Maxine Smith
1938

STUDIES ON ARTIFICIAL FEEDING OF JUVENILE BIRDS.

OBJECT: To work out diets on which wild precocial and altricial birds will gain weight.

PROCEDURE: The following birds were obtained at Indian River, Mich. on June 27, 1938 by the advanced ornithology class of the University of Michigan Biological Station:

Sora Rail approximately one week of age

Black Tern one day old

two Coots, one was approximately two to three days old and one hatched in our hands.

These birds were kept in a large cardboard box with an electric bulb for heat for four days and then in a pen about two by six feet which was made for them in the unheated laboratory. Heat in the pen was supplied by an electric light bulb and the sun would shine in during the day time.

Food given for the first week consisted of pablum, chopped tadpoles and clams, chopped liver and hawk meat. All birds ate readily and none needed force feeding.

On July 4th the ornithology class collected at Hat Island in Lake Michigan the following:

three Caspian Terns approximately four days old and weight records were kept on one of these

Ring-billed Gull approximately five or six days old

Common Tern which was newly hatched.

These birds were kept in the same pen with the birds from Indian River and for sixteen days were fed pablum, chopped clams and fish, hard-boiled egg, chopped dandelion and fresh meat chopped finely. All the birds ate well.

On July 23 the birds with the exception of the sora rail and the black tern were put outside in a wire pen six feet long and five feet wide. They were kept in this pen during the day and brought in at night. During this time plate scrapings consisting mostly of meat, lettuce and potato from the dining hall were fed with frogs, chopped fish and snakes and raw meat.

Beginning August 4th the birds were left in the outside pen night and day and were able to successfully endure rain storms. Table scraps, fish, meat and lettuce were fed to them.

The Caspian terns and the ring-bill gull preferred the fish and meat, but the coots relished lettuce, potato, vegetables and fish. The black tern was fully feathered and reached the weight of an adult before dying suddenly on August 7th. An autopsy by the parasitologists showed the liver badly infected with flukes belonging to the family Dicrocoeliidae, the larvae of which were found in another young tern's liver captured at the same time.

The common tern became fully feathered and flew out of the pen. The ring-bill gull was fully feathered and flew about camp. The Caspian terns were slow in feathering and by August 16th had shown no inclination to fly over the two foot fence enclosing the pen. The coots were fully feathered and appeared in excellent condition. The sora rail was extremely active, ate well and by August 16th weighed 71. grams. He appeared quite content in the indoor pen with Miss Nelson's sandpipers.

All of the water and shore birds were weighed at 7:00 P.M. each day during the period of observation.

The first altricial birds to be fed were the cedar waxwings. Dr. Pettingill brought in the family of four waxwings when they were approximately two weeks old. The nest had not been under observation daily since hatching. These birds were put in separate cages and each bird fed a different diet and weighed in the morning between 7:30 and 9:30 A.M. The waxwing on the chopped orange and pablum diet made the best gain and apparently could live on such food all winter, as it readily ate this diet. The bird on the berry (cherries, grapes, June berries, blue berries, raspberries) diet made no gain after two weeks feeding, so was given pablum along with the berries and immediately the bird began to gain.

One waxwing was fed a raisin and pablum diet. The raisins were soaked and then cut up and mixed with the pablum. At first the bird would eat the raisins as they would come in the pablum, but after a few days would pick out the pablum and leave the raisins. The bird made a very poor gain on this diet.

One wax wing was fed soaked raisins (chopped) for two weeks and lost weight. It definitely did not like the raisins and would spit them out unless hunger forced it to eat a few. Pablum and hard-boiled egg were fed with the raisins for ten days and a good gain was shown.

Three robins were given experimental feedings. Two of these birds came from the same nest which was observed by Dr. Pettingill. Robin II was hatched on July 11th and weighed 62.13 grams when brought in from the nest. Robin III hatched on July 12th and weighed 56.71 grams when brought into the laboratory. Both birds lost weight at first in captivity. Robin II was given insects (mainly grasshoppers and cater-

pillars) for seven days and lost weight. During the following twelve days this bird was fed pablum and made a noticeable gain. It was almost impossible to obtain enough grasshoppers to satisfy the robins' appetite. No doubt it would have eaten many more insects had they been available.

Robin III was fed pablum and chopped raw meat of various kinds (beef, veal, lamb, fish, hamburgers, hawk). It would eat the meat, but acted as though it did not especailly relish such food. This bird showed an excellent gain and appeared in fine health.

Robin I was from a nest observed by Miss Constance Nice and was hatched on July 9th and weighed 61.4 grams when brought in from the nest. It was fed pablum and insects (mainly grasshoppers) at the same time and made a good gain and appeared in good condition.

Four bluebirds were under observation. Three of these were from one nest which was under Dr. Pettingill's observation and all three hatched on July 11th and were brought into the laboratory on July 24th when they were about to leave the nest. Bird banded 131064 weighed 22.91 grams and was fed on pablum for seventeen days. The bird lost weight and did not appear healthy. Bird banded 131063 weighed 27.81 grams when brought into the laboratory and the bird banded 131062 weighed 24.97. These birds were put in one cage and fed pablum, hard-boiled egg (yolk and white), orange, raw meat and cherries. Both birds made small gains, appeared in excellent health with good plumage and were apparently contented together.

Another bluebird was kept under observation whose age was not known, but it was about ready to leave the nest when brought into the laboratory on July 9th and weighed 25.35 grams. The bird was weighed each day and the kind of food recorded, but the amount of food

consumed was not recorded. Diet consisted of pablum, hard-boiled egg, insects, June berries, lettuce, orange, cooked and raw meat and cherries. This bird made a good gain, developed excellent plumage and seemed to be in fine condition when released August 8th.

The vesper sparrow which was hatched on July 15th weighed 1950 when brought into the laboratory on July 23rd. It was fed pablum entirely and made no gain. This bird appeared in good condition, however, took baths beginning on July 26th and picked up its own food beginning August 2nd.

The weighing for all these birds was done between 7:15-9:30 A.M. and the bird gages were hung in the sun shine every day all day that the weather permitted. The pablum was always mixed with milk. There was no evidences of loss of juvenile plumage during this period of observation.

CONCLUSION: Pablum appeared to be a satisfactory and convenient basic food for the few precocial and altricial birds under observation, but it was necessary to supplement with other foods to produce noticeable gains in weights.

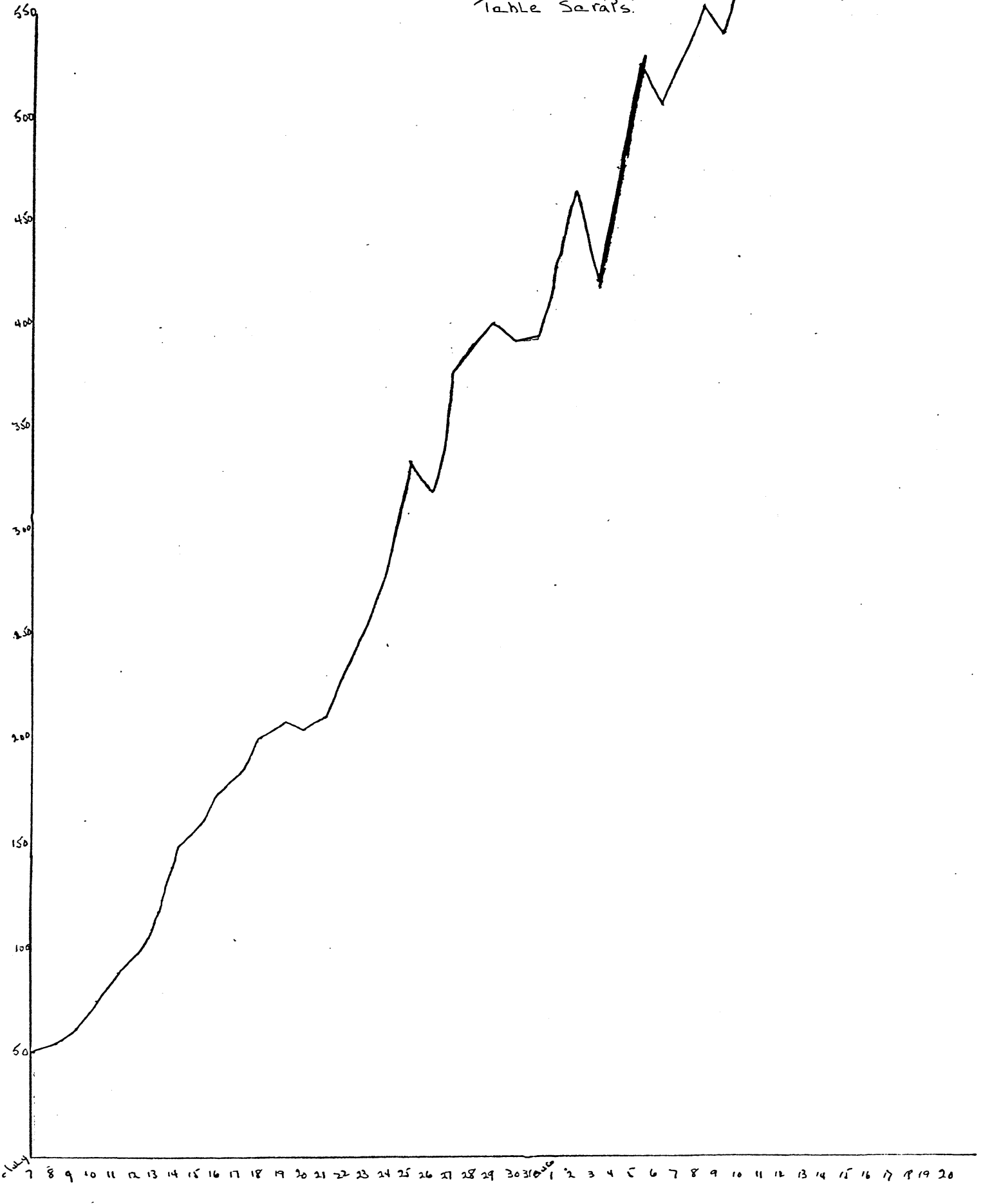
Maxine Smith

WEIGHT AND FOOD CHART OF WATER BIRDS.

