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TRANSPORTATION TEST WITH WASHINGTON NAVEL ORANGES, COMPARING VENTILATION BEHAVIOR OF THE 561- AND THE 462-BOX LOADS FROM CENTRAL CALIFORNIA TO NEW YORK, JANUARY 1951 /

(In cooperation with the California Fruit Growers Exchange)

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Transportation Test with Washington Navel Oranges, Comparing Ventilation Behavior of the 561- and the 462-box Loads from Central California to New York, January 1951

Object

During the three years of investigation of controlled ventilation of Washington Navel oranges in transit from California, all tests were made with a heavy or 561-box orange load. After the completion of this work[1] the principle of controlled, or rather modified ventilation, became widely employed in commercial shipments. The heavy load prevailed until sometime in the navel shipping season of 1948-49, when the size of load returned to the standard 462 boxes. This change to a smaller load caused some concern as to its possible influence on the margin of safety from freezing under the recommended ventilation procedures. Accordingly a small series of shipping tests to study the relative behavior of the smaller load in ventilation was run from Southern California in January and February 1950. (See H.T.&S. Office Report No. 227, 1950). The results of these tests indicated that the difference in the rate of cooling of the 561- and the 462-box loads under ventilation was too small to justify any modification of current procedure at the time. However the results were not considered conclusive, on the assumption that the rather mild outside temperatures encountered by the shipping tests during the ventilation period en route, did not afford a good comparison of the cooling that may occur in colder weather in the two sizes of loads. It was for this reason that the present reported transportation test was planned, it being hoped that ventilated shipments originating in Central California and routed across North Central Nevada and Utah would meet colder weather and supply the more definite information needed. It seemed worth while also to compare the two types of loads under ventilation in cars with fans operating and not in operation.

In lieu of warehouse precooling of oranges in Central California, it has become a rather common practice to cool cars with night air after loading and while still standing at the loading platforms. Cooling is accomplished by forcing night air through the load my means of temporarily installed fans and, in case of fan-cars, sometimes augmented by the car's own fans. When outside air temperatures are favorable this method can very effectively reduce load temperatures during the few available hours between completion of loading and the "pulling" of the cars by the railroad crew. The fact that considerable heat may be removed from a car of oranges before ventilation in transit begins, lessens the total burden of heat to be removed by further ventilation, and under extreme conditions might necessitate some modification of the ventilation procedure in transit in order to avoid over-doing it. With this in mind, it was considered desirable to include in the test some cars cooled with night air and subsequently strongly ventilated in transit.

1/ Reported in H.T.&S. Office Reports Nos. 163 (1945), 170 ('46) and 181 ('47)

The function of the cars receiving ice refrigeration was largely as controls for the ventilated test cars.

Test Cars and Loads

The test consisted of fifteen cars of non-precooled Washington Navel oranges. All cars were loaded January 10. Eleven cars moved under "combination ventilation" and four under ice refrigeration. Three of the ventilated cars were cooled in the car with night air for eight or more hours after loading. The loading data and services are shown in Table 1 and the icing record in Table 2.

The test cars were virtually all of one series, being of the same age, rebuilt at about the same time, with the same dimensions and insulation and were all equipped with half-stage ice grates and fans. The rated capacities of full and half-stage bunkers were respectively 11,500 and 6,500 pounds of chunk ice. The cars were steel sheathed and had 3-1/2 inches of insulation in floor and ceilings and 4 inches in sides and end walls. Originally fan and non-fan cars were desired, but finding that there was no comparable series of non-fan cars available, all fan-cars were accepted and used with fans either in the operative or non-operative position.

The direct comparison of the 561- and the 462-box loads under ventilation involved eight cars or four pairs; the two cars of each pair were loaded at the same packing house.

Two pairs of these test cars moved with fans "on" and two pairs with fans "off". Other details of comparison will be mentioned under "load temperature in transit".

The test being largely for comparing load temperatures attained, no special test boxes of fruit were prepared.

Temperature Records

Temperature records within the cars were obtained by means of electric resistance thermometers at twelve positions in the forward end of each car. The forward end was used because for these cars, it was also the air-intake end in ventilation. The twelve thermometer positions were as follows: Ten in fruit: At bunker, top, middle and bottom of load (centerline); at quarterlength (8th stack), top. middle, and bottom of load (centerline); at doorway, top and bottom of load (centerline) and middle of load adjacent to north and south doors. Two in air; at doorway, top and bottom (centerline).

Outside air temperatures were obtained by two Ryan recording thermometers both attached underneath a test car and a Friez recording thermometer placed on the platform of the business car. The records of the latter instrument are not used in this report except to secure the minimum temperature at Carlin, Nevada.

Route and Running Time

The test was routed via Southern Pacific, Union Pacific, Chicago and North Western, Belt Railway of Chicago, and Erie railroads to Jersey City. The total elapsed time to Jersey City from Fresno was 174 hours and 40 minutes. Of this, 108 hours and 50 minutes (62.3%) was running time, and 65 hours and 50 minutes (37.7%) standing.

Weather Conditions

The outdoor temperature conditions encountered were milder than typical of the route for the middle of January. However, the temperatures encountered between Roseville and Laramie (about 60 hours) were considered low enough to furnish reliable data on the relative behavior of ventilated shipments. The average outside temperature from Fresno to Jersey City was 34.1° F. with an average of 29.6° from Roseville to Laramie, that portion of the route over which most of the effective ventilation was accomplished.

The cars arrived in Jersey City the evening of January 18 and were unloaded January 21 to 23. The average outdoor temperature for the standing period was about 47° F.

Condition of Commercial Loads at Destination

A study of the inspection reports made by Mr. Scanlon, market representative of the California Fruit Growers Exchange, for each of the fifteen test cars shows that the loads of all cars were received in good condition and it is indicated that there were no significant differences in condition or appearances of the loads attributable to the different services used in transit. Special attention was given to the comparison of appearance of fruit receiving ventilation and ice refrigeration but no differences were noted.

Load Temperatures in Transit

Ventilation and size of load. A direct comparison as to the effect of load size on cooling by ventilation was afforded by eight cars of the test. The 561-box load was represented by cars A, G, L, and N; the 461-box load by cars C, I, K, and O. The individual temperature charts for these cars are presented as Nos. 1, 7, 12, and 14 for the former and Nos. 3, 9, 11, and 15 for the latter. These charts show the average top and bottom temperatures of the loads, thus offering an opportunity to note in this respect the effect of fans in ventilation service. However, the effect of load size is better shown in charts Nos. 16 to 19, inclusive, in which appear four pairs of heavy and standard loads with superimposed graphs of average temperature of each member of the pair. In these are the two pairs of cars A and C, and L and K, which had fans ON in transit and pairs G and I, and N and O which had fans OFF. An examination of these charts shows little difference in rate or amount of cooling by ventilation that can be attributed to size of load. Taking the four pairs as a whole the small differences which do occur may slightly indicate more cooling in the heavier load. It would seem as though the burden of removal of 21.4 percent more heat from the heavier load by ventilation is completely offset by other factors. The most suggestive one apparently lies in the character of the top surfaces of the two load types.

The top of the standard, or light load, presents a relatively smooth surface and a generous free space above the load, while the top of the heavy one is very irregular due to the up-turned bulges of the boxes of the top layer and the deck channel, also a reduced free area above the load. It seems probable that under the latter conditions considerable turbulence is imparted to the air passing over the top of the load and thereby increasing the efficiency of a given volume of air in carrying away heat from the load. In any case the results of the present test and those reported for January and February 1950, indicate strongly that the return from the 561- to the 462-box load does not introduce an additional freezing risk in ventilation procedures.

Regarding the effect of fans on ventilation results, it was noted that they had little influence on the total average load temperature changes, but, as in ice refrigeration, they gave a distinct advantage in maintaining more uniform temperatures through the load. This general advantage could, under extreme conditions, become an additional one in ventilation by retarding freezing of fruit at the bottom of the car.

Cooling in car by night air (CIC). Three of the test cars received night air cooling followed by the same ventilation opportunity maintained for the eight cars mentioned above. The cars receiving this treatment were D. E. and F. (See charts Nos. 4, 5, and 6.) With respect to cooling, these cars showed some advantage between shipping point and Roseville as compared with the eight cars receiving controlled ventilation only. At Roseville (about 24 hours from Porterville) the CIC cars had attained about 40 percent of their total cooling en route and correspondingly the CV-only (controlled ventilation) cars about 20 percent. However, by the time of arrival at Sparks (about 9 hours from Roseville) this difference between the CIC plus CV and the CV-only had been effaced. At Ogden about 60 hours from pickup of cars at origin the CIC plus CV cars had attained an average of 82.5 percent of their total cooling en route and correspondingly the CV-only cars 106 percent (i.e. the latter had cooled below their destination averages and continued cooling to Green River). This slower cooling of the CIC plus CV cars in transit was accounted for at destination when it was discovered that the operators of the car-cooling service in Central California had been careless and left the baffles within the cars, effectively obstructing the distribution of air through the load.

Ice refrigeration. The four iced cars were B, H, J, and M, the temperature charts of which are presented as Nos. 2, 8, 10, and 13, respectively. Car M was loaded dry and initially iced, full bunker at Fresno and reiced at Council Bluffs. This car made somewhat poorer showing in cooling than did the other iced cars, and considerably poorer than any of the ventilated cars. Its full bunker initial icing and one reicing in transit but with fans off was not as effective , as for example the half-stage, preiced, replenished, and no reicing in transit, represented by car J with fans on. The iced cars did not accomplish as much total cooling en route as the ventilated cars, but the three preiced cars made a better showing during the first 24 hours (i.e. to Roseville) after which time the cooling by ventilation exceed them. About 45 percent of the total cooling of the iced cars occurred within the first stage of the journey mentioned. All venti-

lated cars attained minimal load temperatures between Green River and Laramie, Wyo., but the temperatures of the iced cars continued slowly downward either to Susquehanna, Pa. or to destination.

CONCLUSIONS

The standard 462-box load and the heavy 561-box load of oranges moving under combination ventilation cooled so nearly at the same rate that it may be assumed that the readoption of the standard load introduces no need for any special modification of ventilation procedures.

Cooling in the car by means of night air showed some cooling advantage over combination ventilation alone during the first twenty-four or thirty hours of transit, but for the reason mentioned, this advantage was not maintained afterwards.

Car fans in operative and non-operative positions allowed approximately the same amount of total cooling under combination ventilation, but with fans in the operative position the temperatures throughout the loads were kept much more uniform, a situation which may be taken not only as a general advantage but also as a special one in ventilation during low outside air temperatures.

The ice refrigerated services used in the test appeared adequate, but were somewhat inferior in performance to combination ventilation, with the exception of the preiced cars during the first twenty-four hours of transit.

ACKNOWLEDGMENTS

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Grand View Heights Citrus Association, Terra Bella, Calif.
Klink Citrus Association, Ivanhoe, Calif.
Lemon Cove Association, Lemon Cove, Calif.
Magnolia Citrus Association, Porterville, Calif.
Strathmore Packing House Company, Strathmore, Calif.
Sunland Packing House Company, Porterville, Calif.
Waddell and Son, Lindsay, Calif.

Mr. R. C. Neill of the Traffic Dept., Calif. Fruit Growers Exchange.
Mr. W. E. Becker, Pacific Fruit Express Company.

The Southern Pacific, Union Pacific, Chicago and North Western, and the Erie railroads over which the train travelled and which furnished business cars for the test party.

Besides the members of the test party the following assisted in preparing or supervising the loading of test cars: Frank Walker and Carl Waldapfel of the California Fruit Growers Exchange; Lloyd Ryall, William Barger, Donald Dewey, G. L. Rygg, and Harlan Barber of the U. S. Department of Agriculture; and Ray Doering of the Pacific Fruit Express Company.

Mr. James A. Scanlon, Inspector for the California Fruit Growers Exchange and the staff of the U. S. Department of Agriculture Market Pathology Laboratory in New York, who assisted in unloading the test cars and inspection.

