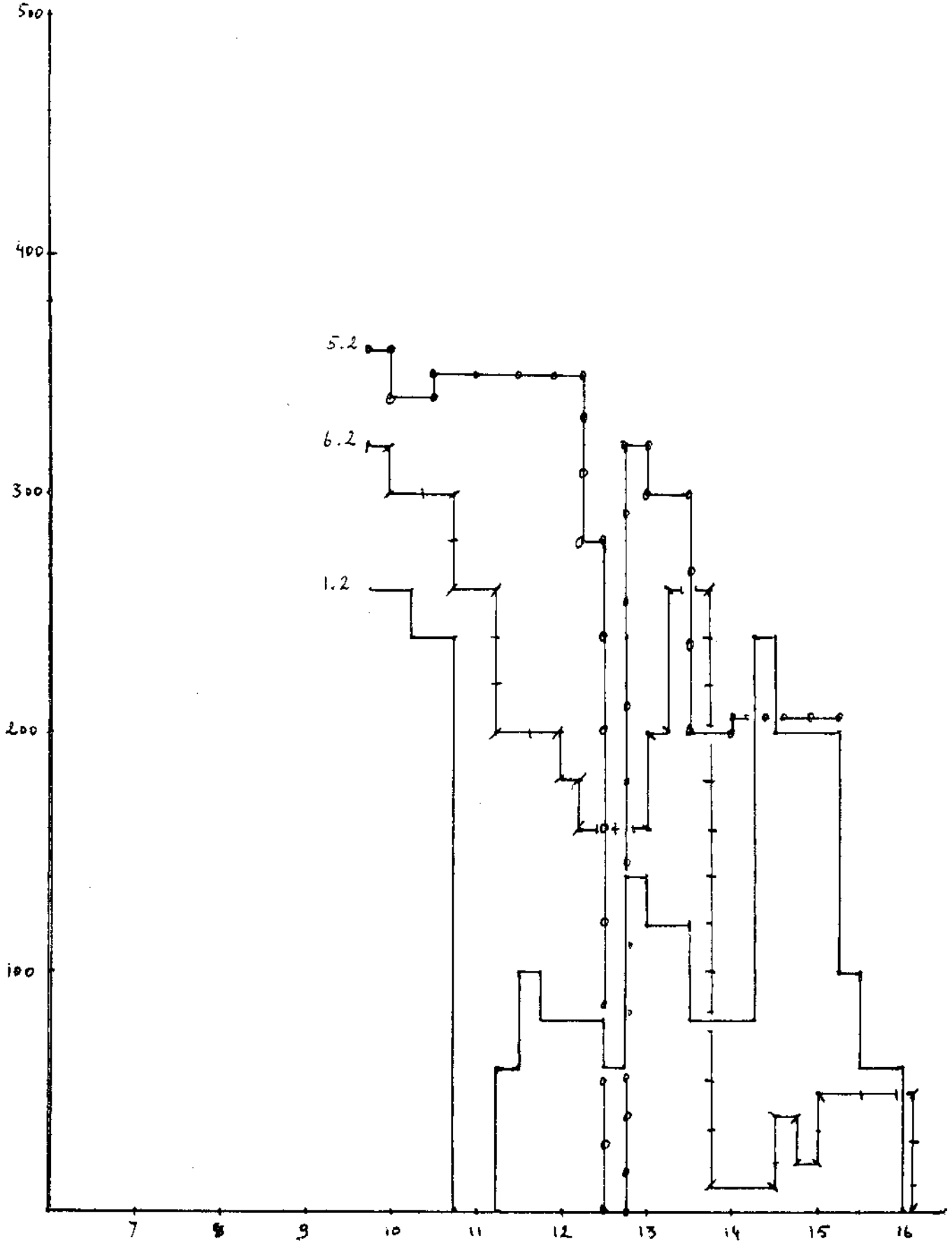
21.1 – 22.1 – 29.1

Tab B3