DATE	SORA RAIL	COOT I	COOT II	BLACK TERN	CASPIAN TERN
June 30, 1938	31.3 g.	33.15 g.	26.15g.	12.5 g.	
July 1, "	35.10	36.95	30.45	16.85	
" 2, "	36.95	42.95	31.55	16.67	
" 3, "	40.80	47.80	34.15	18.5	
" 4, "	43.15	59.15	44.85	23.8	
" 5, "	47.35	62.70	45.41	25.	
" 6, "	49.96	71.05	56.35	35.3	
" 7, "	54.85	82.35	68.35	37.5	52 g.
" 8, "	55.35	89.80	81.85	39.35	56.35
" 9, "	57.60	89.7	83.1	46.35	61.75
" 10, "	57.99	109.25	89.70	50.81	76.77
" 11, "	62.74	119.20	99.35	51.35	89.30
" 12, "	63.1	149.35	119.60	59.95	99.30
" 13, "	63.30	149.35	119.8	63.77	119.15
" 14, "	60.55	139.6	129.05	63.30	149.15
" 15, "	61.67	156.65	131.05	67.49	159.10
" 16, "	63.35	174.25	146.35	71.35	177.85
" 17, "	64.85	182.85	147.35	68.35	184.15
" 18, "	65.35	196.65	164.35	70.35	202.35
" 19, "	68.13	210.75	167.25	73.55	208.75
" 20, "	66.35	213.85	164.85	73.15	206.35
" 21, "	68.35	226.85	175.35	70.85	211.35
" 22, "	67.35	228.85	172.35	67.35	236.35
" 23, "					
" 24, "	62.39	262.89	189.89	58.79	284.39
" 25, "	60.59	276.39	209.89	58.89	335.89
" 26, "	63.89	294.39	236.39	54.69	321.39
" 27, "	60.29	274.59	223.39	58.39	377.39
" 28, "	64.69	302.89	245.39	57.89	390.29
" 29, "	61.29	315.89	243.09	54.89	401.29
" 30, "	59.59	320.39	247.09	53.39	393.39
" 31, "	62.09	369.59	280.29	52.79	394.19
Aug. 1, "	58.79	358.69	259.89	54.49	429.89
" 2, "	59.69	374.89	268.39	51.39	465.69
" 3, "	61.09	377.89	297.89	52.39	421.39
" 4, "	60.49	398.89	314.89	55.89	477.39
" 5, "	60.39	417.29	324.79	59.19	525.69
" 6, "	55.6	411.	335.8	51.8	509.3
" 7, "	59.8	425.	349.8	died	529.
" 8, "	59.8	446.4	366.5		551.5
" 9, "		457.	389.7		542.3
" 10, "		458.8	399.3		573.4
" 11, "		493.	421.		588.
" 12, "		473.5	445.5		582.6

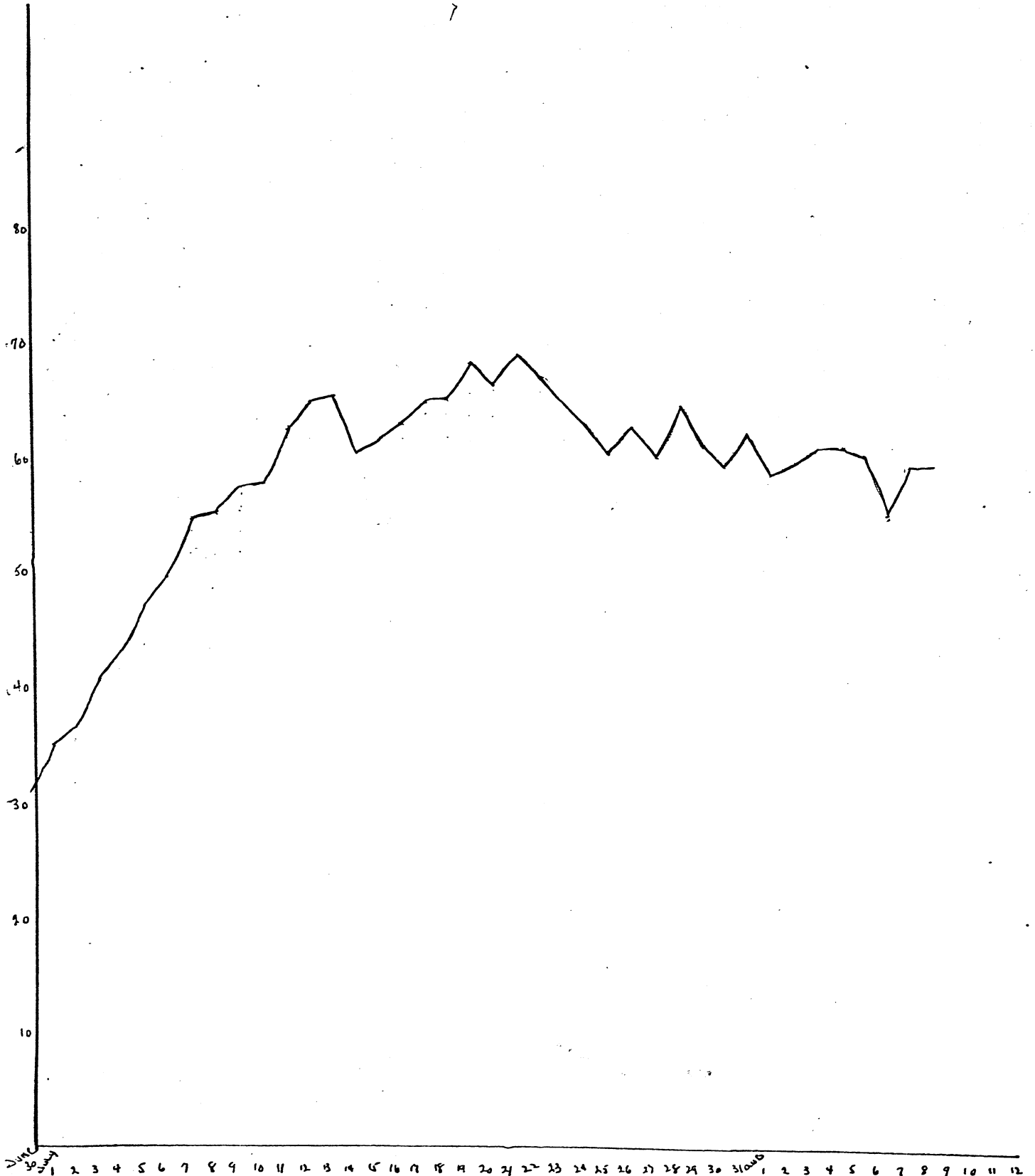
Caspian Tern

Food: Pablum, Fish, Frogs, Clams, Lettuce, Raw Meat Table Scraps.



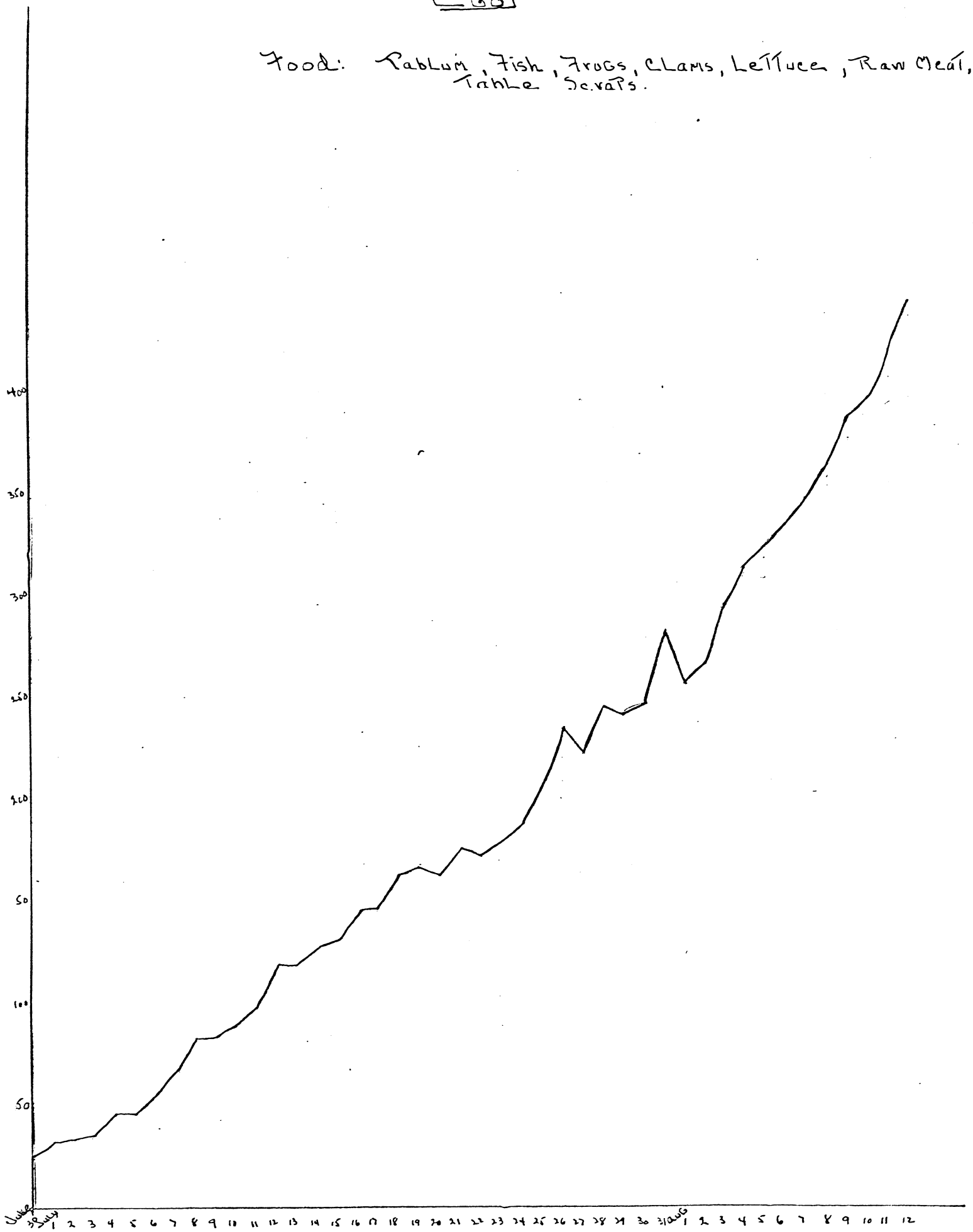
Sora Rail

Food: Pablum, Fish, Frogs, Clams, Lettuce, Raw Meat
Table Scraps.



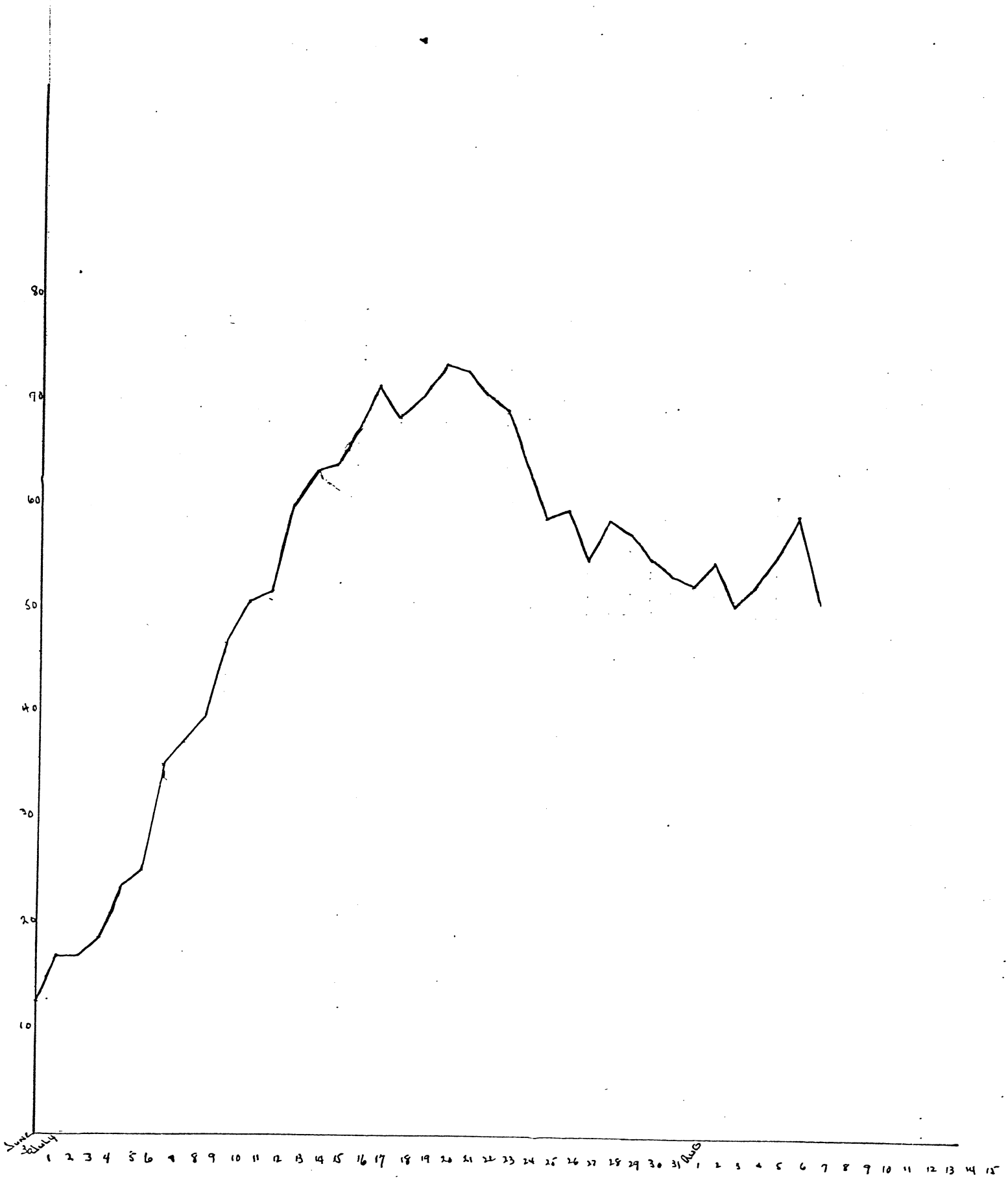
Coot

Food: Tablum, Fish, Frogs, Clams, Lettuce, Raw Meat, Table Scraps.