Members of the test party were:

E. M. Harvey, U. S. Department of Agriculture, Porterville, Calif. to Jersey City, N. J.
E. P. Atrops, ditto
G. E. Mountford, Pacific Fruit Express Co., Porterville, Calif. to Jersey City, N. J.
J. R. MacRill, California Fruit Growers Exchange, Porterville, Calif. to Jersey City, N.J.
Charles J. Colombo, Union Pacific railroad, Ogden, Utah to Cheyenne, Wyo.
J. E. Mulick, Union Pacific railroad, Cheyenne, Wyo. to Council Bluffs, Ia.
James D. Sutherland, Chicago and North Western railroad, Council Bluffs, Ia. to Huntington, Ind.

TABLE NO. 1

LOADING DATA

	A PFE 6809	B PFE 48518	C PFE 47278	D PFE 47931	E PFE 6815	F PFE 6425	G PFE 46949
Shipper	Klink Citrus Assn. Ivanhoe	Klink Citrus Assn Ivanhoe	Klink Citrus Assn. Ivanhoe	Waddell & Son Lindsay	Strathmore Packing Company	Strathmore Packing Company	Sunland Packing Company
Size of Load	561 boxes	462 boxes	462 boxes	462 boxes	462 boxes	462 boxes	561 boxes
Icing 1/ Service	Combination ventilation 2/	Half Stage PI by C.Repl. RI Council Cluffs	Combination ventilation	Combination Vent. CIC	Combination Vent. CIC	Combination Vent. CIC	Combination ventilation
Fan position	Fans on	Fans on	Fans on	Fans on	Fans on	Fans off 3/	Fans off 3/
Loading period 1/10/51	8:45 a.m.- 11:30 a.m.	8:45 a.m. 1:30 p.m.	10 a.m.- 2 p.m.	8:15 a.m. 10 a.m.	8 a.m. 11 a.m.	8 a.m. 11 a.m.	9:30 a.m. 11:45 a.m.

1/ Key. PI by C - Preiced by carrier.
II by C - Initially iced by carrier after loading
RI - Reiced in transit
Repl - Bunkers replenished at first regular icing station
CIC - Cooled in car by forcing night air thru the load, with portable fans in the hatches in addition to operating the regular fan equipment of the car by means of a portable motor

2/ Combination ventilation. The hatches of all ventilated cars remained open to Green River standard ventilation thereafter.

3/ Non-fan cars having comparable structural elements were not available, therefore fan-cars were used with the fans in OFF position

TABLE NO. 1 (Cont'd)

LOADING DATA

	H PFE 6003	I PFE 6321	J PFE 47772	K PFE 7161	L PFE 5001	M PFE 48308	N PFE 47976	O PFE 7755
Shipper	Sunland Packing Company	Sunland Packing Company	Grand View Hgts. Ultra	Grand View Hgts. Ultra	Grand View Hgts. Ultra	Magnolia Citrus Assn.	Lemon Cove Assn.	Lemon Cove Assn.
Size of Load	462 boxes	462 boxes	462 boxes	462 boxes	561 boxes	462 boxes	561 boxes	462 boxes
Icing[1] Service	Full bunker PI, Repl, DNR	Combination ventilation	Half stage PI, Repl, DNR	Combination ventilation	Combination ventilation	Full bunker II Fresno, RI Co. Bluffs	Combination ventilation	Combination ventilation
Fan position	Fans off[3]	Fans off[3]	Fans on	Fans on	Fans on	Fans off[3]	Fans off[3]	Fans off[3]
Loading period 1/10/51	9:20 a.m. 11 a.m.	8:20 a.m. 11 a.m.	9:30 a.m. 1 p.m.	1:30 p.m. 4.p.m.	8:00 a.m. 10 a.m.	8:25 a.m. 1:50 p.m.	9:15 a.m. 4:30 p.m.	8:15 a.m. 1:20 p.m.

TABLE 2

ICING RECORD

			Date Jan.	B Half Stage Fans on Pounds	J Half Stage Fans on Pounds	H Full Bunker Fans off Pounds	M Full Bunker Fans off Pounds
Preiced	Fresno	1:30 p.m.	9	6100	6000	11,875	--
Replen-ished	"	9 a.m.	11	2000	1600	1,500	--
Initial Icing	"	9 a.m.	11	--	--	--	11,500
Reicing	Council Bluffs	2:30 p.m.	15	5000	--	--	3,400
Total Ice Supplied to Jersey City				13,100	7600	13,375	14,900
Ice remaining at Jersey City				3,250	270	4,800	9,580
Ice melted to Jersey City				9,850	7330	8,575	5,320
Ice supplied at Jersey City				--	4000	--	--

Test 1951-1
Oranges
561 boxes

TABLE 3 - Car A

TEMPERATURES IN TRANSIT

561 Boxes. Fans on. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Ivanhoe, Calif.	10	3 P	52°	640	640	610	615	590	585	610	640	625	620	620	595	625	612
Fresno	11	8 A	46	610	625	590	575	505	480	610	605	590	570	575	540	602	562
Roseville	11	11 P	41	560	560	570	570	495	505	520	530	535	535	570	530	528	545
Sparks, Nev.	12	12 M	40	510	505	535	545	410	440	440	450	465	460	540	475	452	492
Carlin	13	1 A	10	440	395	470	380	275	335	365	345	365	400	450	400	358	417
Ogden, Utah	13	1:30P	35	385	340	410	415	360	355	335	295	305	360	385	345	312	363
Green River	14	2 A	26	355	310	390	390	275	310	310	270	285	335	350	320	288	335
Laramie, Wyo	14	2 P	36	335	315	370	370	345	335	310	295	300	335	330	315	302	327
North Platte, Neb	15	6 A	36	345	330	370	360	355	345	325	325	325	350	340	330	325	340
Council Bluffs, Ia	15	2:30P	40	340	335	365	350	385	345	325	330	335	350	335	330	330	338
Clearing, Ill	16	5 P	35	330	330	350	335	355	325	315	315	320	335	335	330	317	333
Marion, Ohio	17	10:30A	45	340	335	350	340	365	340	325	325	335	350	335	335	328	340
Susquehanna, Pa.	18	11 A	46	350	350	360	355	380	350	340	340	345	355	350	350	342	352
Croxton, N.J.	19	12 M	50	365	370	370	370	365	370	380	375	380	375	370	370	378	372
New York, N.Y.	21	7 P	31	400	405	400	400	410	370	440	445	445	395	390	390	443	392

Note: TB - top bunker
TQ - top quarter
TD - top doorway
MB - middle bunker
MQ - middle quarter
BB - bottom bunker
BQ - bottom quarter
BD - bottom doorway
MD - middle doorway
CL - centerline
SS - southside
NS - northside

Test 1951-1
Oranges
462 boxes

TABLE 4 - Car B

TEMPERATURES IN TRANSIT

462 Boxes. Fans on. HS - Preiced, Replenished, One reicing

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Fresno, Calif.	9			Preiced by carrier at Fresno													
Ivanhoe	10	3 P	52°	615	655	625	645	555	435	635	665	635	565	625	645	645	612
Fresno	11	8 A	46	550	610	545	550	565	450	605	630	620	485	535	550	618	523
	11	9 A	46	Replenished at Fresno 9 A													
Roseville	11	11 P	41	505	570	490	500	555	390	565	605	600	425	480	495	590	487
Sparks, Nev.	12	12 M	40	475	540	475	460	525	380	530	575	575	400	445	480	560	442
Carlin	13	1 A	10	465	485	445	445	420	425	490	480	495	435	450	465	488	450
Ogden, Utah	13	1 30P	35	455	455	430	425	415	425	465	440	455	440	445	460	453	448
Green River	14	2 A	26	445	440	425	420	405	410	455	425	435	430	435	445	438	437
Laramie, Wyo.	14	2 P	36	440	420	410	410	395	410	440	405	420	425	425	430	422	427
No.Platte, Neb.	15	6 A	36	435	420	405	410	400	405	435	410	410	425	425	425	418	425
Co.Bluffs, Ia.	15	2:30P	40	430	415	405	405	410	405	425	405	405	420	420	415	412	418
				Reiced at Council Bluffs, 2:30 P													
Clearing, Ill.	16	5 P	35	410	390	380	380	375	360	410	380	395	390	400	405	395	398
Marion, Ohio	17	10:30A	45	400	380	370	375	370	375	395	370	370	385	390	390	378	388
Susquehanna,Pa.	18	11 A	46	385	365	365	365	355	365	380	360	360	370	370	370	367	370
Croxton, N.J.	19	12 M	50	385	370	370	370	380	365	380	365	365	365	375	370	370	370
"	21	11:30A	45	390	390	490	490	415	375	390	390	485	370	380	485	422	412
New York, N.Y.	23	7:30P	46	375	390	360	360	390	345	380	390	390	350	365	360	387	358

Test 1951-1
Oranges
462 boxes

TABLE 5 - Car C

TEMPERATURES IN TRANSIT

462 Boxes. Fans on. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Ivanhoe, Calif.	10	3 P	52°	690	660	650	655	570	515	680	660	645	520	630	660	662	603
Fresno	11	8 A	46	670	655	610	605	530	510	665	645	625	555	585	590	645	577
Roseville	11	11 P	41	620	615	570	565	500	520	605	570	565	545	590	585	580	573
Sparks, Nev.	12	12 M.	40	565	565	500	485	410	445	550	485	495	475	560	555	510	530
Carlin	13	1 A	10	490	475	420	405	290	345	475	375	390	405	490	485	413	460
Ogden, Utah	13	1:30P	35	430	405	360	345	355	355	420	335	335	365	425	425	363	405
Green River	14	2 A	26	400	370	340	325	280	310	390	300	305	340	390	395	332	375
Laramie, Wyo.	14	2 P	36	375	340	325	325	325	335	360	310	310	335	355	360	327	350
No. Platt, Neb.	15	6 A	36	370	345	340	345	340	345	360	335	335	350	355	355	343	353
Council Bluffs, Ia	15	2:30P	40	360	340	345	345	375	350	350	345	345	350	345	345	347	347
Clearing, Ill.	16	5 P	35	355	335	330	330	330	330	340	330	325	340	335	335	332	337
Marion, Ohio	17	10:30A	45	355	340	340	345	350	345	345	340	340	345	340	340	342	342
Susquehanna, Pa.	18	11 A	46	365	360	360	360	385	365	360	360	360	360	355	355	360	357
Croxton, N.J.	19	12 M	50	390	385	390	385	460	380	385	395	390	385	375	375	390	378
Croxton, N.J.	21	11:30A	45	440	425	415	415	455	415	465	465	465	420	400	400	465	407
New York, N.Y.	23	7:30P	46	435	420	395	395	445	405	430	435	435	400	375	370	433	382

Test 1951-1
Oranges
462 boxes

TABLE 6 - Car D

TEMPERATURES IN TRANSIT

462 Boxes. Fans on. Cooled in car. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Lindsay, Calif.	10	12 M.	52°	600	640	635	625	550	455	620	640	635	465	625	625	632	572
"	10	4 P	52	605	645	610	615	520	540	620	645	630	490	610	605	632	568
"	11	12 P	41	545	575	540	535	445	475	505	550	545	480	--	550	533	515
Fresno	11	8 A	46	535	555	520	515	475	475	505	535	515	485	555	535	518	525
Roseville	11	11 P	41	525	545	515	515	485	500	515	520	515	495	540	525	517	520
Sparks, Nev.	12	12 M.	40	505	515	505	485	425	440	505	485	480	460	520	495	490	492
Carlin, Nev.	13	1 A	10	465	470	470	430	350	345	470	430	430	415	475	450	443	447
Ogden, Utah	13	1:30P	35	420	415	415	375	390	375	425	375	380	375	450	400	393	408
Green River	14	2 A	26	400	395	395	360	330	350	405	355	365	360	395	375	375	377
Laramie	14	2 P	36	385	380	375	355	375	370	385	355	360	360	385	370	367	372
No.Platte,Neb.	15	6 A	36	385	380	380	375	390	385	385	370	375	375	405	375	377	385
Council Bluffs,Ia.	15	2:30P	40	380	380	380	370	405	375	385	375	375	375	380	375	378	377
Clearing, Ill.	16	5 P	35	370	370	365	355	375	360	375	365	365	365	375	365	368	368
Marion, Ohio	17	10:30A	45	375	380	375	370	395	385	380	380	375	375	380	370	378	375
Suseuehanna, Pa.	18	11 A	46	380	390	390	380	395	385	390	390	385	380	390	380	388	383
Croxton, N.J.	19	12 M	50	395	400	405	400	440	405	405	410	405	395	400	390	407	395
"	21	11:30A	45	430	430	435	425	465	450	465	465	455	415	420	410	462	415
New York, N.Y.	22	7 P	32	425	430	410	405	425	360	445	450	440	385	405	385	445	392