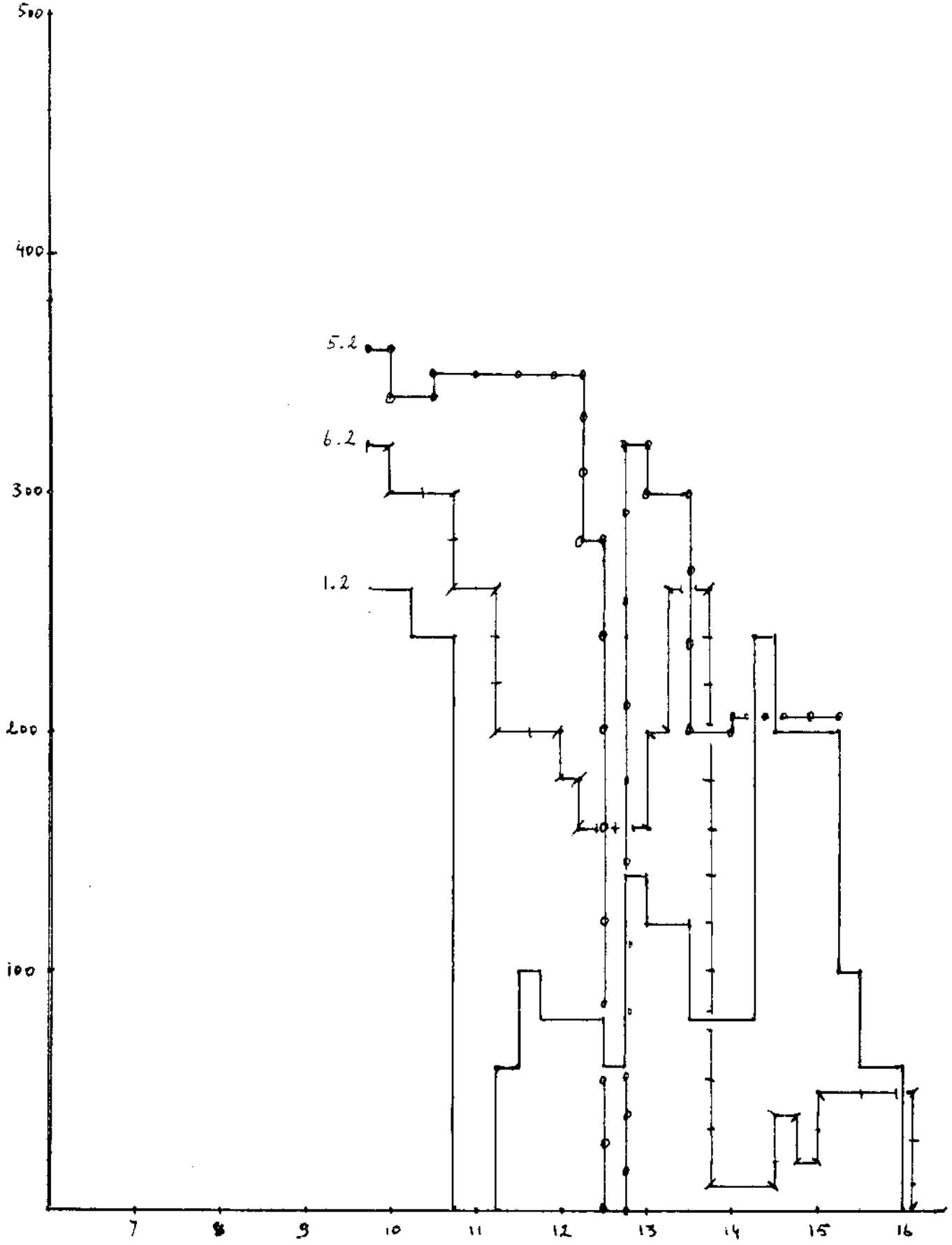
1.2 _ 5.2 _ 6.2

Tab B4



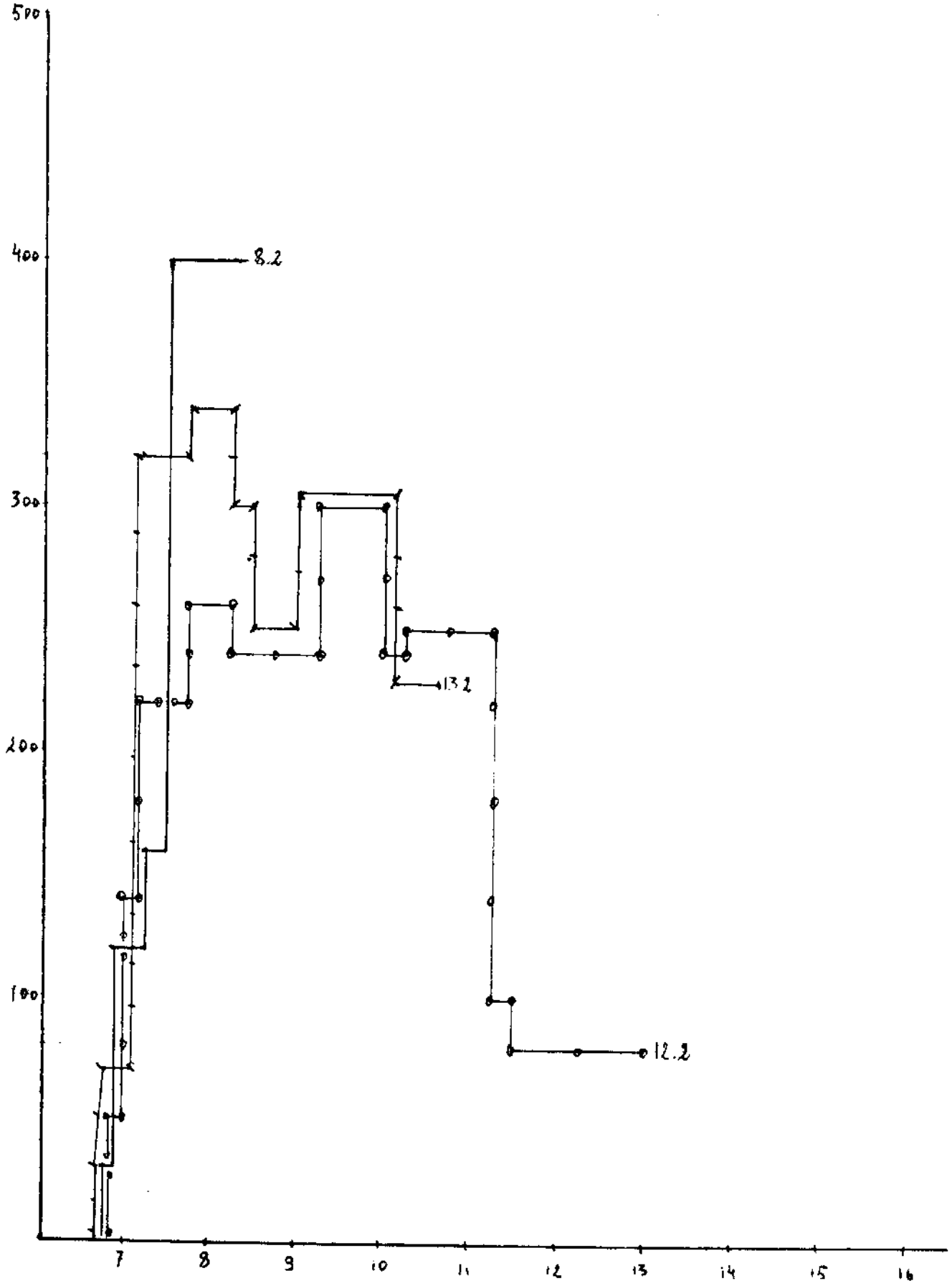