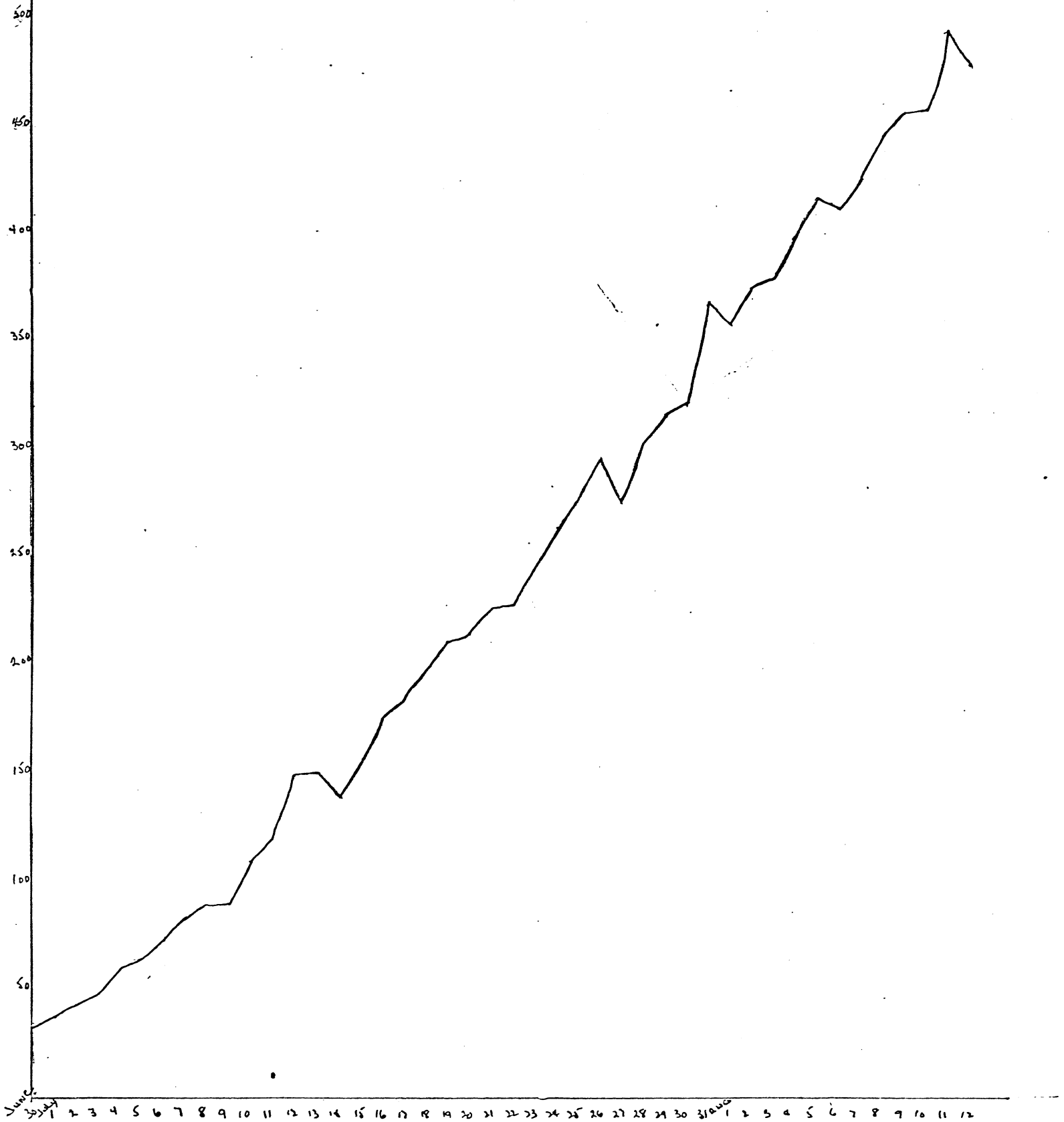
Black Tern

Food: Rabbum, Fish, Frogs, Clams, Lettuce, Raw Meat Table Scraps.



Coot

Food: Tablum, Fish, Frogs, Clams, Lettuce, Raw Meat Table Scraps

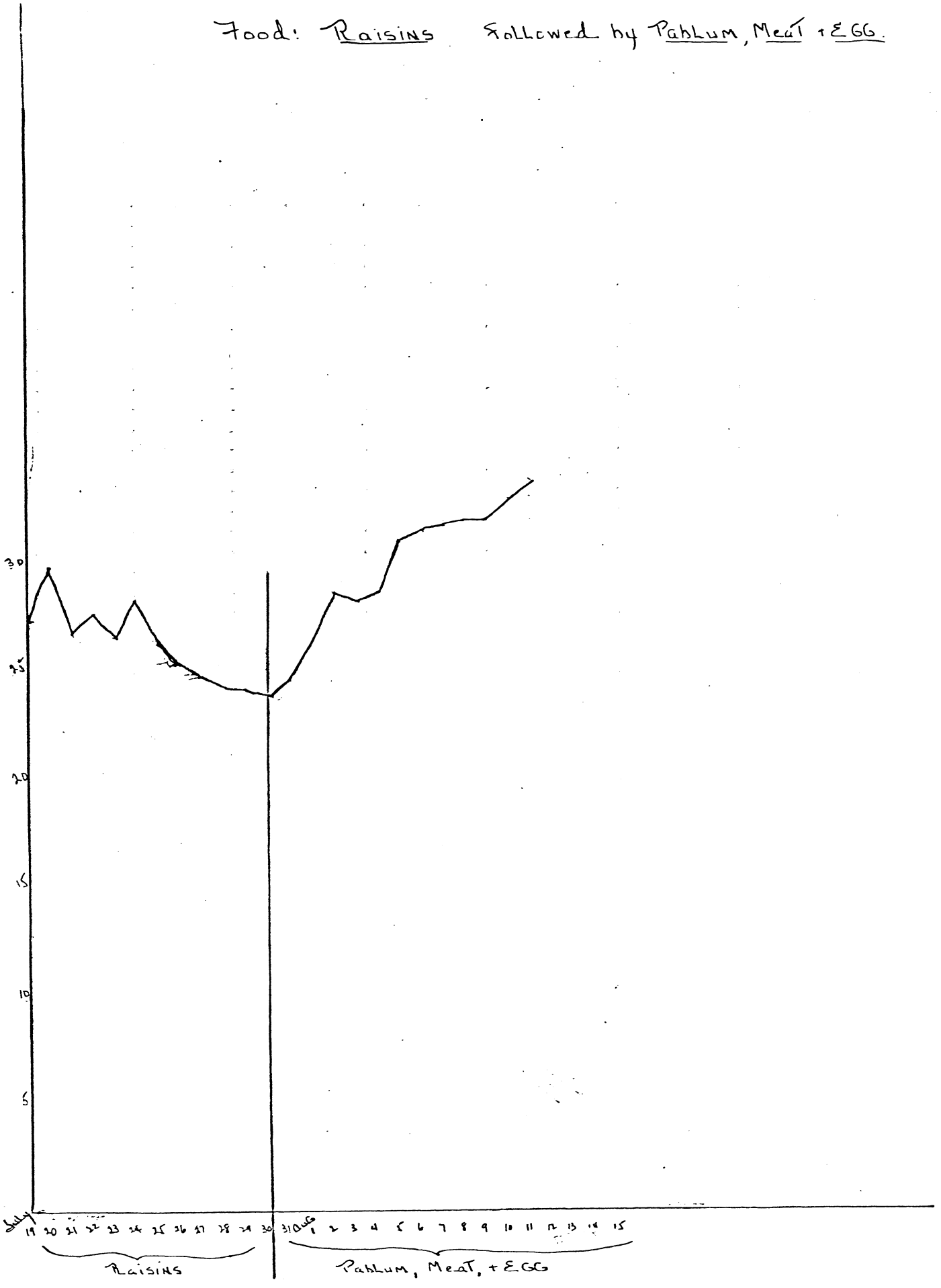


CEDAR WAXWINGS.

DATE	BIRD I	FOOD Pablum Orange	BIRD II	FOOD Raisin Pablum	BIRD III	FOOD Berries Pablum (later)	BIRD LV	FOOD Raisins Pablum Egg.
July 19, '38	28. g.	31.49 g.	27.75 g.	14.7 g.	26.1 g.	23.75.g.	27.15 g.	15.46g.
" 20, "	31.05	31.7	26.45	18.	26.85	39.16	29.85	20.4
" 21, "	29.45	41.5	28.05	27.9	25.25	40.	26.65	37.
" 22, "	31.45	39.5	29.25	28.	25.15	35.	27.65	33.5
" 23, "	32.65	50.	29.65	49.6	26.35	33.2	26.45	31.
" 24, "	34.95	49.	33.25	39.	26.95	27.	28.05	21.5
" 25, "	35.15	44.	32.45	32.	25.65	22.	26.15	29.
" 26, "	35.36	57.	33.85	50.	25.55	30.5	25.15	35.
" 27, "	35.44	60.	34.44	36.	24.24	27.	24.84	5.
" 28, "	36.44	45.	34.94	24.7	23.94	35.	24.24	17.
" 29, "	37.04	50.5	33.74	30.	23.34	41.5	24.14	17.
" 30, "	37.04	47.5	35.44	28.	23.24	31.5	23.94	17.
" 31, "	36.34	55.	36.04	29.	24.94	22.	24.44	17.
Aug. 1, "	-----	72.5	-----	24.	-----	35.5	-----	17.
" 2, "	35.84	64.3	35.14	22.	25.04	31. Pablum	28.64	20.
" 3, "	36.74	69.5	34.94	23.	24.94	26.	28.14	23.
" 4, "	40.24	68.5	33.44	16.5	25.44	45.	28.44	32.
" 5, "	40.24	67.5	33.84	24.	28.64	39.	30.84	39.
" 6, "	40.64	67.	32.44	21.5	30.14	39.8	31.14	54.5
" 7, "	40.04	73.5	32.64	30.	31.44	40.	31.24	43.5
" 8, "	40.24	46.5	32.44	9.5	32.44	21.	31.44	23.5
" 9, "	40.84	52.7	31.84	16.	33.94	38.	31.44	30.
" 10, "	41.74	52.5	31.64	18.	34.94	37.	32.84	37.
" 11, "	42.24	66.	31.64	24.	34.44	54.	33.44	36.