Test 1951-1
Oranges
462 boxes

TABLE 7 - Car E

TEMPERATURES IN TRANSIT

462 Boxes. Fans on. Cooled in car. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Strathmore,Calif.	10	11:30A	50°	590	550	540	600	510	460	575	570	660	600	525	650	602	592
"	10	4 P	50	570	550	515	560	495	555	565	550	620	585	525	605	578	572
"	10	11:30P	41	540	520	460	475	410	485	525	495	535	555	505	525	518	528
Fresno	11	8 A	46	525	515	480	490	470	490	510	490	540	545	510	540	513	532
Roseville	11	11 P	41	520	515	500	500	475	510	510	500	530	540	515	535	513	530
Sparks, Nev.	12	12 M.	40	490	495	445	440	410	460	485	460	490	505	495	500	478	500
Carlin,	13	1 A	10	450	455	390	360	315	380	445	410	425	465	450	440	427	452
Ogden, Utah	13	1:30 P	35	405	405	365	345	375	385	400	365	390	425	410	405	385	413
Green River	14	2 A	26	375	385	340	320	305	345	370	340	355	395	380	380	355	385
Laramie, Wyo.	14	2 P	36	360	370	350	340	355	365	355	340	360	380	370	370	352	373
No. Platte Neb.	15	6 A	36	360	375	365	360	365	375	365	360	380	385	375	375	368	378
Co. Bluffs, Ia.	15	2:30P	40	365	370	375	370	395	375	365	365	375	385	370	370	368	375
Clearing, Ill.	16	5 P	35	360	360	355	355	360	355	365	360	360	380	360	360	362	367
Marion, Ohio	17	10:30A	45	365	370	370	370	380	375	370	370	375	385	370	365	372	373
Susquehanna, Pa.	18	11 A	46	375	375	380	375	385	380	380	375	380	390	375	370	378	378
Croxton, N.J.	19	12 M	50	390	390	400	400	480	400	405	405	400	405	395	390	403	397
"	21	11:30A	45	435	420	435	430	475	425	475	475	460	440	415	405	470	420
New York, N.Y.	22	7 P	32	425	420	405	395	425	365	445	445	445	420	385	385	445	397

Test 1951-1
Oranges
462 boxes

TABLE 8 - Car F

TEMPERATURES IN TRANSIT

462 Boxes. Fans off. Cooled in car. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Strathmore,Calif.	10	11:30A	50°	500	630	595	630	495	445	475	630	630	600	--	565	578	583
"	10	4 P	50	520	605	560	580	495	505	495	590	605	585	--	565	563	575
"	10	11:30P	41	495	535	510	510	400	460	455	410	535	545	--	535	500	540
Fresno	11	8 A	46	500	530	515	500	480	460	475	510	520	525	--	525	502	525
Roseville	11	11 P	41	505	540	520	500	500	455	490	525	525	510	--	525	513	518
Sparks, Nev.	12	12 M.	40	480	535	490	485	450	355	460	525	525	455	545	495	503	498
Carlin, Nev.	13	1 A	10	435	510	445	445	390	240	405	510	520	385	475	455	478	438
Ogden, Utah	13	1:30P	35	385	485	405	400	420	335	355	490	500	330	420	405	448	385
Green River	14	2 A	26	355	465	385	380	380	280	335	470	490	305	390	380	432	358
Laramie, Wyo	14	2 P	36	345	455	375	375	420	320	345	460	485	305	380	365	430	350
No.Platte,Nebr	15	6 A	36	360	455	385	380	430	335	375	460	480	325	380	365	438	357
Co. Bluffs, Ia.	15	2:30P	40	365	450	390	375	410	355	375	460	480	335	380	365	438	360
Clearing, Ill.	16	5 P	35	355	430	370	360	410	325	365	440	465	335	365	355	423	352
Marion, Ohio	17	10:30A	45	370	430	380	370	420	335	380	440	465	350	370	360	428	360
Susquehanna,Pa.	18	11 A	46	375	420	385	370	395	345	380	435	450	365	375	365	422	368
Croxton, N.J.	19	12 M	50	395	425	400	385	480	370	400	435	455	390	390	380	430	387
New York, N.Y.	21	7 P	31	440	460	440	420	405	380	455	475	480	425	415	405	470	415

Test 1951-1
Oranges
561 Boxes.

TABLE 9 - Car G

TEMPERATURES IN TRANSIT

561 Boxes. Fans off. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Sunland, Calif.	10	11 A	50°	580	540	530	580	530	450	550	595	560	575	550	510	568	545
Fresno	11	8 A	46	570	585	540	545	480	455	540	565	565	530	530	505	557	522
Roseville	11	11 P	41	555	585	540	545	530	445	520	565	565	510	525	505	550	513
Sparks, Nev.	12	12 M	40	530	575	525	520	475	360	450	540	550	440	505	480	513	475
Carlin	13	1 A	10	485	550	485	480	415	240	385	505	525	370	465	435	472	423
Ogden, Utah	13	1:30P	35	440	525	445	435	440	335	360	470	495	335	415	385	442	378
Green River, Wyo	14	2 A	26	410	500	420	415	370	290	335	455	480	310	390	365	423	355
Laramie	14	2 P	36	405	485	405	405	465	320	370	460	485	320	375	350	438	348
No.Platte, Nebr.	15	6 A	36	--	485	405	--	475	330	415	475	495	345	380	355	462	360
Co.Bluffs,Ia.	15	2:30P	40	415	480	405	405	425	360	405	470	485	350	380	355	453	362
Clearing, Ill.	16	5 P	35	405	460	390	390	455	330	405	460	475	355	370	345	447	357
Marion, Ohio	17	10:30A	45	415	465	395	400	470	340	435	470	485	375	380	355	463	370
Susquehanna,Pa.	18	11 A	46	410	455	395	400	420	370	405	455	470	380	385	365	443	377
Croxton, N.J.	19	12 M.	50	415	455	405	410	485	--	435	460	470	395	395	375	455	388
"	21	11:30A	45	450	485	440	440	485	--	415	505	510	435	420	400	477	418
New York, N.Y.	22	7 P	32	445	460	420	415	460	--	455	470	480	410	400	385	468	398

Test 1951-1
Oranges
462 boxes

TABLE 10 - Car H

TEMPERATURES IN TRANSIT

462 Boxes. Fans off. FB - Preiced, Replenished, DNR

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Fresno, Calif.	9			Preiced by carrier at Fresno													
Sunland	10	11 A	50°	700	620	615	610	530	350	675	620	615	685	590	635	637	637
Fresno	11	8 A	46	595	590	565	530	550	380	610	610	610	490	475	510	610	492
				Replenished at Fresno at 9 A													
Roseville	11	11 P	41	535	550	510	490	530	370	570	580	585	405	435	465	578	435
Sparks, Nev.	12	12 M	40	500	525	480	460	500	365	540	560	560	395	410	435	553	413
Carlin	13	1 A	10	480	510	455	450	485	360	510	545	540	385	400	425	532	403
Ogden Utah	13	1:30A	35	465	490	435	430	485	350	495	530	530	375	390	415	518	393
Gr.River, Wyo.	14	2 A	26	450	480	420	515	465	345	485	515	510	370	380	400	503	383
Laramie	14	2 P	36	435	465	405	405	450	340	470	495	495	355	370	390	487	372
No.Platte,Nebr.	15	6 A	36	425	455	395	400	445	345	455	485	485	360	370	390	475	373
Co.Bluffs,Ia.	15	2:30P	40	415	450	390	395	450	340	450	480	475	355	365	385	468	368
Clearing, Ill.	16	5 P	35	400	430	380	380	425	335	430	455	450	350	355	370	445	358
Marion, Ohio	17	10:30A	45	395	425	375	380	425	345	425	450	445	350	355	370	440	358
Susquehanna,Pa.	18	11 A	46	390	415	375	375	415	345	415	440	430	345	350	370	428	355
Croxton, N.J.	19	11:30A	50	385	410	375	380	415	350	410	430	425	345	350	370	421	355
New York, N.Y.	21	7 P	31	385	405	380	390	415	360	410	425	415	350	355	375	417	360

Test 1951-1
Oranges
462 boxes

TABLE 11- Car I

TEMPERATURES IN TRANSIT

462 Boxes. Fans off. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Sunland, Calif	10	11 A	50°	560	590	565	575	530	440	580	605	590	545	595	600	592	580
Fresno	11	8 A	46	550	580	450	550	480	445	555	590	595	505	550	545	580	533
Roseville	11	11 P	41	535	570	535	540	505	425	535	580	590	500	540	520	568	520
Sparks Nev.	12	12 M	40	495	555	495	510	435	330	485	560	575	410	490	490	540	463
Carlin	13	1 A	10	435	515	440	470	350	180	420	530	550	335	450	440	500	408
Ogden Utah	13	1:30P	35	385	480	380	420	400	310	375	495	515	295	385	375	462	352
Green River	14	2 A	26	365	465	370	400	375	255	365	480	500	295	365	355	448	338
Laramie, Wyo	14	2 P	35	365	450	360	385	425	295	370	465	480	295	350	340	438	328
No.Platte, Nebr.	15	6 A	36	375	440	370	385	430	320	390	460	475	305	350	340	442	332
Co.Bluffs Ia	15	2:30P	40	375	435	370	380	410	350	385	455	470	310	350	340	437	333
Clearing, Ill.	16	5 P	35	370	410	360	365	410	305	380	435	445	310	345	335	420	330
Marion, Ohio	17	10:30A	45	380	410	365	365	415	325	390	430	440	330	350	340	420	340
Susquehanna Pa.	18	11 A	46	385	410	380	375	400	355	390	430	440	365	365	355	420	362
Croxton, N.J.	19	12 M	50	395	415	390	385	495	375	405	430	440	390	380	370	425	380
"	21	11:30A	45	435	440	425	415	475	410	470	475	480	420	405	395	475	407
New York, N.Y.	22	7 P	32	430	430	265	390	285	330	445	455	465	395	390	375	455	387

TABLE 12 - Car J

TEMPERATURES IN TRANSIT

462 Boxes. Fans on. HS - Preiced, Replenished, DNR

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
				Preiced by carrier at Fresno													
Fresno, Calif.	9																
Ultra	10	1 P	52°	630	600	570	580	535	370	655	600	570	620	600	555	608	592
Fresno	11	8 A	46	590	555	530	535	510	425	615	570	545	510	525	520	577	518
				Replenished at Fresno, 9 A													
Roseville	11	11 P	41	545	525	505	505	470	430	555	515	505	475	495	505	525	492
Sparks, Nev.	12	12 M	40	510	495	480	480	430	420	515	480	470	460	480	490	488	477
Carlin	13	1 A	10	490	485	465	470	425	385	490	470	460	435	470	485	473	463
Ogden, Utah	13	1:30P	35	480	470	445	450	425	375	475	455	445	405	465	475	458	448
Gr.River, Wyo.	14	2 A	26	460	450	430	430	395	390	455	440	430	400	445	455	442	433
Laramie	14	2 P	36	455	445	425	425	395	375	450	430	425	395	445	455	435	432
No.Platte, Nebr.	15	6 A	36	440	430	410	415	390	375	430	420	415	390	430	465	422	428
Co.Bluffs, Ia.	15	2:30P	40	435	425	410	410	390	380	425	415	410	385	425	440	417	417
Clearing, Ill.	16	5 P	35	420	420	395	400	385	350	415	405	400	370	420	425	407	405
Marion, Ohio	17	10:30A	45	420	425	395	400	390	375	415	410	405	375	420	425	410	407
Susquehanna,Pa.	18	11 A	46	415	425	400	405	390	380	410	410	405	375	420	425	408	405
Croxton,N.J.	19	12 M	50	415	425	400	410	405	380	415	415	415	380	410	425	415	405
"	21	11:30A	45	395	415	395	410	420	385	410	425	435	370	390	405	423	388
New York, N.J.	22	7 P	32	390	405	385	400	395	340	395	420	430	365	380	390	415	378