1.2 _ 5.2 _ 6.2

Tab B4

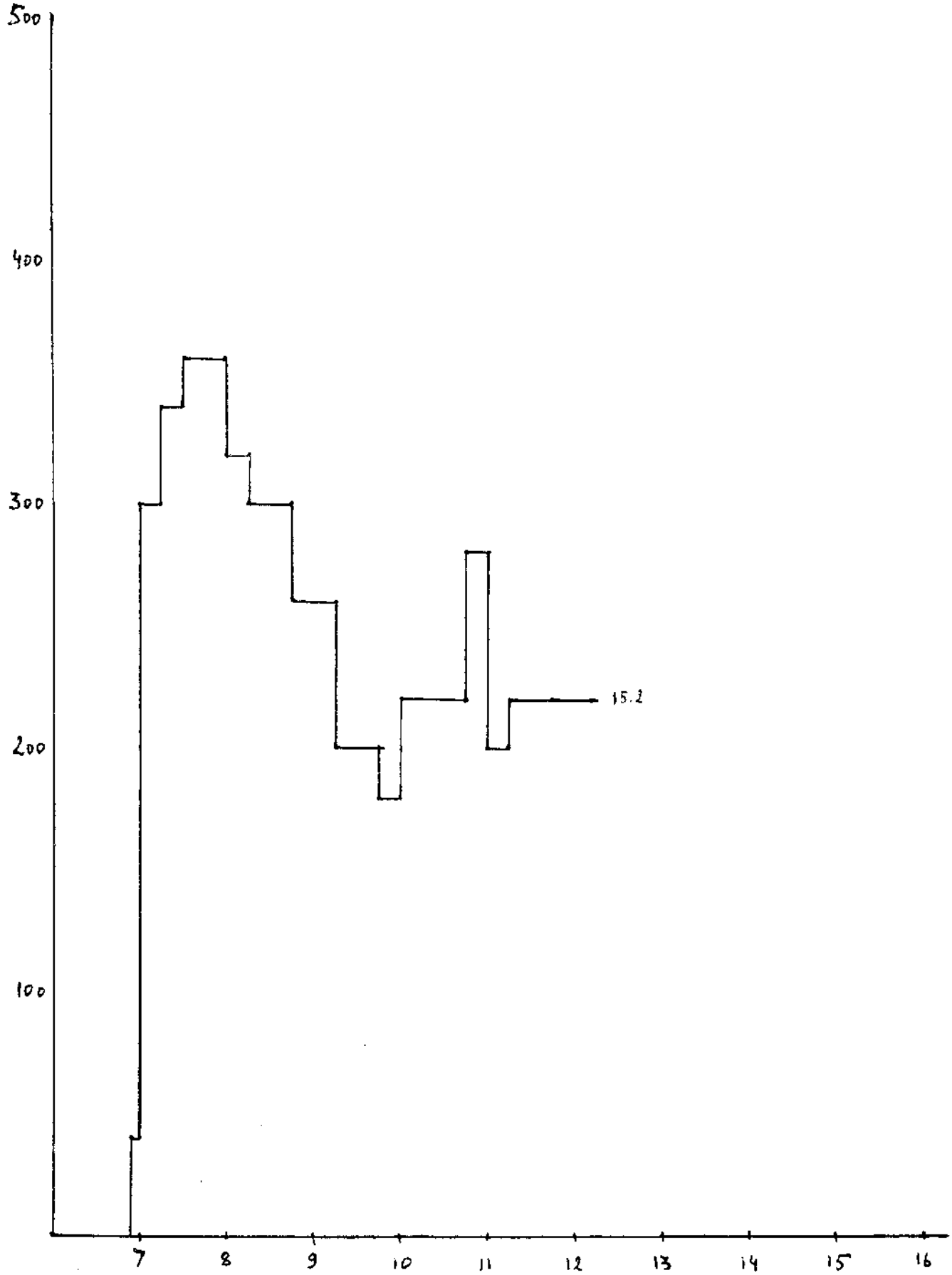


8.2 – 12.2 – 13.2.