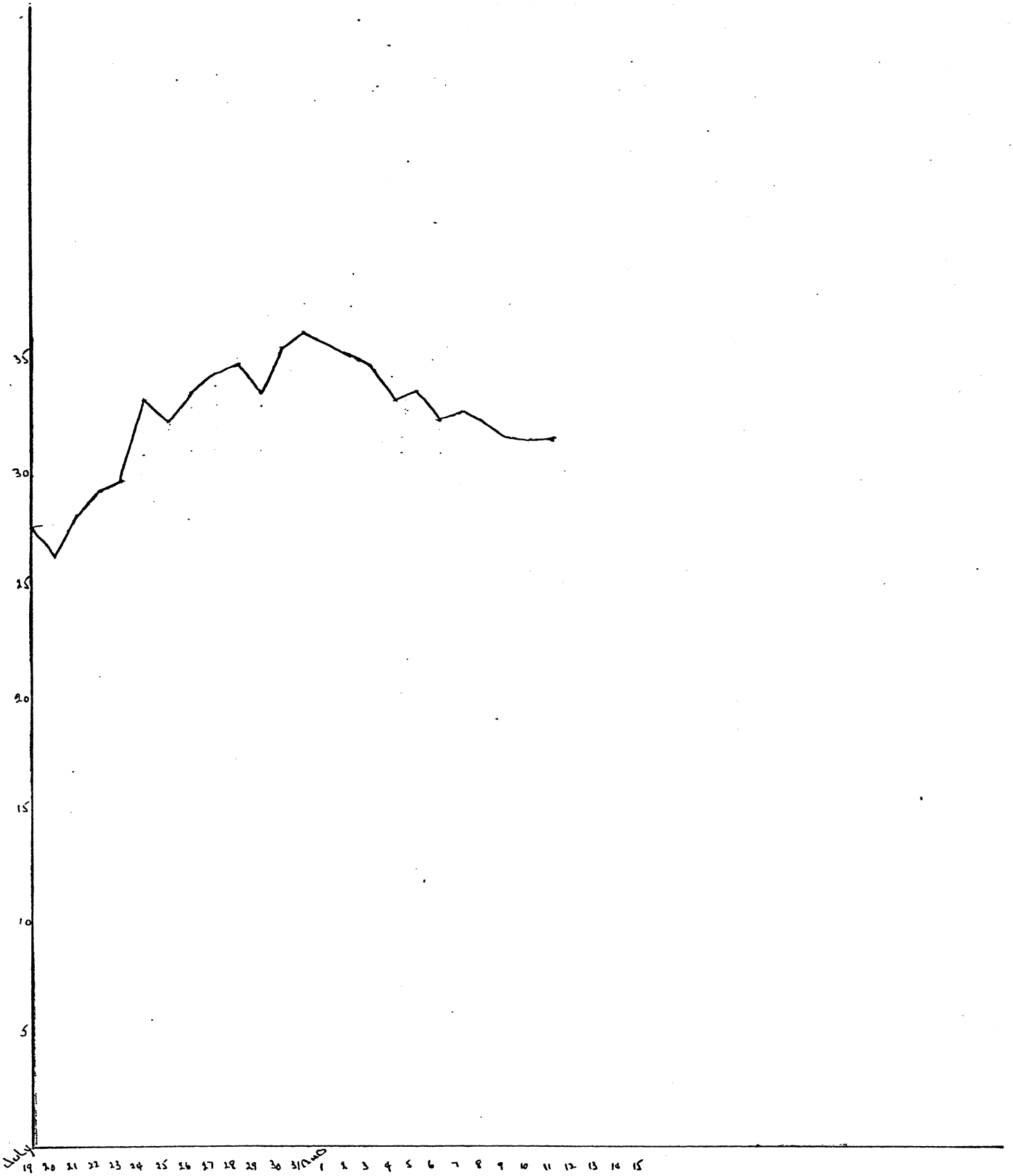
Cedar Waxwing

Food: Raisins followed by Pablum, Meat + Egg



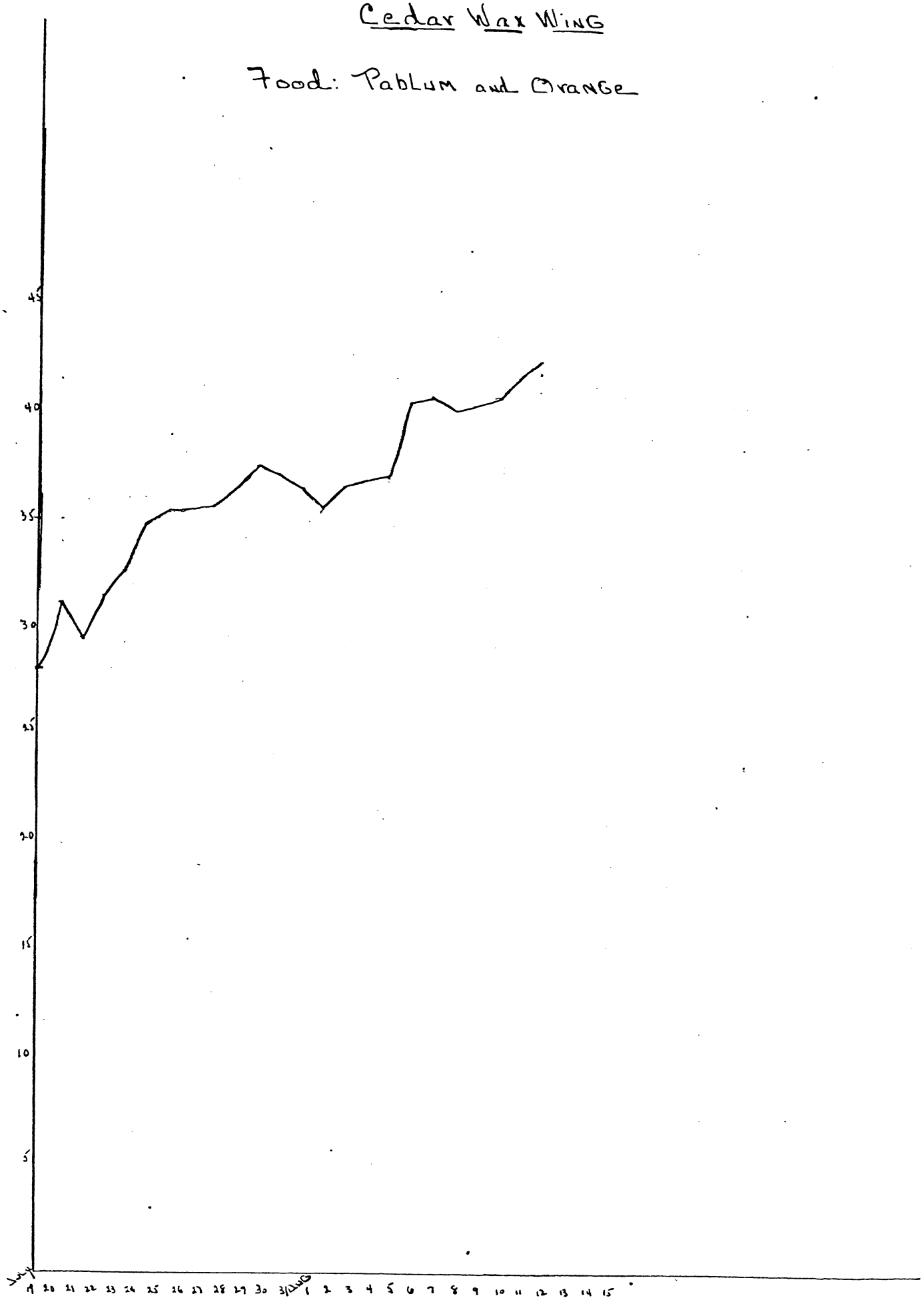
Cedar Wax Wing

Food: Raisin and Pablum



Cedar Wax Wing

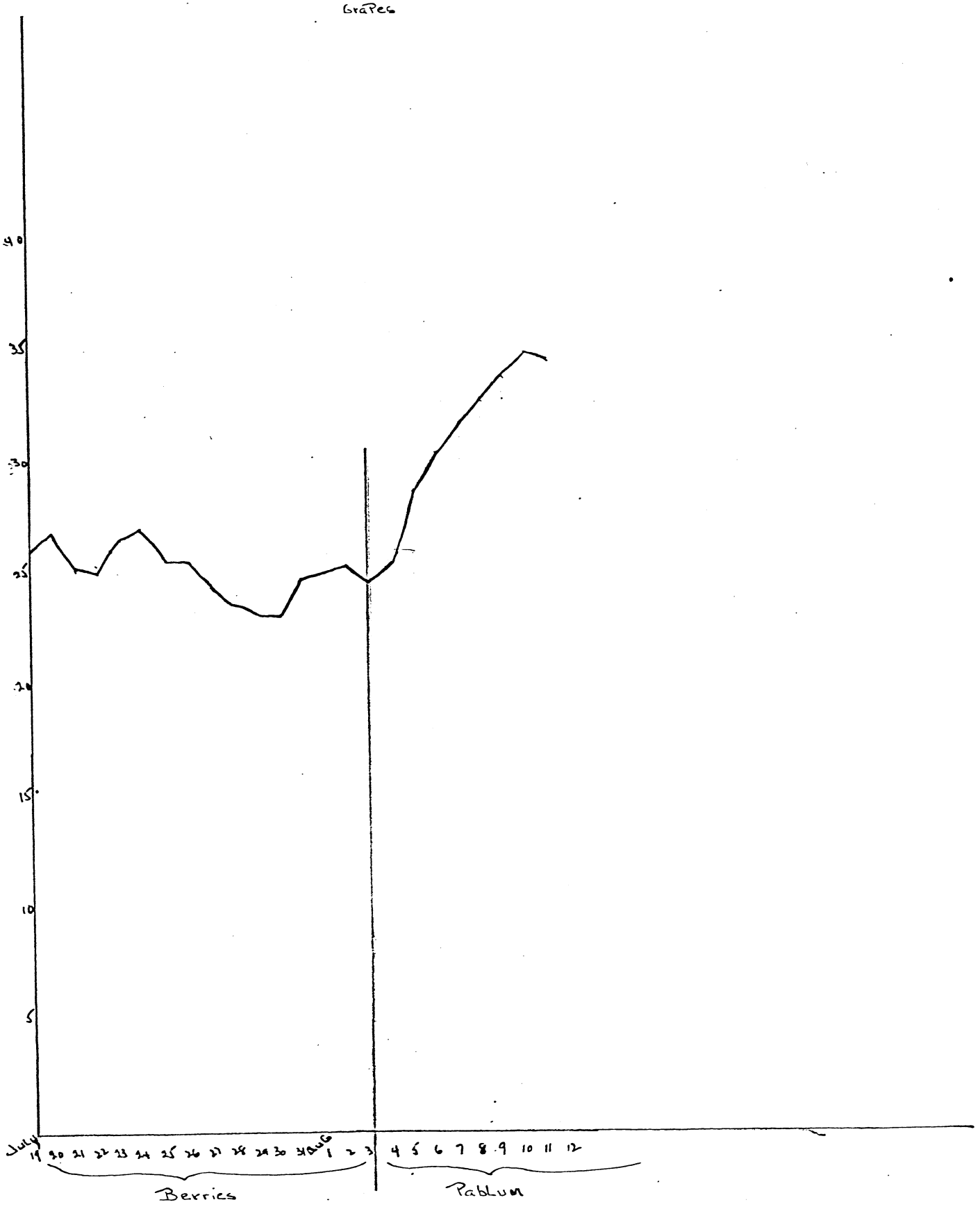
Food: Pablum and Orange



Cedar Wax Wing

Food: Berries followed by Pablum

June Berries
Cherries
Raspberries
Grapes

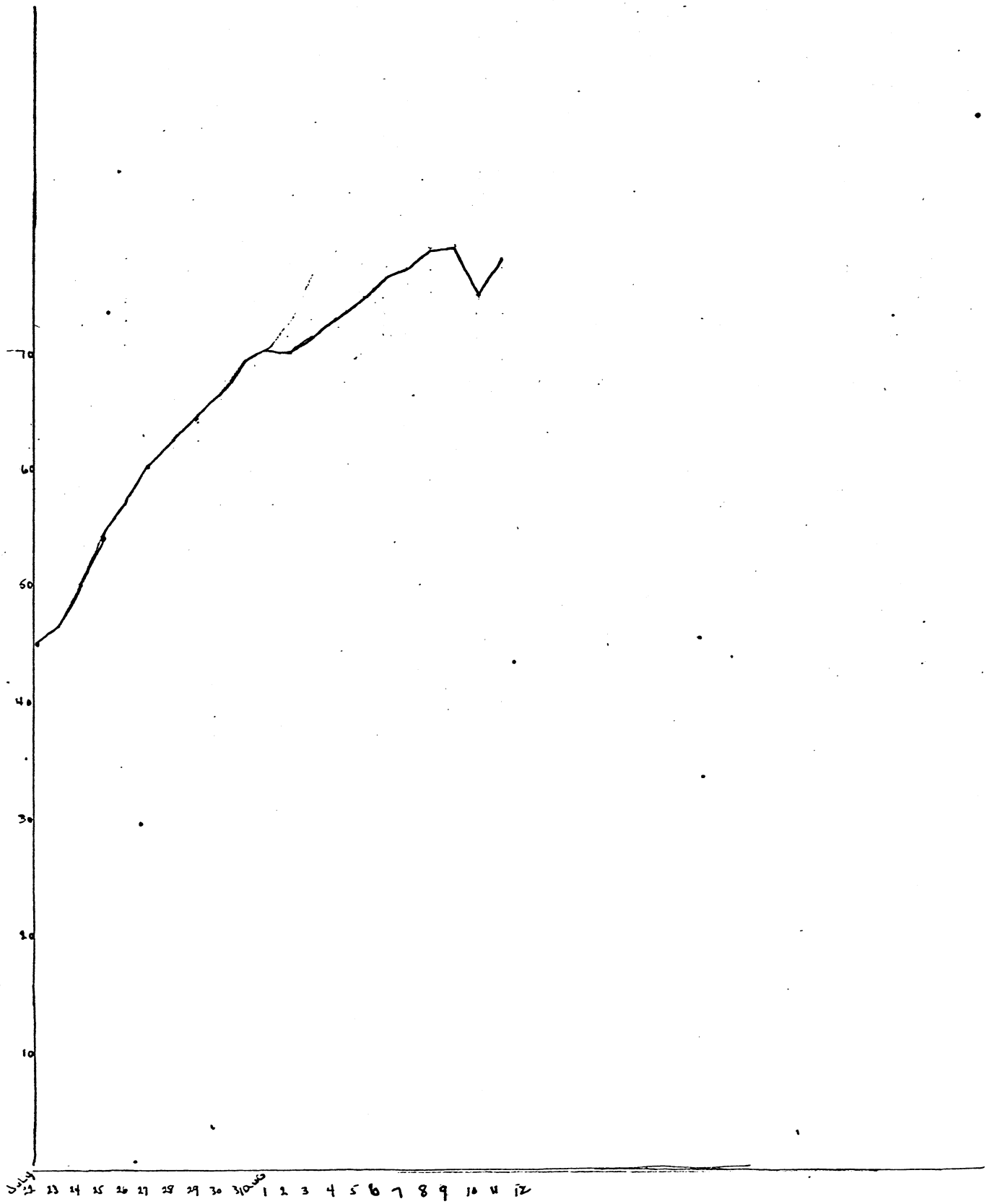


ROBINS

DATE	ROBIN I WEIGHT	FOOD	ROBIN II WEIGHT	FOOD	ROBIN III WEIGHT	FOOD
		Insects Pablum		Insects for 7 days Pablum for 12 days		Meat Pablum
July 19, 1938	57.95 g.					
" 20, "	55.65					
" 21, "	56.15	25.6 g.				
" 22, "	55.65	45.5			45.05 g.	27. g.
" 23, "	59.15	59.			47.45	51.5
" 24, "	58.65	60.	49.45 g.	65 grasshoppers	50.15	59.
" 25, "	59.15	60.	42.65	29 " 10 g. meat	54.15	54.