Test 1951-1
Oranges
462 boxes

TABLE 13- Car K

TEMPERATURES IN TRANSIT

462 Boxes. Fans on. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Ultra, Calif.	10	4 P	52°	575	510	515	545	515	470	570	540	520	550	510	520	543	527
Fresno	11	8 A	46	560	530	510	525	490	475	575	530	515	525	520	525	540	523
Roseville	11	11 P	41	540	530	510	515	480	480	550	515	510	515	530	525	525	523
Sparks, Nev.	12	12 M	40	490	485	455	480	400	415	500	460	450	460	500	490	470	483
Carlin	13	1 A	10	435	410	385	420	290	325	440	390	375	405	450	430	402	428
Ogden, Utah	13	1:30 P	35	385	370	345	370	365	355	380	340	340	365	405	390	353	387
Green River	14	2 A	26	355	340	325	340	280	315	355	315	310	340	375	365	327	360
Laramie, Wyo.	14	2 P	36	350	340	330	335	355	345	340	325	330	345	360	360	332	355
No.Platte,Nebr.	15	6 A	36	355	350	345	350	355	355	350	345	350	355	360	360	348	358
Co.Bluffs, Ia.	15	2:30P	40	355	355	355	355	495	355	355	355	360	360	360	360	357	360
Clearing, Ill.	16	5 P	35	345	335	325	330	350	330	345	335	335	345	340	340	338	342
Marion, Ohio	17	10:30A	45	355	350	345	345	380	350	355	355	355	355	355	355	355	355
Susquehanna, Pa.	18	11 A	46	375	365	365	360	395	365	370	370	375	375	370	370	372	372
Croxton, N.J.	19	12 M	50	390	380	390	385	460	380	395	395	400	390	380	385	397	385
"	21	11:30A	45	425	415	415	405	460	410	455	460	465	415	400	400	460	405
New York, N.Y.	22	7 P	32	425	425	385	390	420	345	440	445	440	395	380	385	442	387

Test 1951-1
Oranges
561 boxes

TABLE 14 - Car L

TEMPERATURES IN TRANSIT

561 Boxes. Fans on. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Ultra, Calif.	10	10A	52°	580	560	545	560	575	425	585	565	620	625	600	600	590	608
Fresno	11	8 A	46	595	575	540	540	500	515	590	580	590	590	575	575	587	580
Roseville	11	11 P	41	575	550	530	550	495	505	550	555	555	560	570	565	553	565
Sparks, Nev.	12	12 M	40	535	495	495	535	415	450	470	500	500	520	545	535	490	533
Carlin	13	1 A	10	480	425	435	500	325	360	410	435	425	465	495	475	423	478
Ogden, Utah	13	1:30 P	35	430	380	380	455	365	390	360	370	375	420	440	430	368	430
Green River	14	2 A	26	400	350	360	435	295	355	335	345	345	395	410	390	342	398
Laramie	14	2 P	36	390	365	350	425	370	385	345	355	355	385	395	375	352	385
No. Platte, Neb.	15	6 A	36	390	375	360	420	380	395	375	375	380	395	395	375	377	388
Co. Bluffs, Ia.	15	2:30 P	40	390	375	370	415	375	385	380	380	385	395	385	365	382	382
Clearing, Ill.	16	5 P	35	385	370	340	395	360	375	375	375	375	385	375	360	375	373
Marion, Ohio	17	10:30A	45	390	380	365	395	380	390	380	380	385	390	380	365	382	378
Susquehanna, Pa.	18	11 A	46	395	380	370	395	375	380	385	385	385	395	385	370	385	383
Croxton, N.J.	19	12 M	50	405	395	385	405	440	395	405	405	405	400	395	375	405	390
New York, N.Y.	21	7 P	31	440	425	415	435	400	400	470	470	470	420	415	395	470	410

Test 1951-1
Oranges
462 boxes

TABLE 15 - Car M

TEMPERATURES IN TRANSIT

462 Boxes. Fans off. FB - Initially iced and one reicing.

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Magnolia, Calif.	10	12 M	52°	585	570	620	570	495	470	585	560	600	585	555	615	582	585
Fresno	11	8 A	46	575	585	585	560	505	475	575	575	595	525	540	535	582	550
				Initially iced at Fresno, 9 A													
Roseville	11	11 P	41	560	565	535	515	535	385	550	565	575	455	485	535	563	492
Sparks, Nev.	12	12 M	40	545	545	495	480	510	380	525	550	555	415	445	505	543	455
Carlin	13	1 A	10	520	520	465	450	485	365	495	530	540	390	420	485	522	432
Ogden, Utah	13	1:30P	35	505	505	450	435	485	360	480	520	525	385	410	480	508	425
Gr.River, Wyo.	14	2 A	26	485	485	425	415	465	345	465	505	505	375	395	475	492	415
Laramie	14	2 P	36	475	470	405	400	450	345	445	490	490	370	395	460	475	408
No.Platte, Nebr.	15	6 A	36	465	465	400	390	445	350	440	480	485	375	380	410	468	388
Co Bluffs, Ia	15	2:30P	10	460	455	395	385	445	355	430	475	480	370	375	420	462	388
				Reiced at Council Bluffs, 2:30 P													
Clearing, Ill.	16	5 P	35	415	415	370	360	410	330	390	445	445	350	360	425	427	378
Marion, Ohio	17	10:30A	45	425	420	375	370	420	355	400	440	445	355	365	425	428	382
Susquehanna,Pa.	18	11 A	46	420	415	380	365	415	360	395	430	435	355	365	425	420	382
Croxton, N.J.	19	12 M	50	415	410	380	370	415	370	390	420	425	350	365	435	412	383
New York, N.Y.	21	7 P	31	390	385	365	360	395	360	370	395	400	335	345	430	388	370

Test 1951-1
Oranges
561 boxes

TABLE 16- Car N

TEMPERATURES IN TRANSIT

561 Boxes. Fans off. Combined ventilation.

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Kaweah, Calif.	10	4:30P	50°	585	600	585	575	550	495	595	605	585	570	565	585	595	573
Fresno	11	8 A	46	585	595	560	550	510	465	580	595	580	530	525	550	585	535
Roseville	11	11 P	41	580	585	545	535	525	460	560	585	570	520	515	530	572	525
Sparks, Nev.	12	12 M	40	530	560	510	500	455	360	430	540	525	430	470	490	498	463
Carlin	13	1 A	10	450	530	450	445	370	215	310	485	480	340	405	430	425	392
Ogden, Utah	13	1:30P	35	395	490	390	390	395	335	320	450	445	305	355	370	405	343
Green River	14	2 A	26	365	470	370	370	375	270	295	430	425	300	335	350	383	328
Laramie, Wyo.	14	2 P	36	365	455	355	360	420	320	345	440	435	300	340	335	407	325
No.Platte,Nebr.	15	6 A	36	375	445	365	370	430	340	380	450	450	305	340	340	427	328
Co.Bluffs, Ia.	15	2:30P	40	375	440	365	370	400	375	375	450	445	320	340	345	423	335
Clearing, Ill.	16	5 P	35	360	410	345	355	410	325	365	425	425	315	325	335	405	325
Marion, Ohio	17	10:30A	45	370	410	360	365	420	355	385	435	435	330	340	340	418	337
Susquehanna	18	11 A	46	370	400	365	370	390	370	370	415	415	365	350	355	400	355
Croxton,N.J.	19	12 M	50	385	410	385	390	485	390	420	430	435	400	375	375	428	383
New York, N.Y.	21	7 P	31	420	435	415	420	425	390	470	480	480	420	395	400	477	405

Jay Fox
Fox Research
Fox Box
Jr

Test 1951-1
Oranges
462 boxes

TABLE 17- Car 0

TEMPERATURES IN TRANSIT

462 Boxes. Fans off. Combined ventilation

Place	Date Jan.	Time	Out-side	MB --	MQ --	MD SS	MD NS	Top Air	Bot Air	TB CL	TQ CL	TD CL	BB CL	BQ CL	BD CL	AVE. TOP	AVE. BOT
Kaweah, Calif.	10	1 P	56°	595	595	570	570	530	485	590	590	575	565	600	565	585	577
Fresno	11	8 A	46	585	590	520	555	510	470	570	590	590	520	545	525	583	530
Roseville	11	11 P	41	570	585	510	540	525	465	555	590	585	510	540	515	577	522
Sparks, Nev.	12	12 M	40	545	565	450	505	470	365	520	565	565	435	505	465	550	468
Carlin	13	1 A	10	495	530	390	465	400	235	465	535	535	360	450	410	512	407
Ogden, Utah	13	1:30P	35	450	500	340	420	400	335	430	505	505	305	395	360	480	353
Green River	14	2 A	26	420	475	325	395	385	280	400	485	480	285	375	335	455	332
Laramie, Wyo.	14	2 P	35	405	465	320	390	425	320	395	475	470	285	370	325	447	327
No. Platte, Neb.	15	6 A	36	410	460	335	390	435	340	405	475	470	305	365	330	450	333
Co. Bluffs, Ia.	15	2:30P	40	405	450	345	385	415	365	400	470	460	320	375	335	443	343
Clearing, Ill.	16	5 P	35	385	425	325	370	410	320	385	445	440	315	350	325	423	330
Marion, Ohio	17	10:30A	45	390	425	345	380	420	355	395	445	440	330	375	330	427	345
Susquehanna, Pa.	18	11 A	46	385	415	365	380	400	370	390	435	445	355	385	350	423	363
Croxton, N.J.	19	12 M	50	395	420	385	390	485	385	400	435	445	370	390	360	427	373
"	21	11:30A	45	430	440	410	420	465	425	455	480	490	405	415	385	475	402
New York, N.Y.	22	7 P	32	425	430	375	395	430	355	435	455	465	375	390	365	452	377