Tab B)

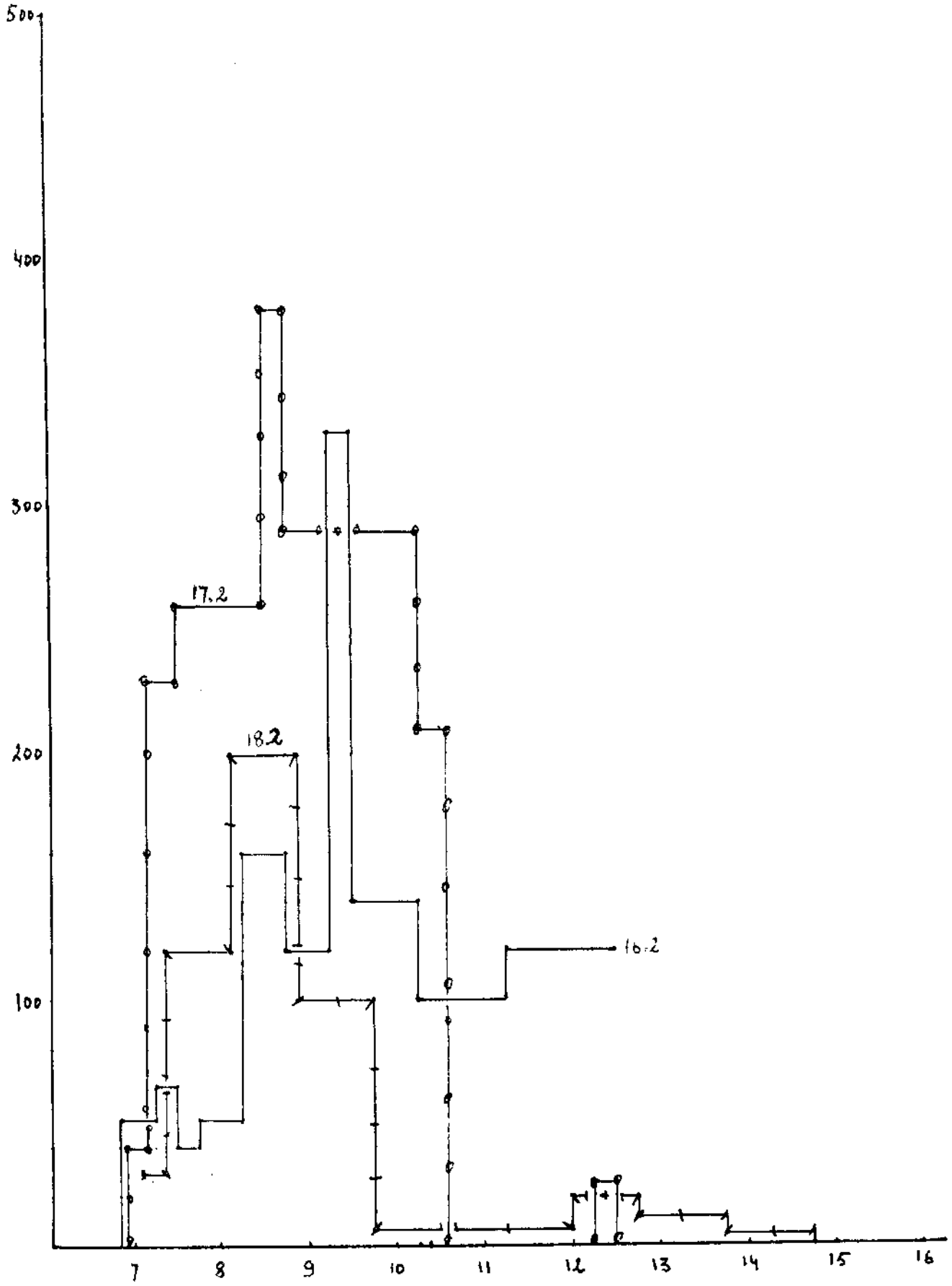


Tab B6



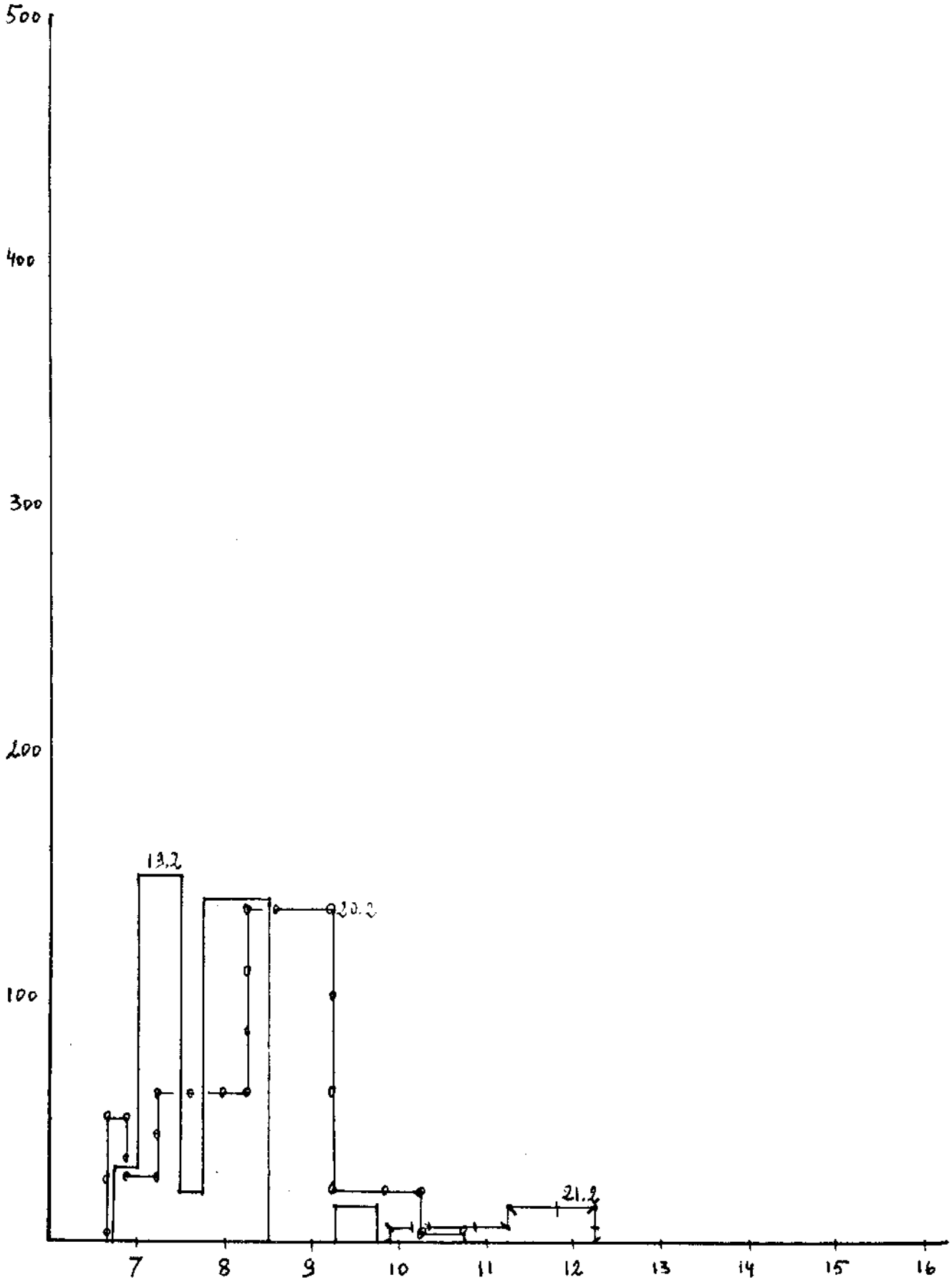
16.2 – 17.2 – 18.2

Tab B7



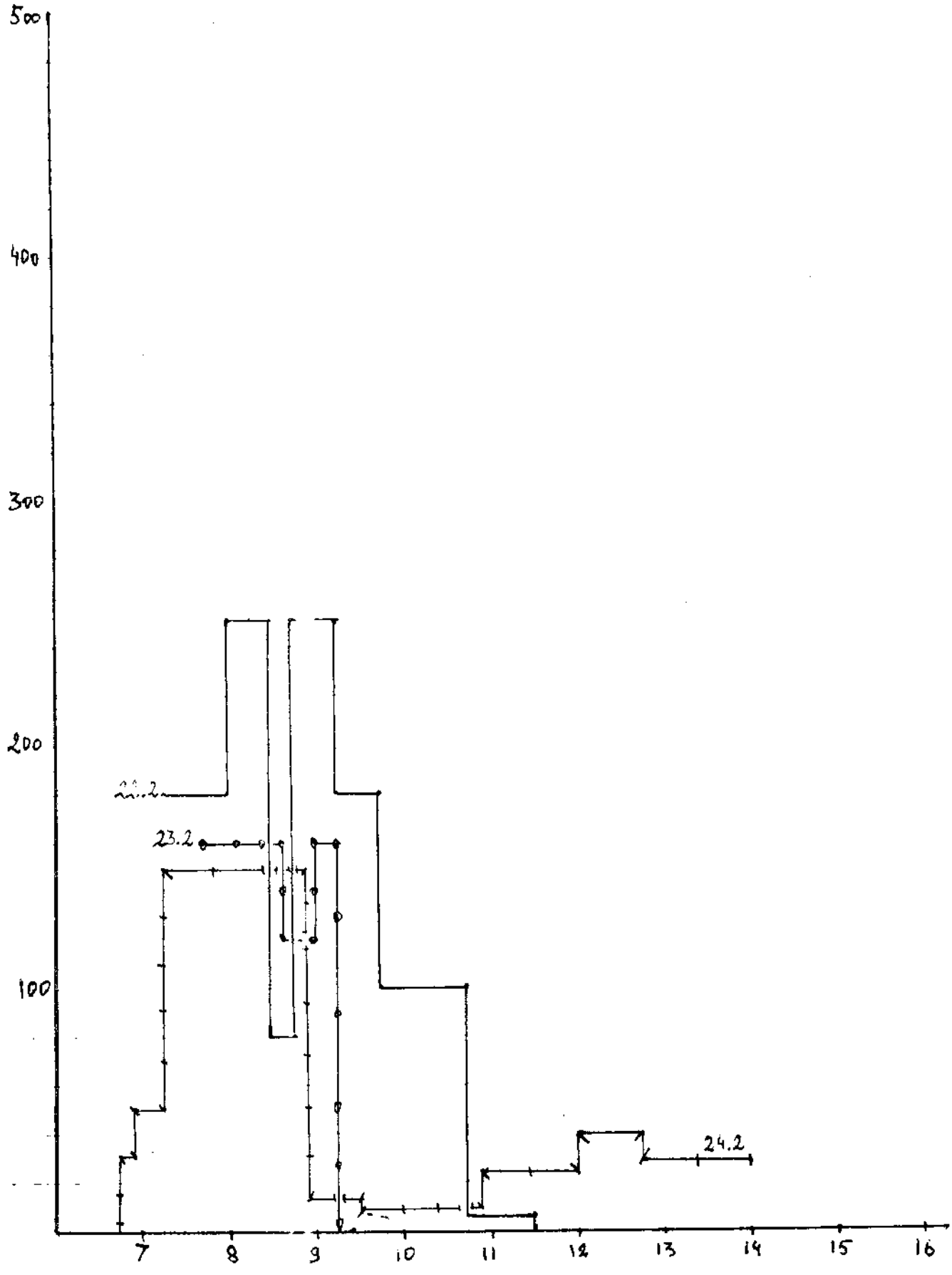
19.2 – 20.2 – 21.2

Tab B8



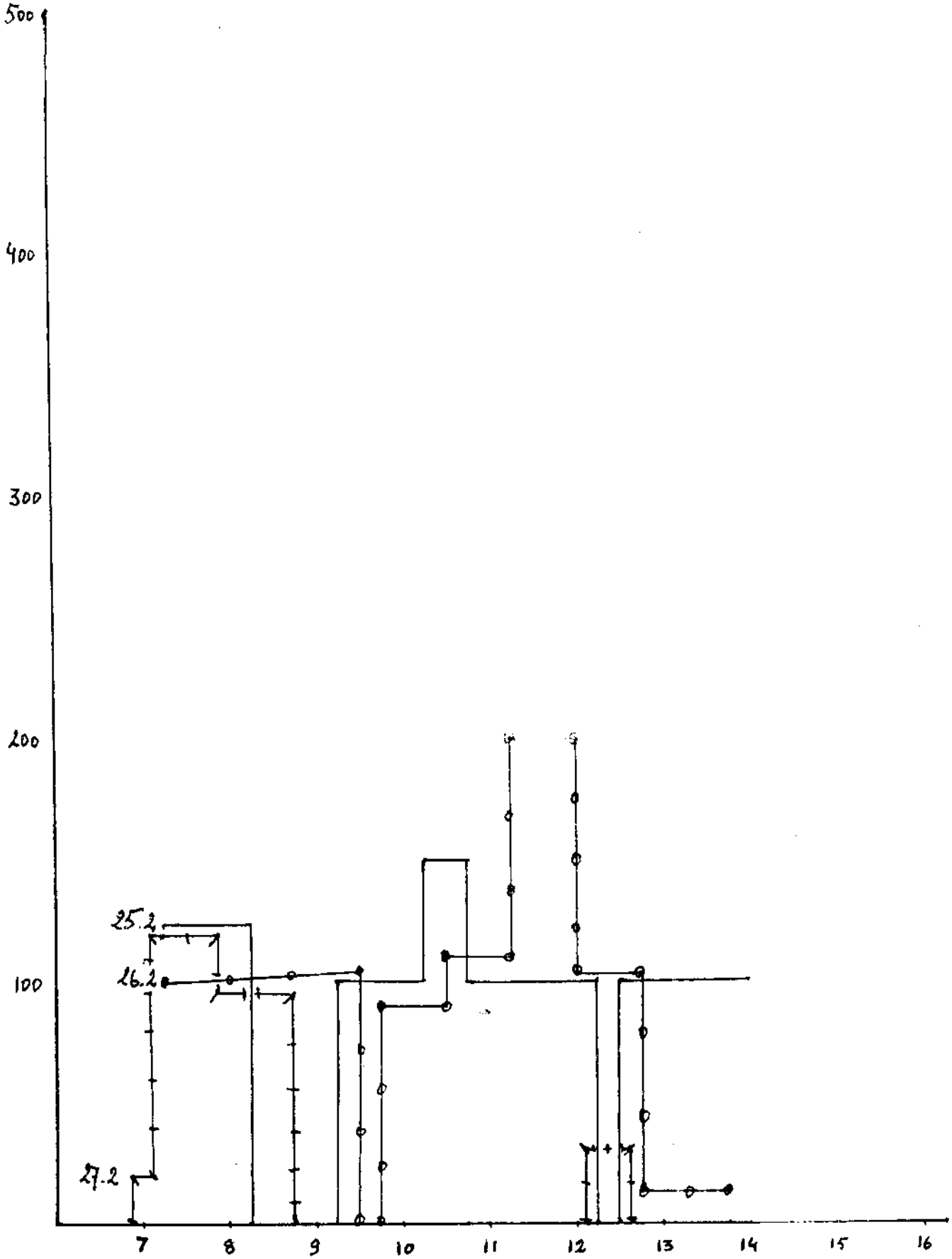
22.2 _ 23.2 _ 24.2

Tab B9



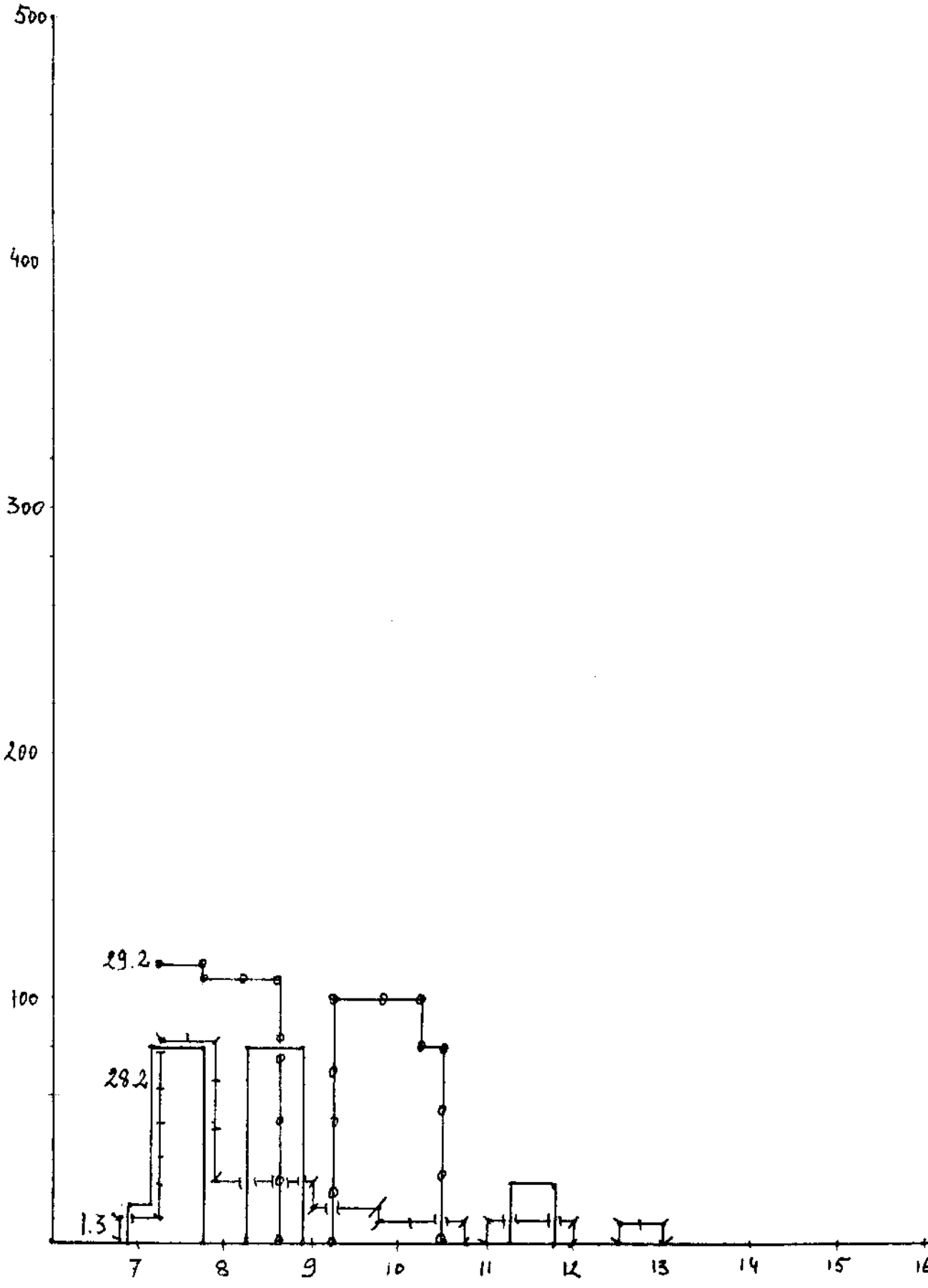
25.2 _ 26.2 _ 27.2

Tab B10



28.2 _ 29.2 _ 1.3

Tab B11



Number and Behaviour of Gulls on Yehoud Municipal Dump

Date	Weather	Hour of arrival of first gulls	Number of gulls in first wave	Hours 6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	Number of gulls on banks of canal
21-1		6 55	30	80 250	120 250	100 250								150
22-1		-	-					70 150	30 30	50 50	100 120	10 120	100 175	100