" 26, "	65.69	56.	46.05	106 grasshoppers	57.25	36.1
" 27, "	65.84	70.	42.95	46 " 42 caterpillars	60.44	59.
" 28, "	70.34	60.74	44.74	13 " 39 grasshoppers	63.84	50
" 29, "	70.64	62.	43.94	48 " 20 g. pablum	64.44	56.
" 30, "	70. 74	62.	43.94	84 grasshoppers	66.44	77.
" 31, "	71.74	50.	46.44	52. g. pablum	69.44	55.
Aug. 1, "	-----	85.	-----	60. "	-----	86.5
" 2, "	71.74	51.5	49.44	70. "	70.24	63.5
" 3, "	69.94	67.	50.44	86. "	71.84	67.
" 4, "	70.74	55.	58.44	58. "	73.44	74.
" 5, "	72.6	57.	55.6	48. "	77.4	48.
" 6, "	74.14	64.3	53.44	57. "	77.89	45.
" 7, "	76.44	64.	58.94	62. "	76.24	33.
" 8, "	79.24	71.5	57.14	80. "	79.44	68.
" 9, "	77.5	65.5	60.44	60.	77.5	42.1
" 10, "	77.84	50.	67.84	28.5	75.74	43.
" 11, "	76.74	61.4	58.94	40.	78.14	76.5