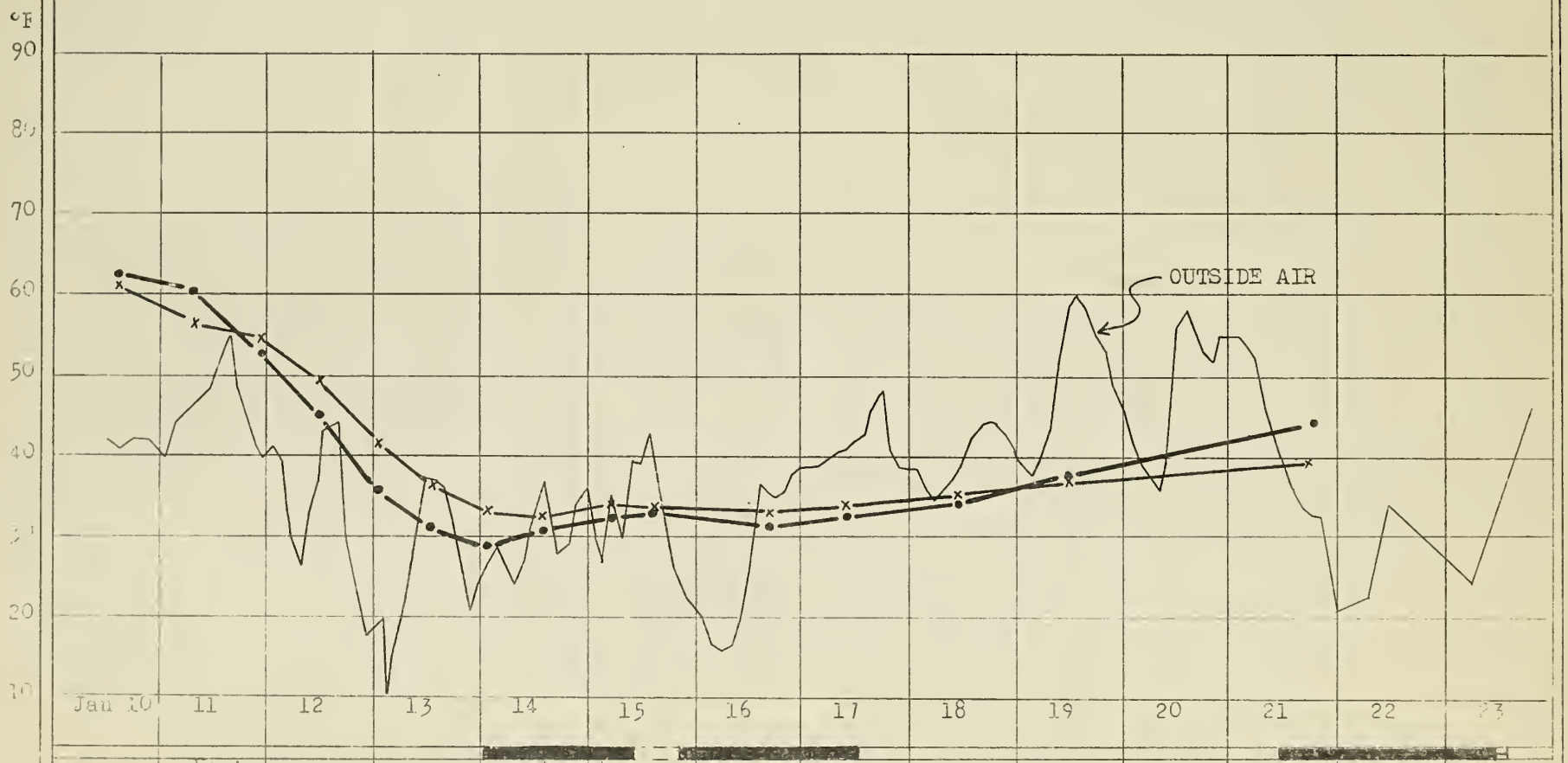
Figure 1

FRUIT TEMPERATURES

Ave. Top •——•——•

Ave. Bot. ×——×——×

CAR A ORANGES (Jan. 1951)
COMBINED VENTILATION
561-BOX LOAD. FANS ON



NOTE: Fans off by error from Fresno to Sparks

Figure 2

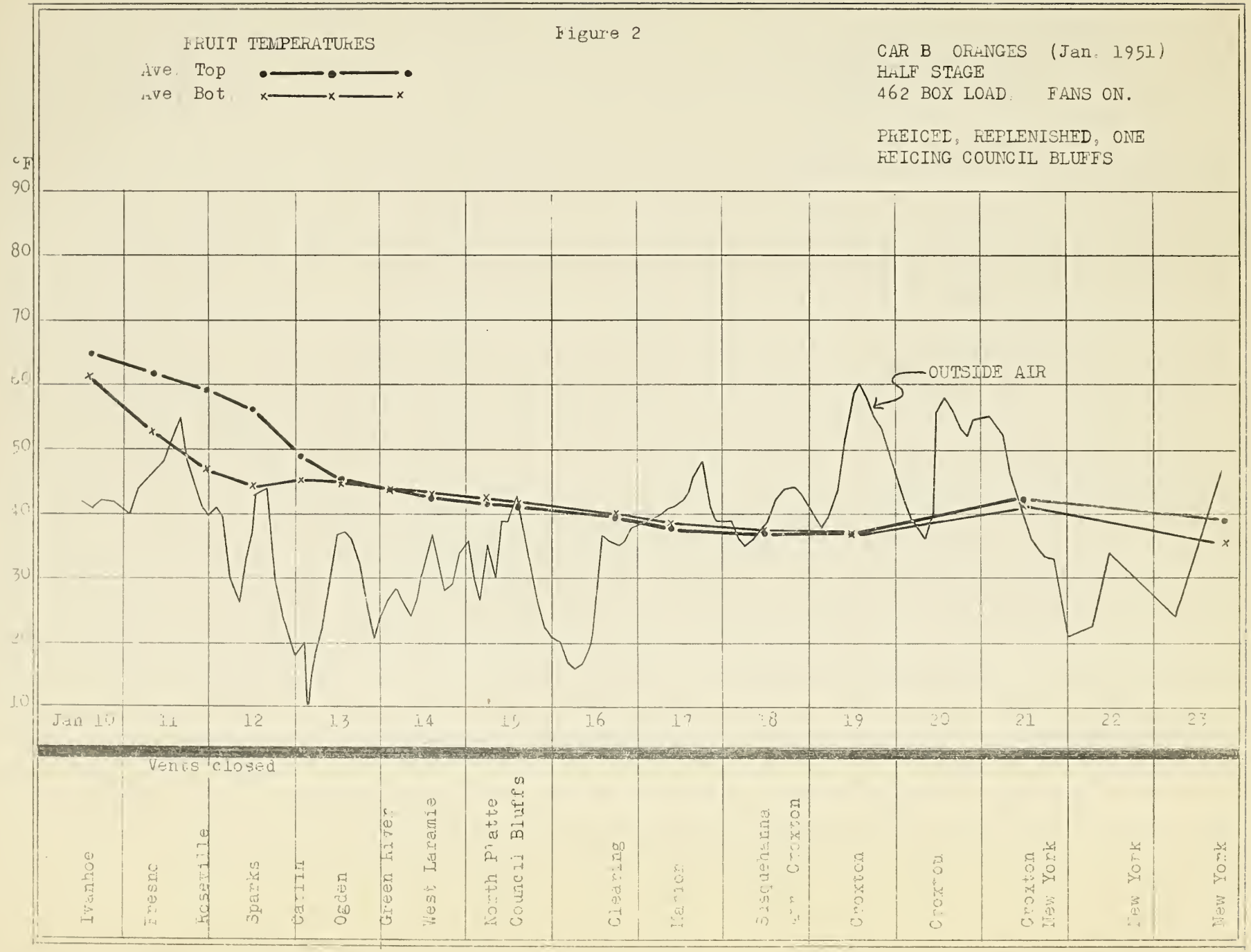


Figure 3

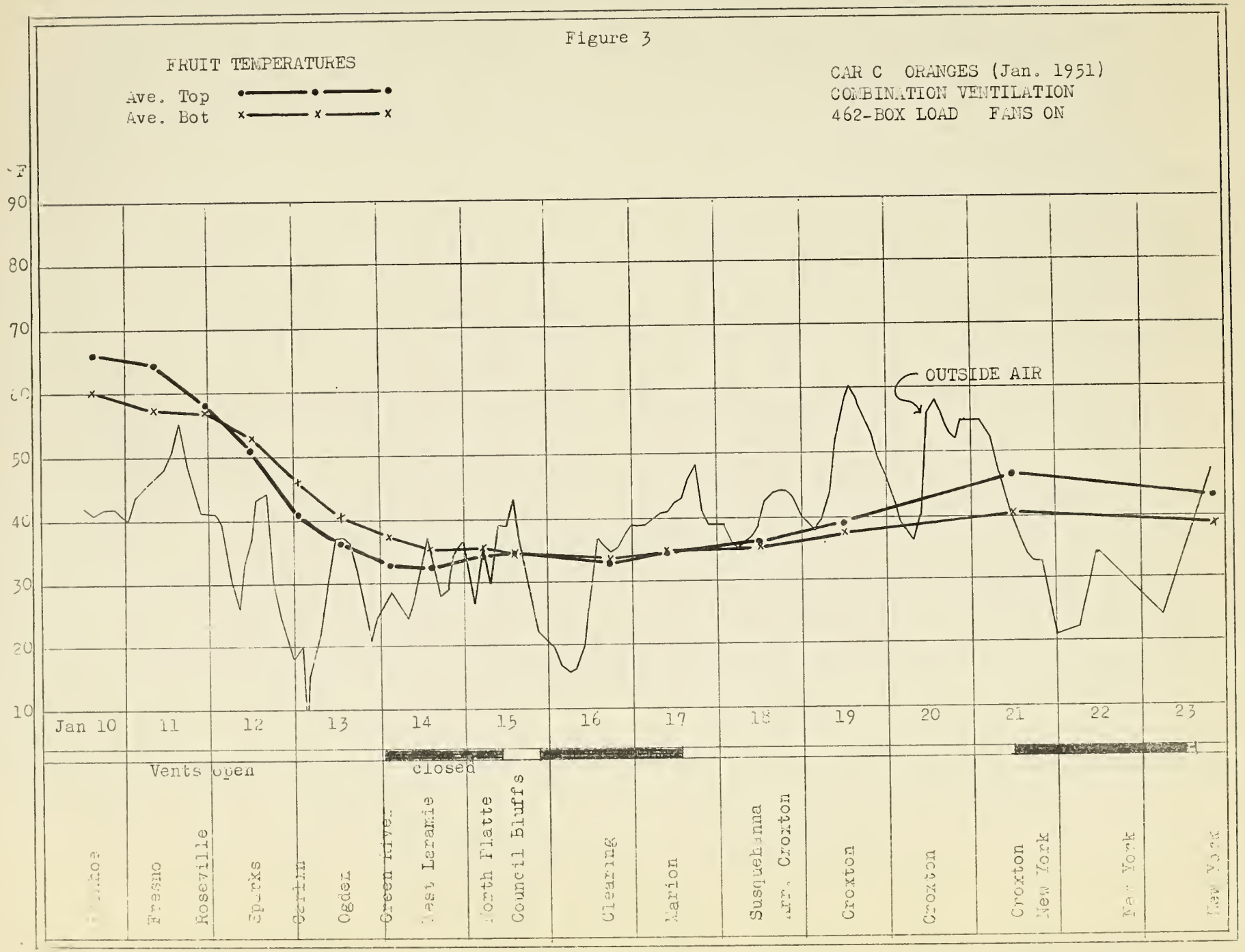

FRUIT TEMPERATURES
Ave. Top
Ave. Bot
CAR C ORANGES (Jan. 1951)
COMBINATION VENTILATION
462-BOX LOAD FANS ON
°F
90
80
70
60
50
40
30
20
10
OUTSIDE AIR
Jan 10
11
12
13
14
15
16
17
18
19
20
21
22
23
Vents open
closed
Fresno
Roseville
Sparks
Ogden
Green River
East Laramie
North Platte
Council Bluffs
Clearing
Marion
Susquehanna
Croxton
Croxton
Croxton
New York
New York