29-1		-	-							150 450	200 400			150
1.2		-	-					80 250	80 80	120 120	50 80	60 200	0 60	150
5-2		-	-					80 350	100 350	80 280	80 300	80 200		150
6-2		-	-					100 300	100 200	80 175	100 250	0 10	0 50	175
8-2		6 45	30	80 120	120 400									120
12-2		6 50	50	0 50	80 220	150 250	150 300	150 250	0 80	50 80				175
13-2		6 50	30	70 70	175 320	120 250	75 225							200
15-2		6 55	40	40 40	200 350	150 300	100 200	80 200	120 200	helicopter	helicopter			200
16-2		6 50	50	50 50	100 160	80 120	75 330-110	30 100	50 120					120
17-2		6 50	40	40 40	50 230	50 380	0 290	100-0 200-0	0 0	0 250				0
18-2		-	-	0 30	40 120	0 200	0 100	0 6	0 6	5 20	0 10	0 5	0 0	0
19-2		6 45	30	30 30	0 150	100-0 20-0	0 15-0							0
20-2		6 45	50	0 30	0 60	100-0 140	4 20	0 3	0 0	0 0	0 0			0
21-2		-	-					5 5	0 15	0 0				0
22-2		-	-	-	100 180	120 250	0 180	0 100	0 5	0 0	0 5	0 0		0
23-2		-	-			60 160	0 0	0 0	0 0	0 0				0
24-2		6 45	30	0 50	30 150	0 150	0 15	0 10	0 25	20-0 40	0 30			0
25-2		-	-		0 125	0 125-0	20 100	50 150	5 100	0 100	0 100			0
26-2		-	-		0 100	50 100	0 100	30 100	40 200	0 100	0 15			0
27-2		6 55	20	20-0 20	0 120	0 100	0 0	0 0	0 0	0 30	0 0			0
28-2		6 55	15	15-0 15	20 80	0 80	0 0	0 0	0 25	0 0	0 0			0
29-2		-	-		50 115	0 110	0 100	30-0 80-0	0 0	0 0	0 0			0
1-3		6 50	10	10-0 10	15 80	0 25	0 15	0 10	10 10	0 10	0 0			0
2-3		6 20	10	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0			0
3-3		6 31	7	0 0	0 2	0 0	1 1	0 0	0 0	0 0	0 0			0