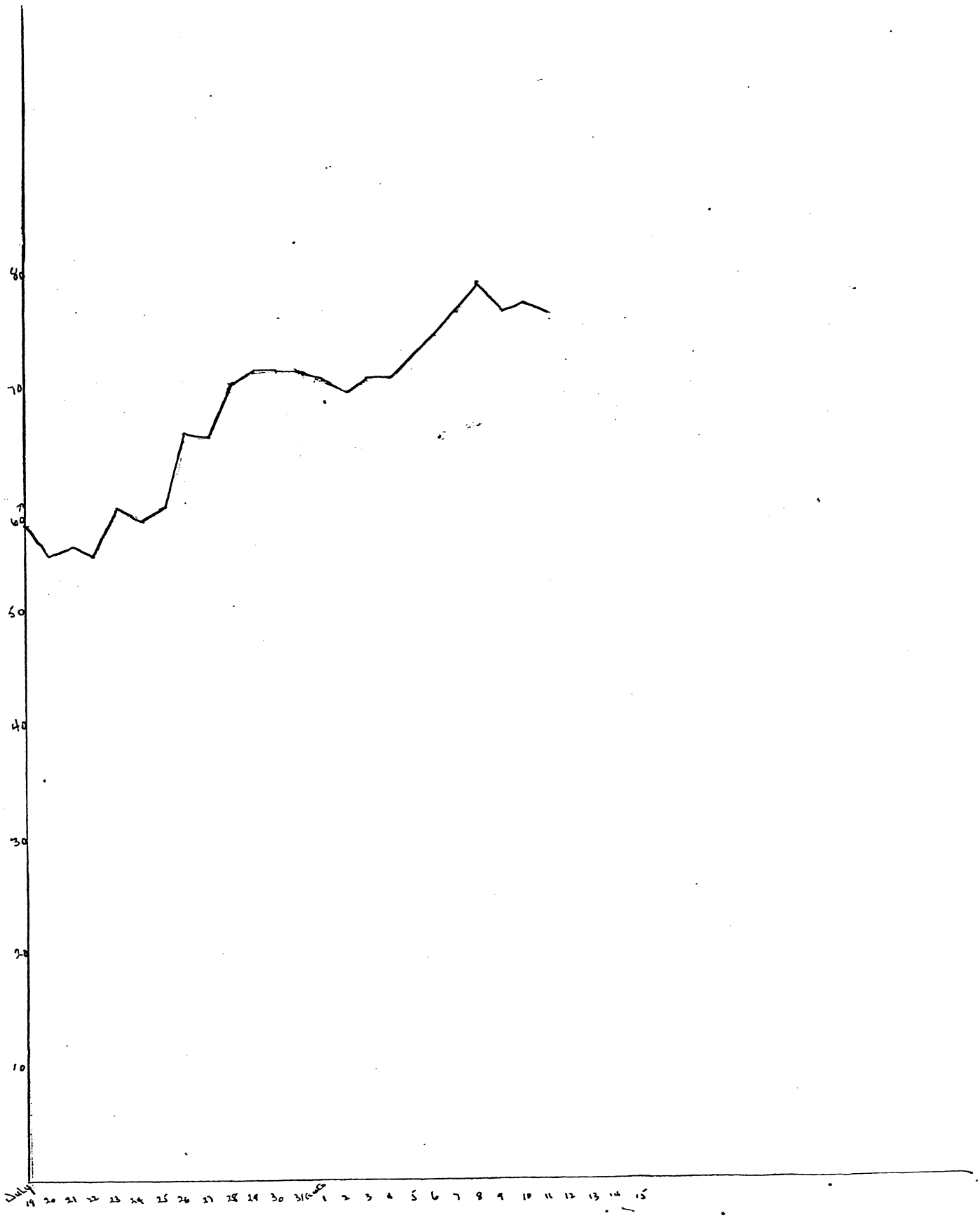
Robin

Food: Pablum and Meat



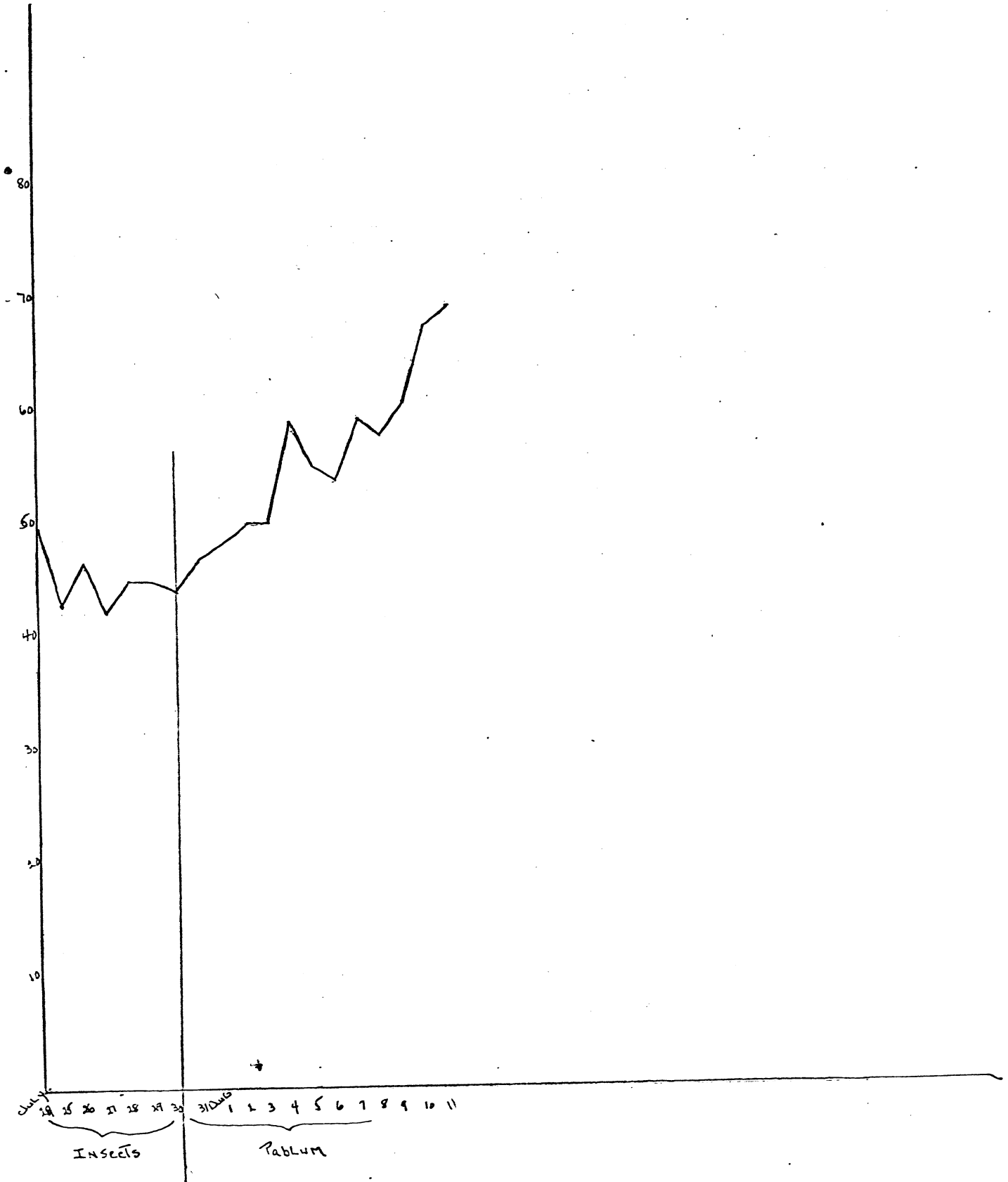
Robin

Food: Insects (mainly Grasshoppers) and Produce



Robin

Food: Insects followed by Pablum



BLUEBIRDS

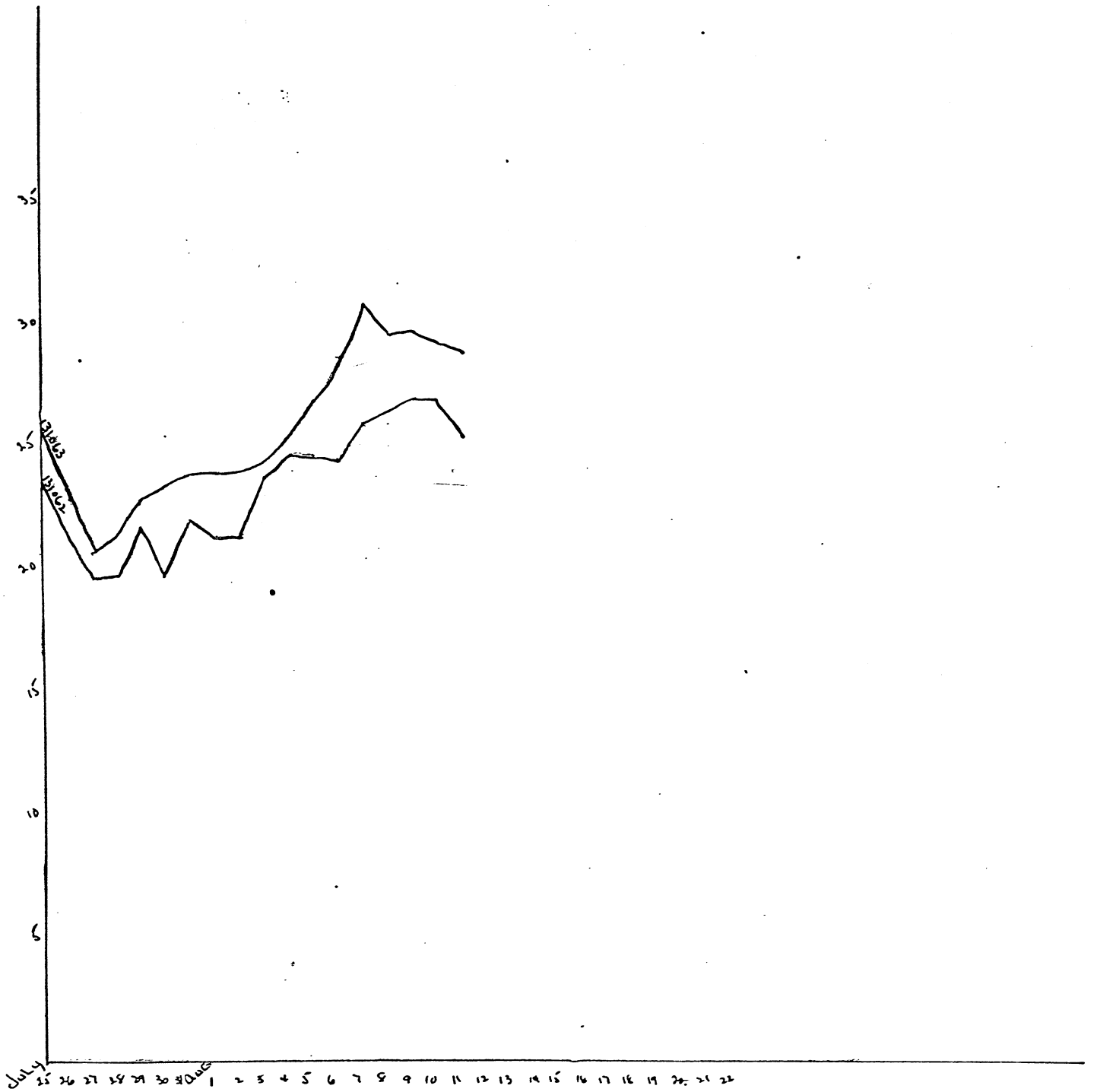
DATE	131064 WEIGHT	FOOD Pablum WEIGHT	131063 WEIGHT	131062 WEIGHT	FOOD Pablum Egg Orange Meat Cherries WEIGHT
July 25, 1938	21.25 g.	21 g.	25.65 g.	23.45 g.	27 g.
" 26, "	18.85	30.5	23.15	23.35	30
" 27, "	18.35	30.	20.74	19.94	47
" 28, "	16.44	22.	21.04	19.94	50
" 29, "	19.39	23.	22.94	21.84	40.5
" 30, "	19.44	36.	23.04	19.94	65.
" 31. "	19.44	40.	23.44	21.94	50.
Aug. 1, "					
" 2, "	18.84	36.	23.74	21.44	63
" 3, "	18.84	35.	24.14	21.34	52.7
" 4, "	20.44	36.	25.24	23.84	59.
" 5, "	20.84	24.	26.94	24.44	61.5
" 6, "	21.94	29.	28.44	24.34	37.9
" 7, "	21.04	21.5	30.84	25.94	40.5
" 8, "	22.44	34	29.44	26.24	28.
" 9, "	19.84	27.	29.64	26.94	33.5
" 10, "	19.94	25.	29.14	26.94	44.
" 11. "	18.44	35.	28.74	25.24	72.

BLUEBIRD.

DATE	WEIGHT
July 10, 1938.	25.35 g.
" 11, "	21.72
" 12, "	20.85
" 13, "	21.90
" 14, "	22.55
" 15, "	22.80
" 16, "	25.40
" 17, "	25.05
" 18, "	26.15
" 19, "	25.48
" 20, "	27.55
" 21., "	26.05
" 22, "	27.95
" 23, "	28.65
" 24, "	27.65
" 25, "	30.15
" 26, "	31.45
" 27, "	29.34
" 28, "	27.94
" 29, "	28.44
" 30, "	29.44
" 31, "	29.24
Aug. 1, "	----
" 2, "	26.94
" 3, "	25.94
" 4, "	29.44
" 5, "	31,44
" 6, "	32.94
" 7, "	30.84
" 8, "	31.34