Figure 4

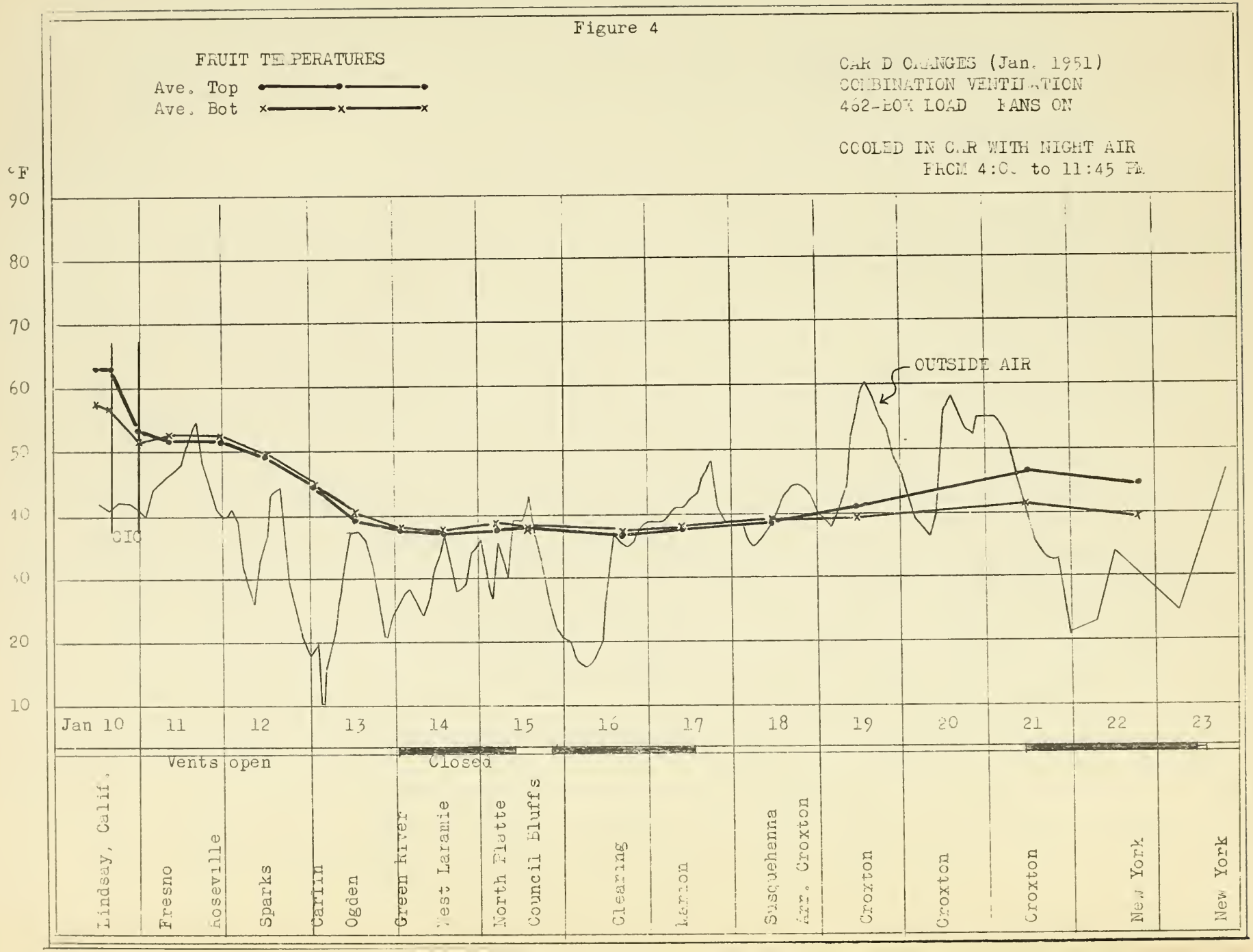

FRUIT TEMPERATURES
Ave. Top
Ave. Bot
CAR D CHANGES (Jan. 1951)
COMBINATION VENTILATION
462-BOX LOAD FANS ON
COOLED IN CAR WITH NIGHT AIR
FROM 4:0. to 11:45 PM.
°F
90
80
70
60
50
40
30
20
10
OUTSIDE AIR
ICE
Jan 10
11
12
13
14
15
16
17
18
19
20
21
22
23
Vents open
Closed
Lindsay, Calif.
Fresno
Roseville
Sparks
Carlin
Ogden
Green River
West Laramie
North Platte
Council Bluffs
Clearing
Marion
Susquehanna
Arr. Croxton
Croxton
Croxton
Croxton
New York
New York