4-3		6 45	7	0 0	0 6	0 0	0 0	0 0	0 0	0 0	0 0			0
5-3		6 45	2	0 0	0 5	0 0	0 0	0 0	0 0	0 0	0 0			0
6-3		6 30	4	0 3	0 0	0 0	0 0	0 0	0 0	0 0	0 0			0
7-3		7 20	1	0 0	0 20	0 0	0 0	0 0	0 0	0 0	0 0			0
8-3		6 50	1	0 0	0 50-0	0 0	0 0	0 0	0 0	0 0	0 0			0
9-3		7 20	1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0			0
10-3		-	-		0 0	0 2	0 0	0 0	0 0	0 0	0 0			0
11-3		6 30	1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0			0

Number and Behaviour of Gulls on Yahoud Municipal Dump

Date	Weather	Hour of arrival of first gulls	Number of gulls in first wave	Hours 6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	Number of gulls on banks of canal
12-3		8.00	1											0
13-3		6.45	1											0
14-3		7.30	1									20-0		0
15-3		7.00	4											0
16-3		7.25	16		16-0							5-0		0
17-3		6.42	1											0
18-3		7.44	1											0
19-3		8.15	3			3-0								0
20-3		-	0											0
21-3		8.50	1											0
22-3		10.15	60					0-60-0						0
23-3		8.00	1											0
24-3		7.15	1											0
25-3		9.05	1											0
26-3		-	0											0
27-3		-	0											0
28-3		-	0											0
29-3														
30-3														
31-3														
1-4														
2-4														
3-4								50 / 50						
4-4							60-80 / 60-80							
5-4							80 / 80							
6-4						75-200 / 75-200								

Note: In each case the upper figure gives the total number of falls on the area and the lower figure gives the number of sitting gulls on the refuse.