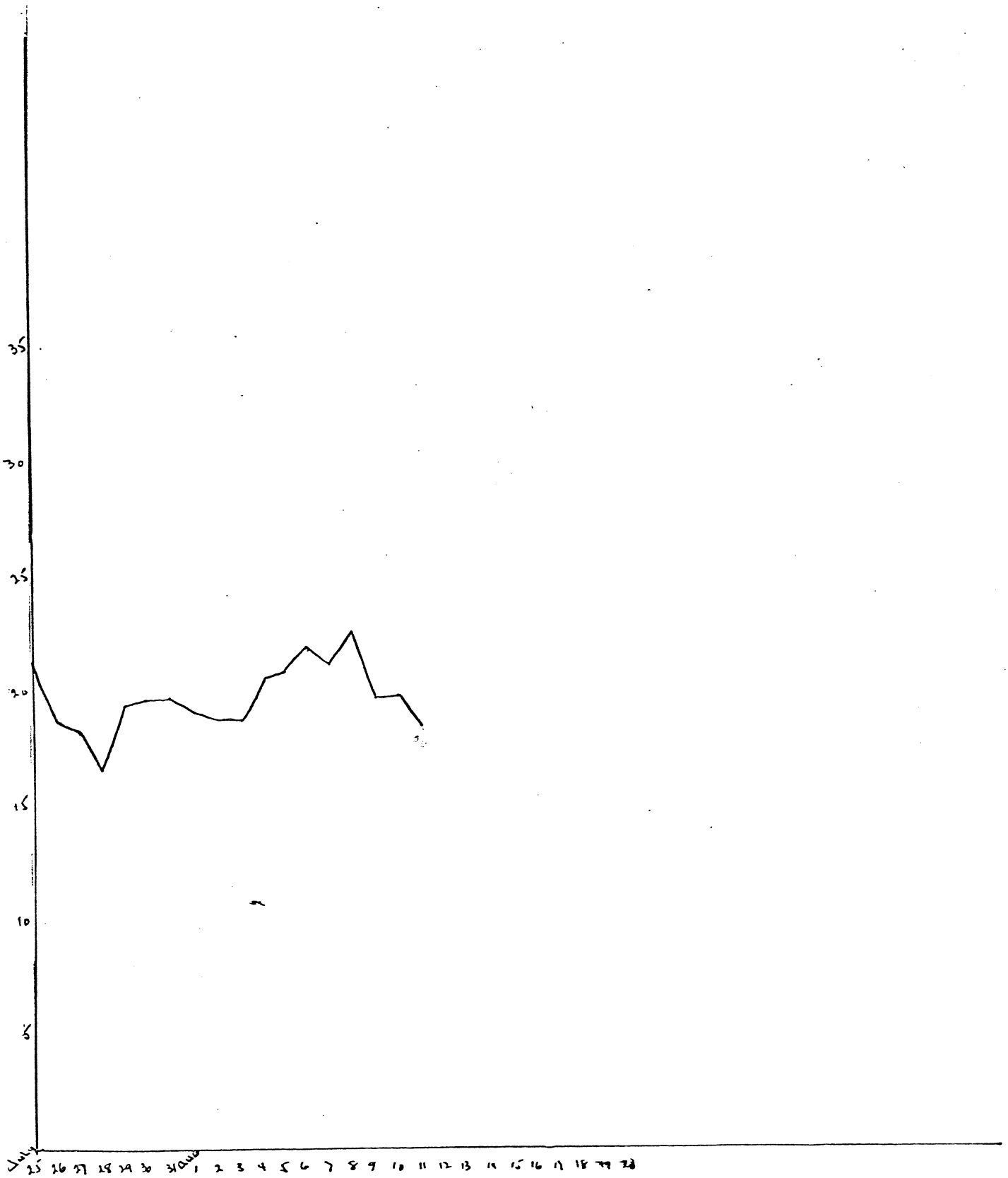
Blue bird

Food: Pablum, Egg, Meat, Orange, Berries, Insects

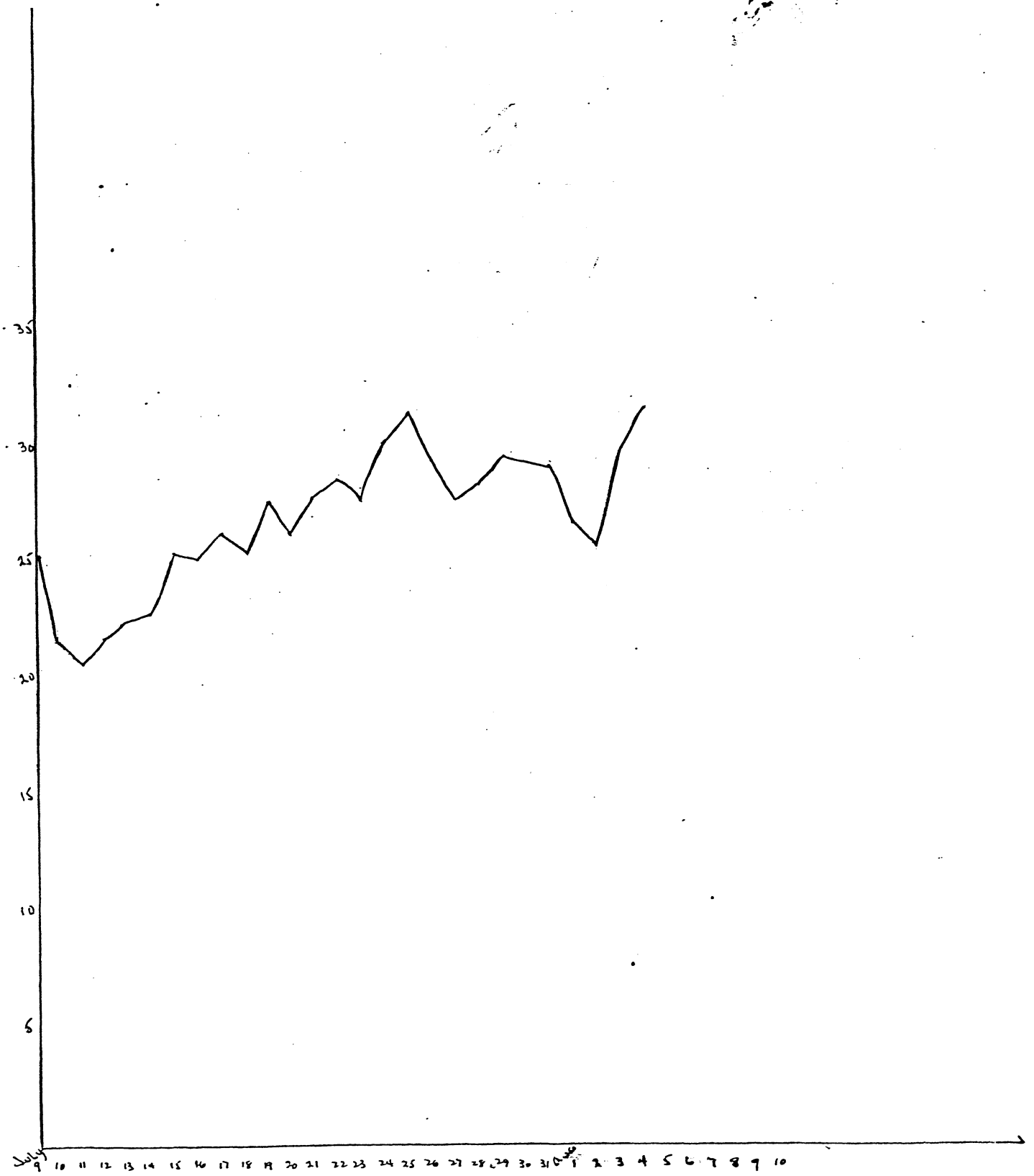


Blue bird

Food: Pablum



Blue bird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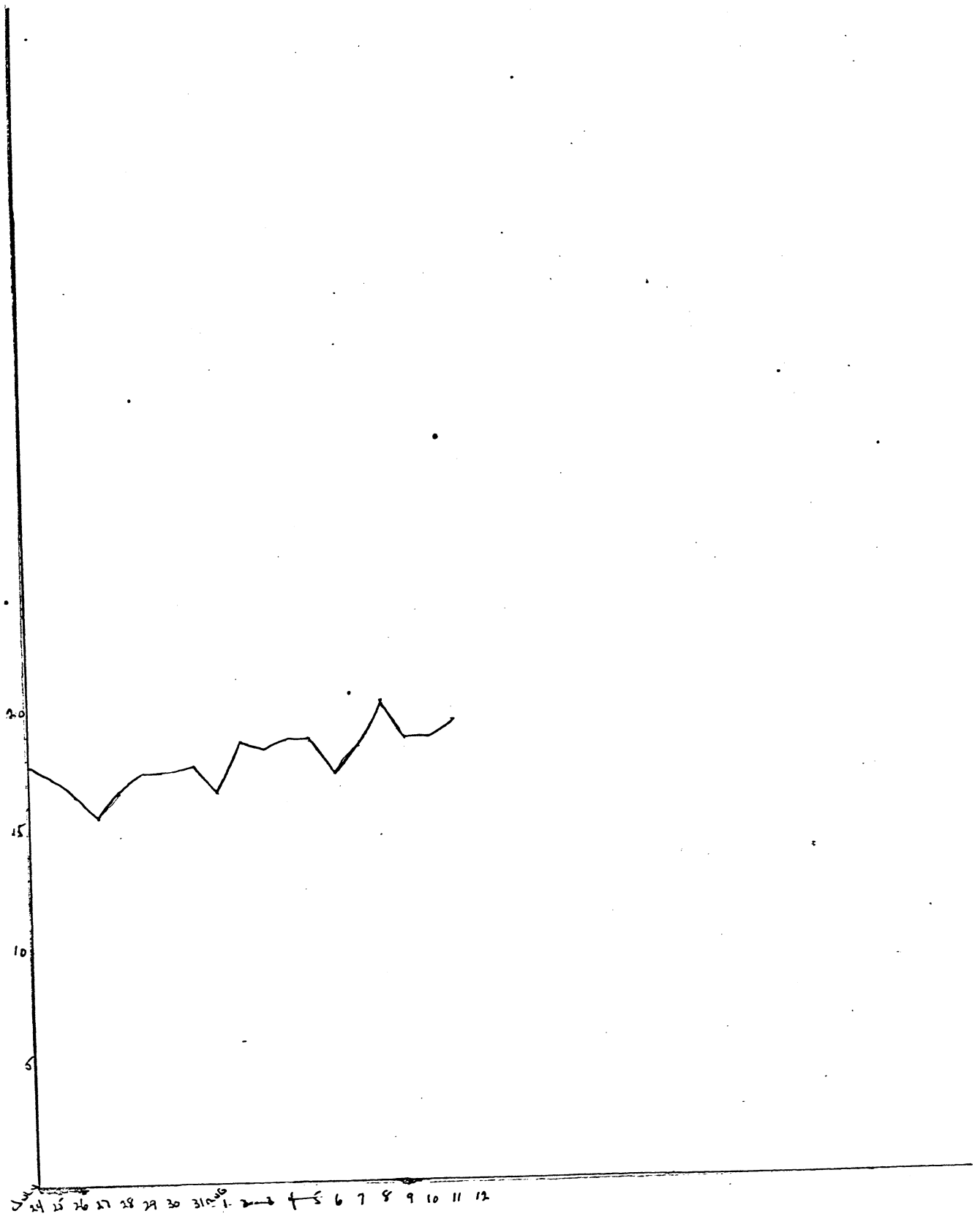
Aug
1 2 3 4 5 6 7 8 9 10

VESPER SPARROW.

DATE	WEIGHT	FOOD (Pablum)
July 24,1938	17.85	12 g.
" 25, "	17.05	22
" 26, "	16.35	30
" 27, "	15.44	25
" 28, "	16.44	20
" 29, "	17.24	21
" 30, "	17.29	35
" 31, "	17.44	35
Aug. 1, "	-----	35
" 2, "	16.44	29
" 3, "	18.74	21
" 4, "	18.24	26
" 5, "	18.74	21
" 6, "	17.24	29
" 7, "	18.44	25
" 8, "	20.34	26
" 9, "	18.94	24
" 10, "	18.94	22
" 11, "	19.44	32

Vesper Sparrow

Food: Pablum



Maynard Smith 1938

STUDIES ON ARTIFICIAL FEEDING OF JUVENILE BIRDS.

OBJECT: To work out diets on which wild precocial and altricial birds will gain weight.

PROCEDURE: The following birds were obtained at Indian River, Mich. on June 27, 1938 by the advanced ornithology class of the University of Michigan Biological Station:

sora rail approximately one week of age

black tern one day old

two coots, one was approximately two to three days old and one hatched in our hands.

These birds were kept in a large cardboard box with an electric bulb for heat for four days and then in a pen about two by six feet which was made for them in the unheated laboratory. Heat inthe pen was supplied by an electric light bulb and the sun would shine in during the day time.

Food given for the first week consisted of peblum, chopped tadpoles and clams, chopped liver and hawk meat. All birds ate readily and none needed force feeding.

On July 4th the ornithology class collected at Hat Island in Lake Michigan the following:

three Caspian terns approximately four days old and weight records were kept on one of these

ring-bill gull approximately five or six days old

common tern which was newly hatched.

These birds were kept in the same pen with the birds from Indian River and for sixteen days were fed peblum, chopped clams and fish, hard-boiled egg, chopped dandelion and fresh meat chopped finely. All the birds ate well.

On July 23 the birds with the exception of the sora rail and the black tern were put outside in a wire pen six feet long and five feet wide. They were kept in this pen during the day and brought in at night. During this time plate scrapings consisting mostly of meat, lettuce and potato from the dining hall were fed with frogs, chopped fish and snakes and raw meat.

Beginning August 4th the birds were left in the outside pen night and day and were able to successfully endure rain storms. Table scraps, fish, meat and lettuce were fed to them.

The Caspian terns and the ring-bill gull preferred the fish and meat, but the coots relished lettuce, potato, vegetables and fish. The black tern was fully feathered and reached the weight of an adult before dying suddenly on August 7th. An autopsy by the parasitologists showed the liver badly infected with flukes belonging to the family Dicrocoeliidae, the larvae of which were found in another young tern's liver captured at the same time.

The common tern became fully feathered and flew out of the pen. The ring-bill gull was fully feathered and flew about camp. The Caspian terns were slow in feathering and by August 16th had shown no inclination to fly over the two foot fence enclosing the pen. The coots were fully feathered and appeared in excellent condition. The sora rail was extremely active, ate well and by August 16th weighed 71. grams. He appeared quite content in the indoor pen with Miss Nelson's sandpipers.

All of the water and shore birds were weighed at 7:00 P.M. each day during the period of observation.

The first altricial birds to be fed were the cedar waxwings. Dr. Pettingill brought in the family of four waxwings when they were approximately two weeks old. The nest had not been under observation daily since hatching. These birds were put in separate cages and each bird fed a different diet and weighed in the morning between 7:30 and 9:30 A.M. The waxwing on the chopped orange and pablum diet made the best gain and apparently could live on such food all winter, as it readily ate this diet. The bird on the berry (cherries, grapes, June berries, blue berries, raspberries) diet made no gain after two weeks feeding, so was given pablum along with the berries and immediately the bird began to gain.

One waxwing was fed a raisin and pablum diet. The raisins were soaked and then cut up and mixed with the pablum. At first the bird would eat the raisins as they would come in the pablum, but after a few days would pick out the pablum and leave the raisins. The bird made a very poor gain on this diet.

One wax wing was fed soaked raisins (chopped) for two weeks and lost weight. It definitely did not like the raisins and would spit them out unless hunger forced it to eat a few. Pablum and hard-boiled egg were fed with the raisins for ten days and a good gain was shown.

Three robins were given experimental feedings. Two of these birds came from the same nest which was observed by Dr. Pettingill. Robin II was hatched on July 11th and weighed 62.13 grams when brought in from the nest. Robin III hatched on July 12th and weighed 56.71 grams when brought into the laboratory. Both birds lost weight at first in captivity. Robin II was given insects (mainly grasshoppers and cater-

pillars) for seven days and lost weight. During the following twelve days this bird was fed pablum and made a noticeable gain. It was almost impossible to obtain enough grasshoppers to satisfy the robins' appetite. No doubt it would have eaten many more insects had they been available.

Robin III was fed pablum and chopped raw meat of various kinds (beef, veal, lamb, fish, hamburgers, hash). It would eat the meat, but acted as though it did not especially relish such food. This bird showed an excellent gain and appeared in fine health.