Figure 5

FRUIT TEMPERATURES

Ave. Top ●——●——●
Ave. Bot x——x——x

CAR E ORANGES (Jan. 1951)
COMBINATION VENTILATION
462-BOX LOAD FANS ON

COOLED IN CAR WITH NIGHT AIR
FROM 1:30 to 11:30 PM

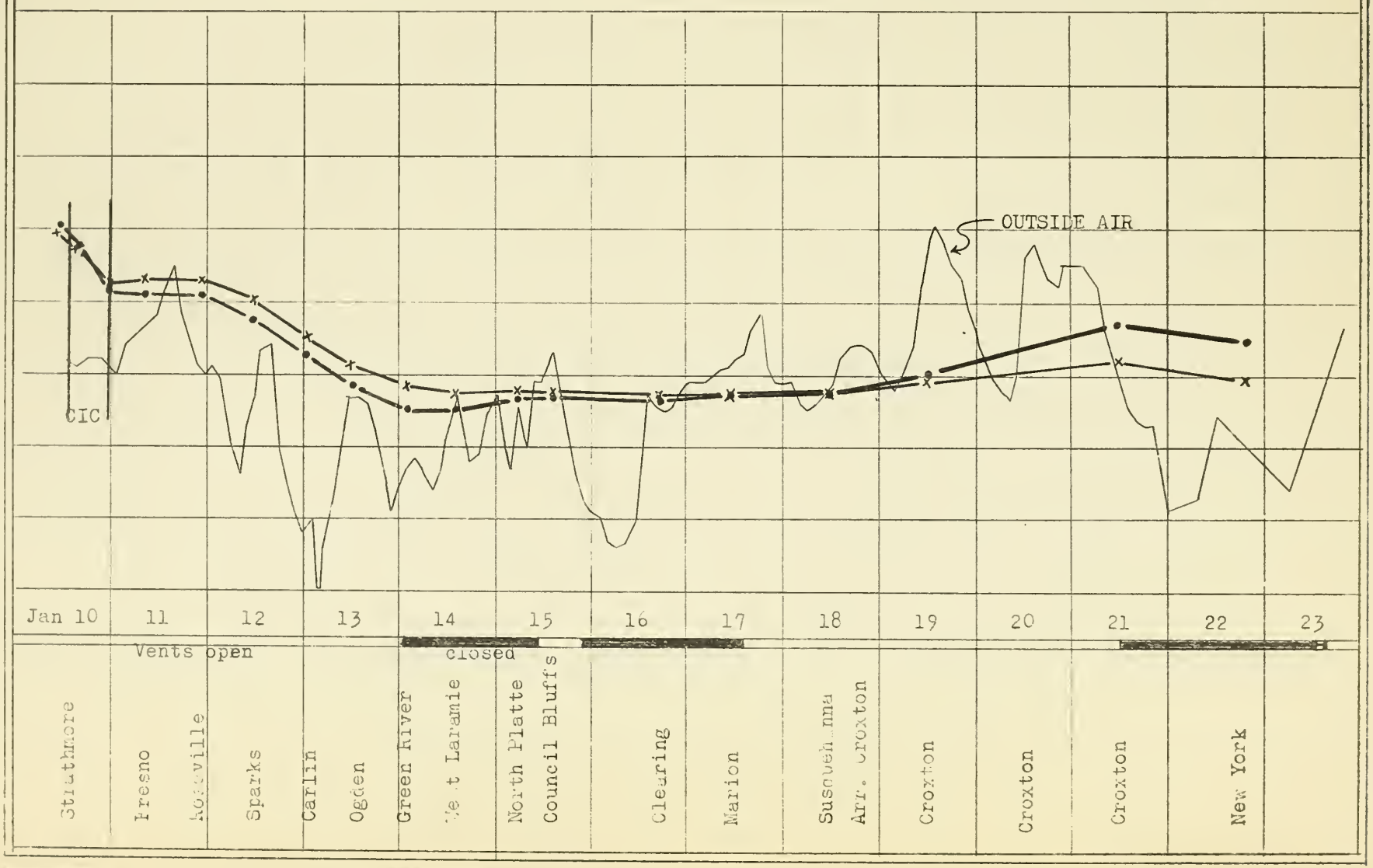


Figure 6

FRUIT TEMPERATURES

Ave. Top •———•———•

Ave. Bot ×———×———×

CAR F ORANGES (Jan. 1951)
COMBINATION VENTILATION
462-BOX LOAD FANS OFF

COOLED IN CAR WITH NIGHT AIR
FROM 1:30 to 11:30 PM

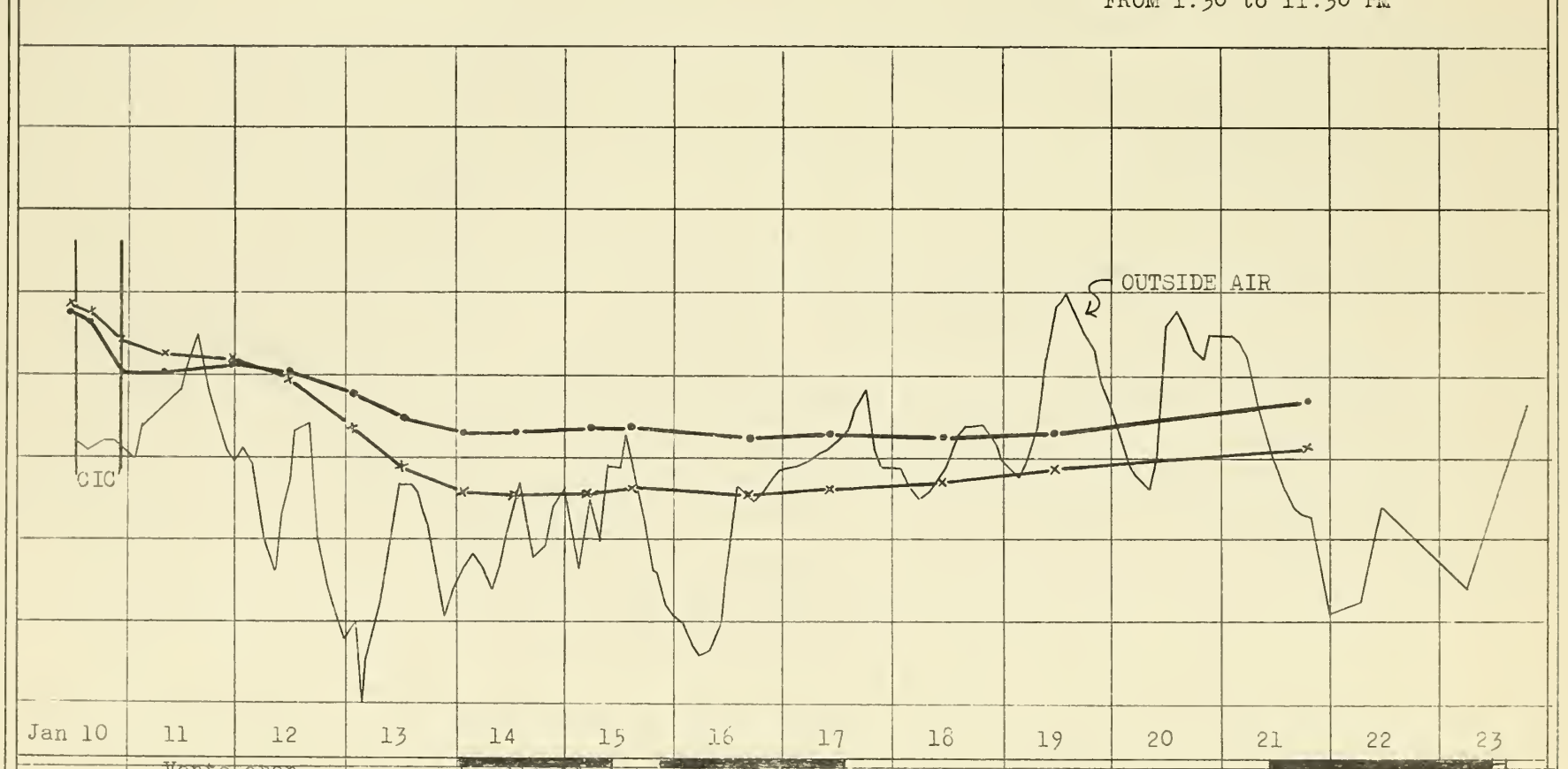


Figure 7

FRUIT TEMPERATURES
Ave. Top
Ave. Bot

CAR G ORANGES (Jan. 1951)
COMBINATION VENTILATION
561-BOX LOAD FANS OFF

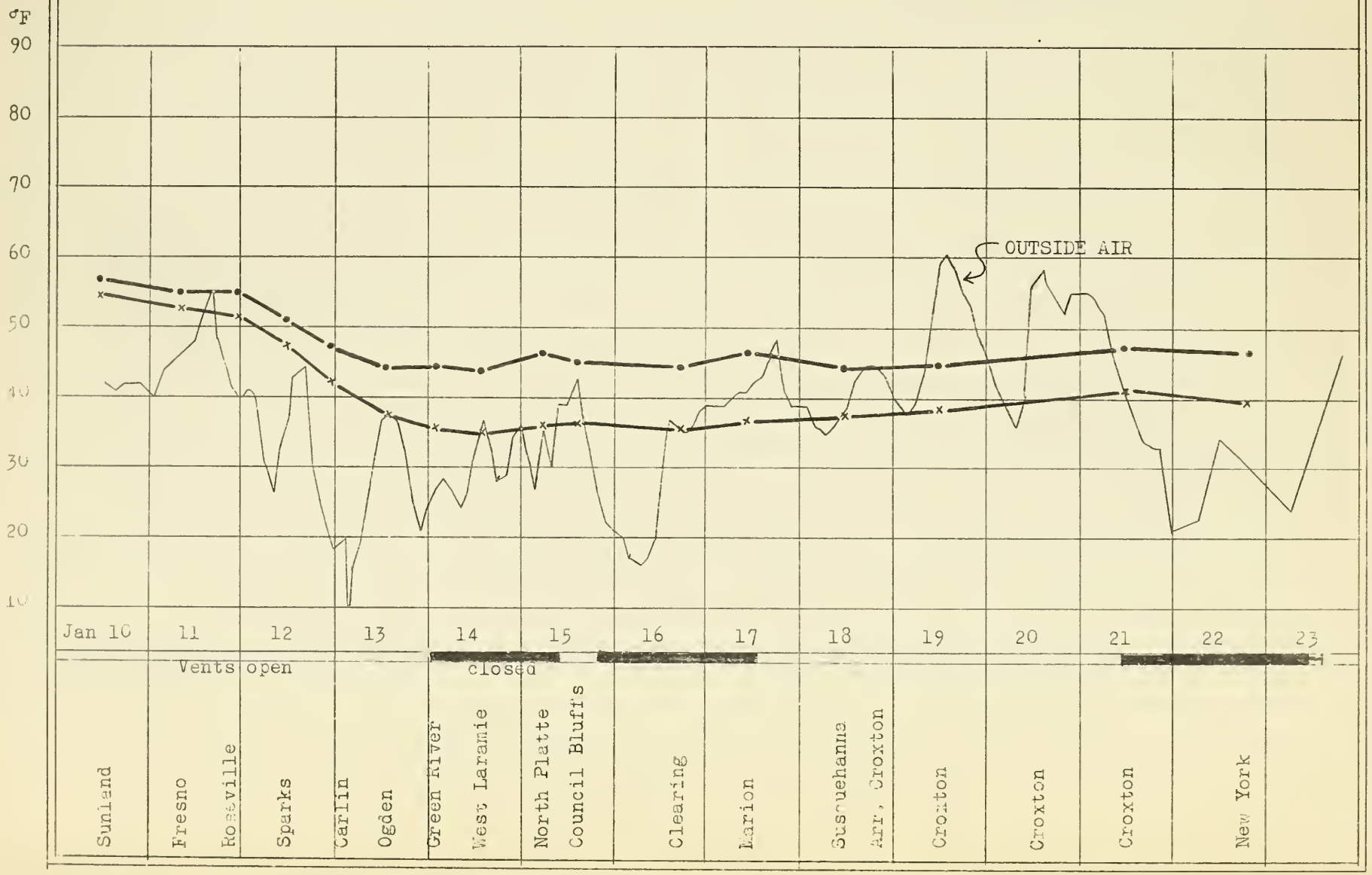


Figure 8

FRUIT TEMPERATURES
Ave. Top
Ave. Bot

CAR H ORANGES (Jan. 1951)
FULL BUNKER
462-BOX LOAD FANS OFF

PREICED, REPLENISHED, DNR.

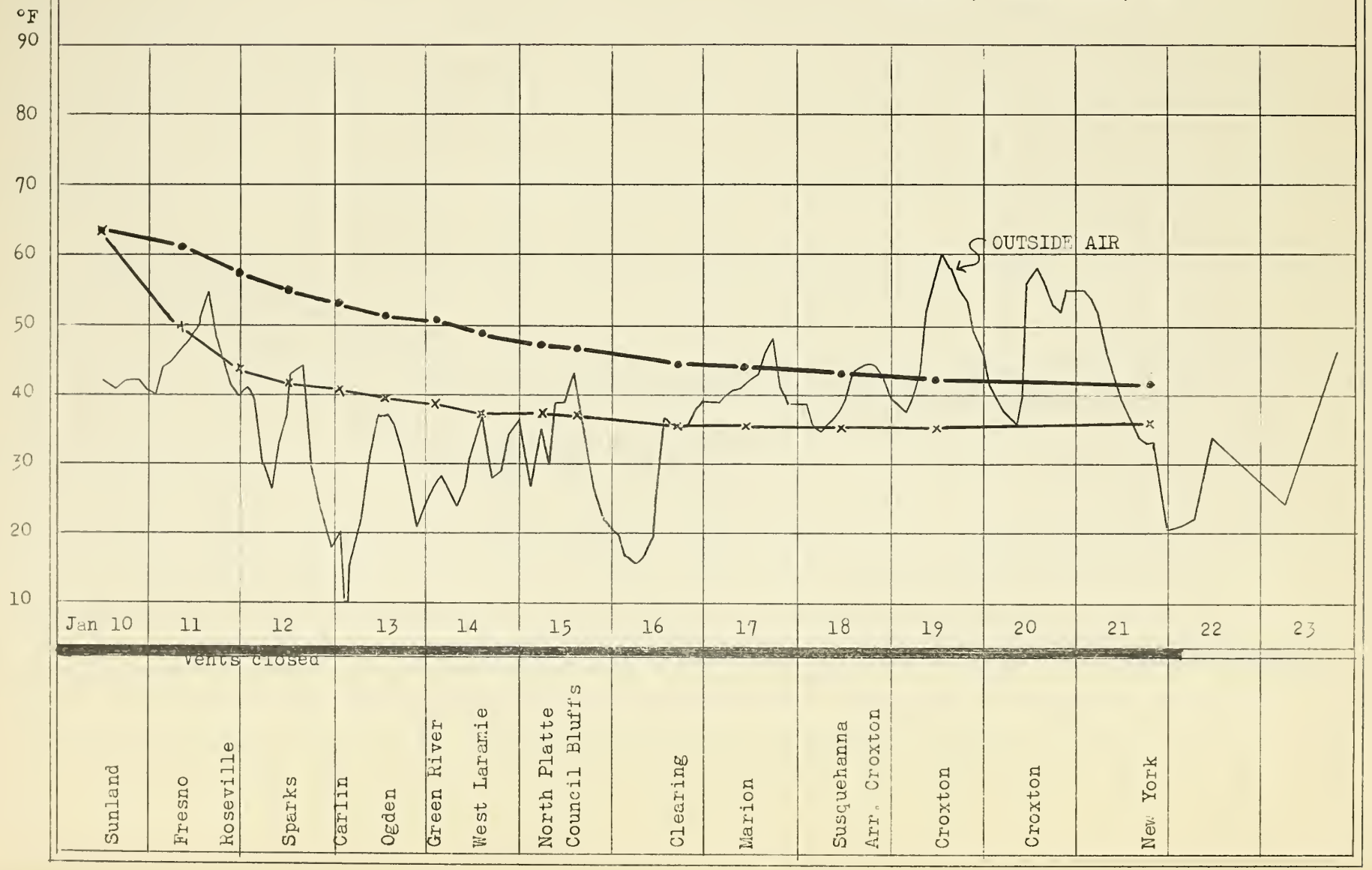
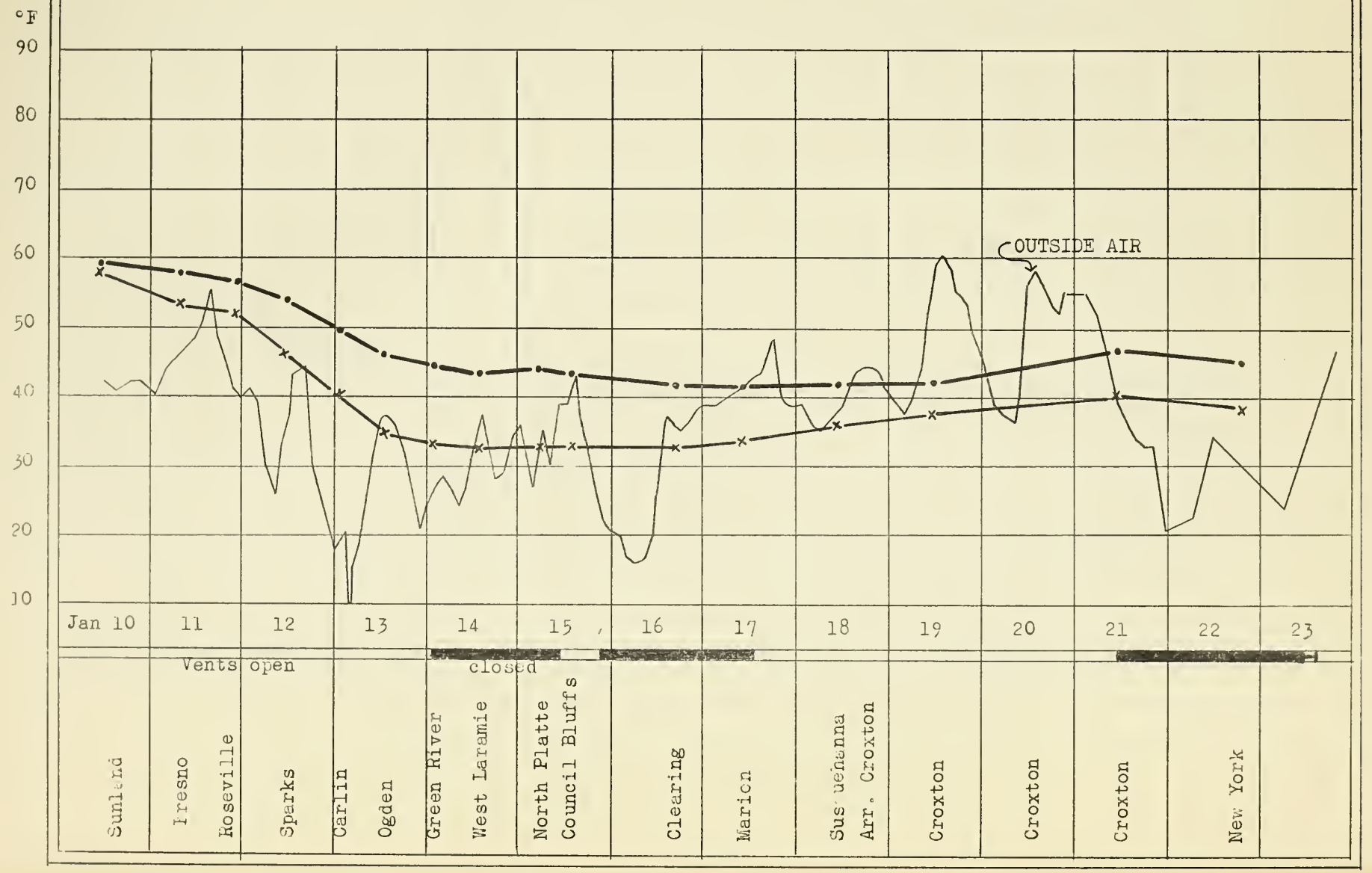


Figure 9

FRUIT TEMPERATURES
Ave. Top
Ave. Bot

Car I ORANGES (Jan. 1951)
COMBINATION VENTILATION
462-BOX LOAD FANS OFF



FRUIT TEMPERATURES

Ave. Top •——•——•
Ave. Bot x——x——x

Figure 10

CAR J ORANGES (Jan. 1951)
HALF STAGE
462-BOX LOAD FANS ON

PREICE, REPLENISH, DNR.