Robin I was from a nest observed by Miss Constance Nice and was hatched on July 9th and weighed 21.4 grams when brought in from the nest. It was fed pablum and insects (mainly grasshoppers) at the same time and made a good gain and appeared in good condition.

Four bluebirds were under observation. Three of these were from one nest which was under Dr. Pettingill's observation and all three hatched on July 11th and were brought into the laboratory on July 24th when they were about to leave the nest. Bird banded 151064 weighed 22.91 grams and was fed on pablum for seventeen days. The bird lost weight and did not appear healthy. Bird banded 151063 weighed 27.81 grams when brought into the laboratory and the bird banded 151062 weighed 24.97. These birds were put in one cage and fed pablum, hard-boiled egg (yolk and white), orange, raw meat and cherries. Both birds made small gains, appeared in excellent health with good plumage and were apparently contented together.

Another bluebird was kept under observation whose age was not known, but it was about ready to leave the nest when brought into the laboratory on July 9th and weighed 25.35 grams. The bird was weighed each day and the kind of food recorded, but the amount of food

consumed was not recorded. Diet consisted of pablum, hard-boiled egg, insects, June berries, lettuce, orange, cooked and raw meat and cherries. This bird made a good gain, developed excellent plumage and seemed to be in fine condition when released August 8th.

The vesper sparrow which was hatched on July 15th weighed 1960 when brought into the laboratory on July 23rd. It was fed pablum entirely and made no gain. This bird appeared in good condition, however, took baths beginning on July 26th and picked up its own food beginning August 2nd.

The weighing for all these birds was done between 7:15-8:30 A.M. and the bird cages were hung in the sun shine every day all day that the weather permitted. The pablum was always mixed with milk. There was no evidences of loss of juvenile plumage during this period of observation.

CONCLUSION: Pablum appeared to be a satisfactory and convenient basic food for the few precocial and altricial birds under observation, but it was necessary to supplement with other foods to produce noticeable gains in weights.

Maxine Smith

WEIGHT AND FOOD CHART OF WATER BIRDS.

DATE	SORA RAIL	COOT I	COOT II	BLACK TERN	CASPIAN TERN
June 30, 1938	31.3 g.	33.15 g.	26.15g.	12.5 g.	
July 1, "	35.10	36.95	30.45	16.85	
" 2, "	36.95	42.95	31.55	16.67	
" 3, "	40.80	47.80	34.15	18.5	
" 4, "	43.15	59.15	44.85	23.8	
" 5, "	47.35	62.70	45.41	25.	
" 6, "	49.96	71.05	56.35	35.3	
" 7, "	54.85	82.35	68.35	37.5	52 g.
" 8, "	55.35	89.80	81.85	39.35	56.35
" 9, "	57.60	89.7	83.1	46.35	61.75
" 10, "	57.99	109.25	89.70	50.81	76.77
" 11, "	62.74	119.20	99.35	51.35	89.30
" 12, "	63.1	149.35	119.60	59.95	99.30
" 13, "	63.30	149.35	119.8	63.77	119.15
" 14, "	60.55	139.6	129.05	63.30	149.15
" 15, "	61.67	156.65	131.05	67.49	159.10
" 16, "	63.35	174.25	146.35	71.35	177.85
" 17, "	64.85	182.85	147.35	68.35	184.15
" 18, "	65.35	196.65	164.35	70.35	202.35
" 19, "	68.13	210.75	167.25	73.55	208.75
" 20, "	66.35	213.85	164.85	73.15	206.35
" 21, "	68.35	226.85	175.35	70.85	211.35
" 22, "	67.35	228.85	172.35	67.35	236.35
" 23, "					
" 24, "	62.39	262.89	189.89	58.79	284.39
" 25, "	60.59	276.39	209.89	58.89	335.89
" 26, "	63.89	294.39	236.39	54.69	321.39
" 27, "	60.29	274.59	223.39	58.39	377.39
" 28, "	64.69	302.89	245.39	57.89	390.29
" 29, "	61.29	315.89	243.09	54.89	401.29
" 30, "	59.59	320.39	247.09	53.39	393.39
" 31, "	62.09	369.59	280.29	52.79	394.19
Aug. 1, "	58.79	358.69	259.89	54.49	429.89
" 2, "	59.69	374.89	268.39	51.39	465.69
" 3, "	61.09	377.89	297.89	52.39	421.39
" 4, "	60.49	398.89	314.39	55.89	477.39
" 5, "	60.39	417.29	324.79	59.19	525.69
" 6, "	55.6	411.	335.8	51.8	509.3
" 7, "	59.8	425.	349.8	died	529.
" 8, "	59.8	446.4	366.5		551.5
" 9, "		457.	389.7		542.3
" 10, "		458.8	399.3		573.4
" 11, "		493.	421.		588.
" 12, "		478.5	445.5		582.6

CEDAR WAXWINGS.

DATE	BIRD I	FOOD Pablum Orange	BIRD II	FOOD Raisin Pablum	BIRD III	FOOD Berries	BIRD LV	FOOD Raisins Pablum Egg
July 19, '38	28. g.	31.49 g.	27.75 g.	14.7 g.	26.1 g.	23.75 g.	27.15 g.	15.46g.
" 20, "	31.05	31.7	26.45	18.	26.85	39.16	29.85	20.4
" 21, "	29.45	41.5	28.05	27.9	25.25	40.	26.65	37.
" 22, "	31.45	39.5	29.25	28.	25.15	35.	27.65	33.5
" 23, "	32.65	50.	29.65	49.6	26.35	33.2	26.45	31.
" 24, "	34.95	49.	33.25	39.	26.95	27.	28.05	21.5
" 25, "	35.15	44.	32.45	32.	25.65	22.	26.15	29.
" 26, "	35.36	57.	33.85	50.	25.65	30.5	25.15	35.
" 27, "	35.44	60.	34.44	36.	24.24	27.	24.84	5.
" 28, "	36.44	45.	34.94	24.7	23.94	35.	24.24	17.
" 29, "	37.04	50.5	33.74	30.	23.34	41.5	24.14	17.
" 30, "	37.04	47.5	35.44	28.	23.24	31.5	23.94	17.
" 31, "	36.34	55.	36.04	29.	24.94	22.	24.44	17.
Aug. 1, "	-----	72.5	-----	24.	-----	35.5	-----	17.
" 2, "	35.84	64.3	35.14	22.	25.04	31. Pablum	28.64	20.
" 3, "	36.74	69.5	34.94	23.	24.94	26.	28.14	23.
" 4, "	40.24	67.5	33.44	16.5	25.44	45.	28.44	32.
" 5, "	40.24	67.5	33.84	24.	28.64	39.	30.84	39.
" 6, "	40.64	67.	32.44	21.5	30.14	39.8	31.14	54.5
" 7, "	40.04	73.5	32.64	30.	31.44	40.	31.24	43.5
" 8, "	40.24	46.5	32.44	9.5	32.44	21.	31.44	23.5
" 9, "	40.84	52.7	31.84	16.	33.94	38.	31.44	30.
" 10, "	41.74	52.5	31.64	18.	34.94	37.	32.84	37.
" 11, "	42.24	66.	31.64	24.	34.44	54.	33.44	36.

ROBINS

DATE	ROBIN I WEIGHT	FOOD	ROBIN II WEIGHT	FOOD	ROBIN III WEIGHT	FOOD
		Insects Pablum		Insects for 7 days Pablum for 12 days		Meat Pablum
July 19, 1938	57.95 g.					
" 20, "	55.65					
" 21, "	53.15	25.6 g.				
" 22, "	55.65	45.5			45.05 g.	27. g.
" 23, "	59.15	59.			47.45	51.5
" 24, "	59.65	60.	49.45 g.	65 grasshoppers	50.15	59.
" 25, "	59.15	60.	42.65	29 " 10 g. meat	54.15	54.
" 26, "	65.69	56.	46.05	106 grasshoppers	57.25	36.1
" 27, "	65.84	70.	42.95	46 " 42 caterpillars	60.44	59.
" 28, "	70.34	60.	44.74	13 " 39 grasshoppers	63.84	50
" 29, "	70.64	62.	43.94	48 " 20 g. pablum	64.44	56.
" 30, "	70. 74	62.	43.94	84 grasshoppers	65.44	77.
" 31, "	71.74	50.	46.44	52. g. pablum	69.44	55.
Aug. 1, "	-----	85.	-----	60. "	-----	86.5
" 2, "	71.74	51.5	49.44	70. "	70.24	63.5
" 3, "	69.94	67.	50.44	86. "	71.84	67.
" 4, "	70.74	55.	58.44	58. "	73.44	74.
" 5, "	72.6	57.	55.6	48. "	77.4	48.
" 6, "	74.14	64.3	53.44	57. "	77.89	45.
" 7, "	76.44	64.	58.94	62. "	76.24	33.
" 8, "	79.24	71.5	57.14	80. "	79.44	68.
" 9, "	77.5	65.5	60.44	60.	77.5	42.1
" 10, "	77.84	50.	67.84	28.5	75.74	43.
" 11, "	76.74	61.4	58.94	40.	78.14	76.5

BLUEBIRDS

DATE	131064 WEIGHT	FOOD Pabjum WEIGHT	131063 WEIGHT	131062 WEIGHT	FOOD Pabjum Egg Orange Meat Cherries WEIGHT
July 25, 1938	21.25 g.	21 g.	25.65 g.	23.45 g.	27 g.
" 26, "	18.85	30.5	23.15	23.35	30
" 27, "	18.35	30.	20.74	19.94	47
" 28, "	16.44	22.	21.04	19.94	50
" 29, "	19.39	23.	22.94	21.84	40.5
" 30, "	19.44	36.	23.04	19.94	65.
" 31. "	19.44	40.	23.44	21.94	50.
Aug. 1, "					
" 2, "	18.84	36.	23.74	21.44	63
" 3, "	18.84	35.	24.14	21.34	52.7
" 4, "	20.44	36.	25.24	23.84	59.
" 5, "	20.84	24.	26.94	24.44	61.5
" 6, "	21.94	29.	28.44	24.34	37.9
" 7, "	21.04	21.5	30.84	25.94	40.5
" 8, "	22.44	34	29.44	26.24	28.
" 9, "	19.84	27.	29.64	26.94	33.5
" 10, "	19.94	25.	29.14	26.94	44.
" 11. "	18.44	35.	28.74	25.24	72.

BLUEBIRD.

DATE	WEIGHT
July 10, 1938.	25.35 G.
" 11, "	21.72
" 12, "	20.85
" 13, "	21.90
" 14, "	22.55
" 15, "	22.80
" 16, "	25.40
" 17, "	25.05
" 18, "	26.15
" 19, "	25.48
" 20, "	27.55
" 21, "	26.05
" 22, "	27.95
" 23, "	28.65
" 24, "	27.65
" 25, "	30.15
" 26, "	31.45
" 27, "	29.34
" 28, "	27.94
" 29, "	28.44
" 30, "	29.44
" 31, "	29.24
AUG. 1, "	----
" 2, "	30.94
" 3, "	25.94
" 4, "	29.44
" 5, "	31.44
" 6, "	32.94
" 7, "	30.94
" 8, "	31.34

VESPER SPARROW.

DATE	WEIGHT	FOOD (Pablum)
July 24, 1938	17.85	12 g.
" 25, "	17.05	22
" 26, "	16.35	30
" 27, "	15.44	25
" 28, "	16.44	20
" 29, "	17.24	21
" 30, "	17.29	35
" 31, "	17.44	35
Aug. 1, "	-----	35
" 2, "	16.44	29
" 3, "	18.74	21
" 4, "	18.24	26
" 5, "	18.74	21
" 6, "	17.24	29
" 7, "	18.44	25
" 8, "	20.34	26
" 9, "	18.94	24
" 10, "	18.94	22
" 11, "	19.44	32