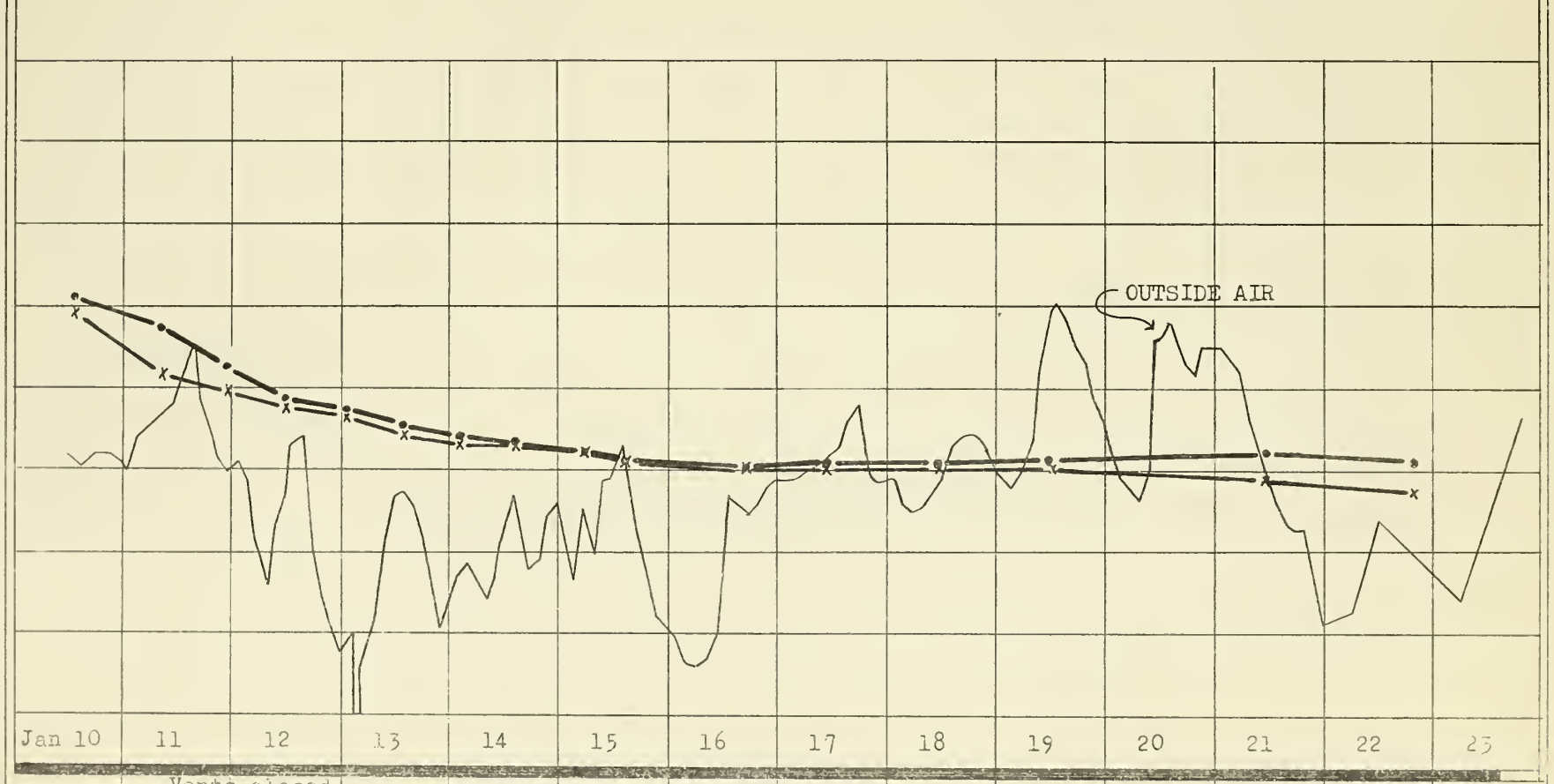


Figure 11

FRUIT TEMPERATURES

Ave. Top

Ave. Bot

CAR K ORANGES (Jan. 1951)
COMBINATION VENTILATION
462-BOX LOAD FANS ON

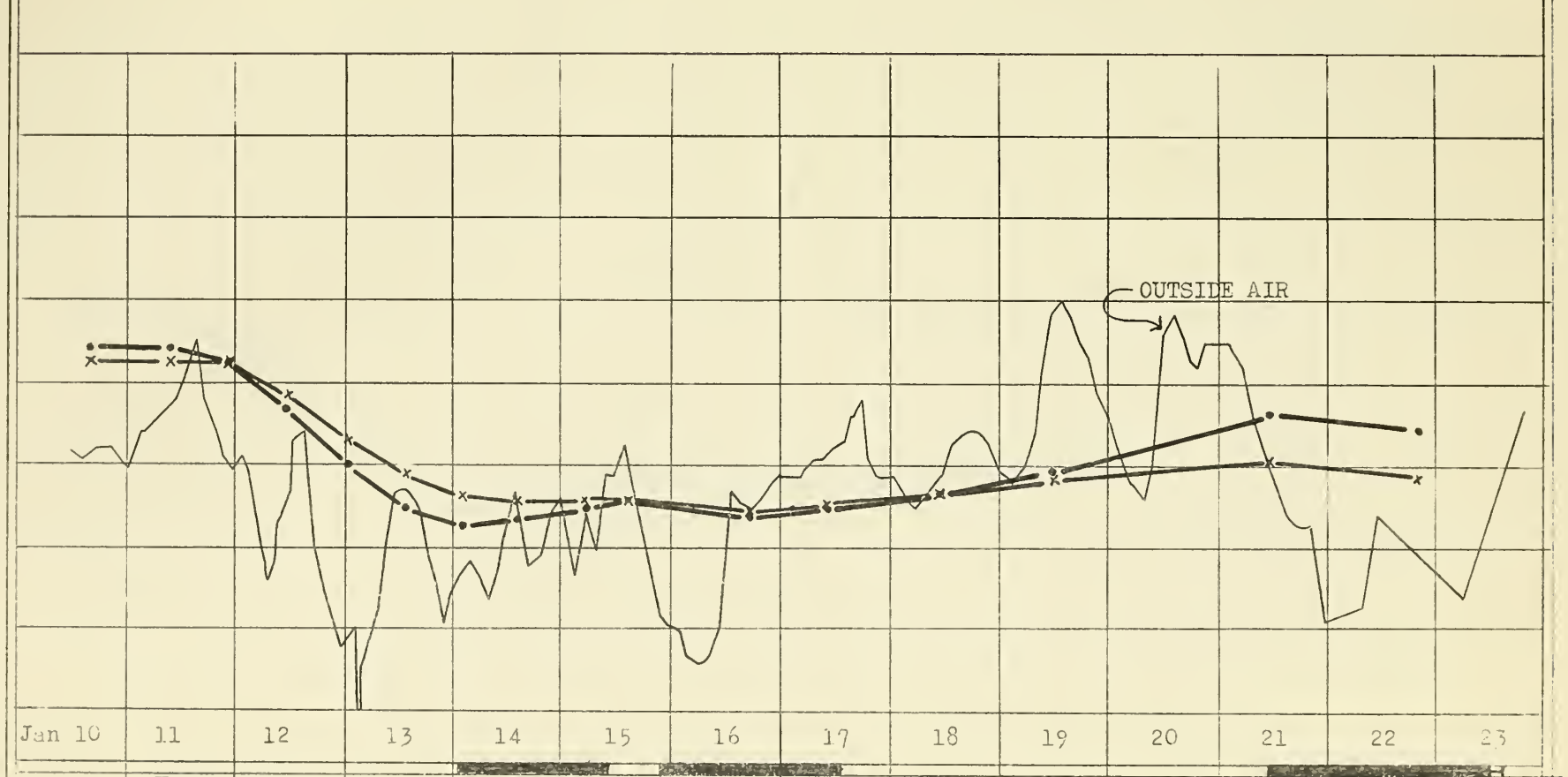


Figure 12

FRUIT TEMPERATURES

Ave. Top ●——●——●

Ave. Bot ×——×——×

CAR L ORANGES (Jan. 1951)
COMBINATION VENTILATION
561-BOX LOAD FANS ON

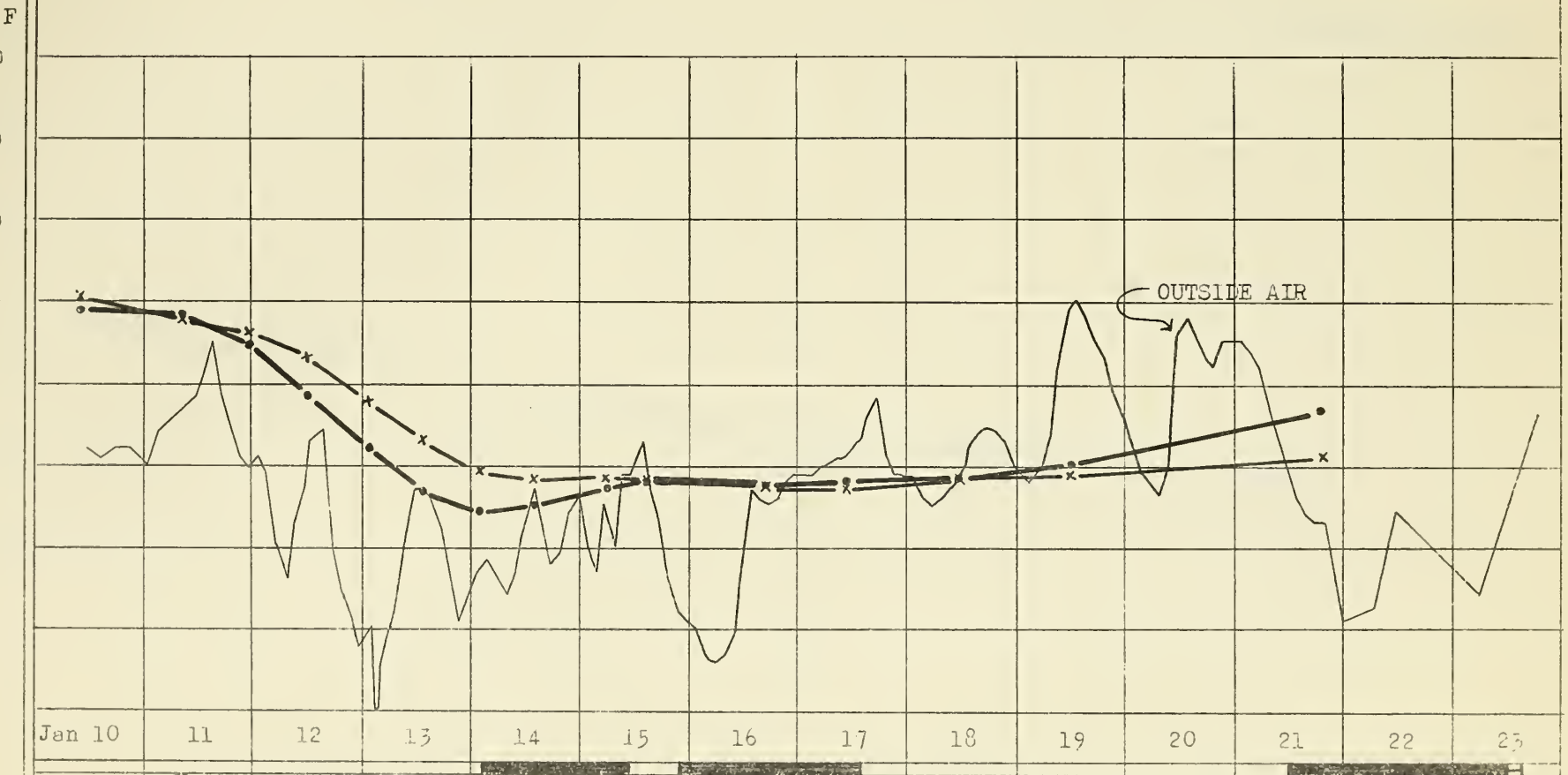
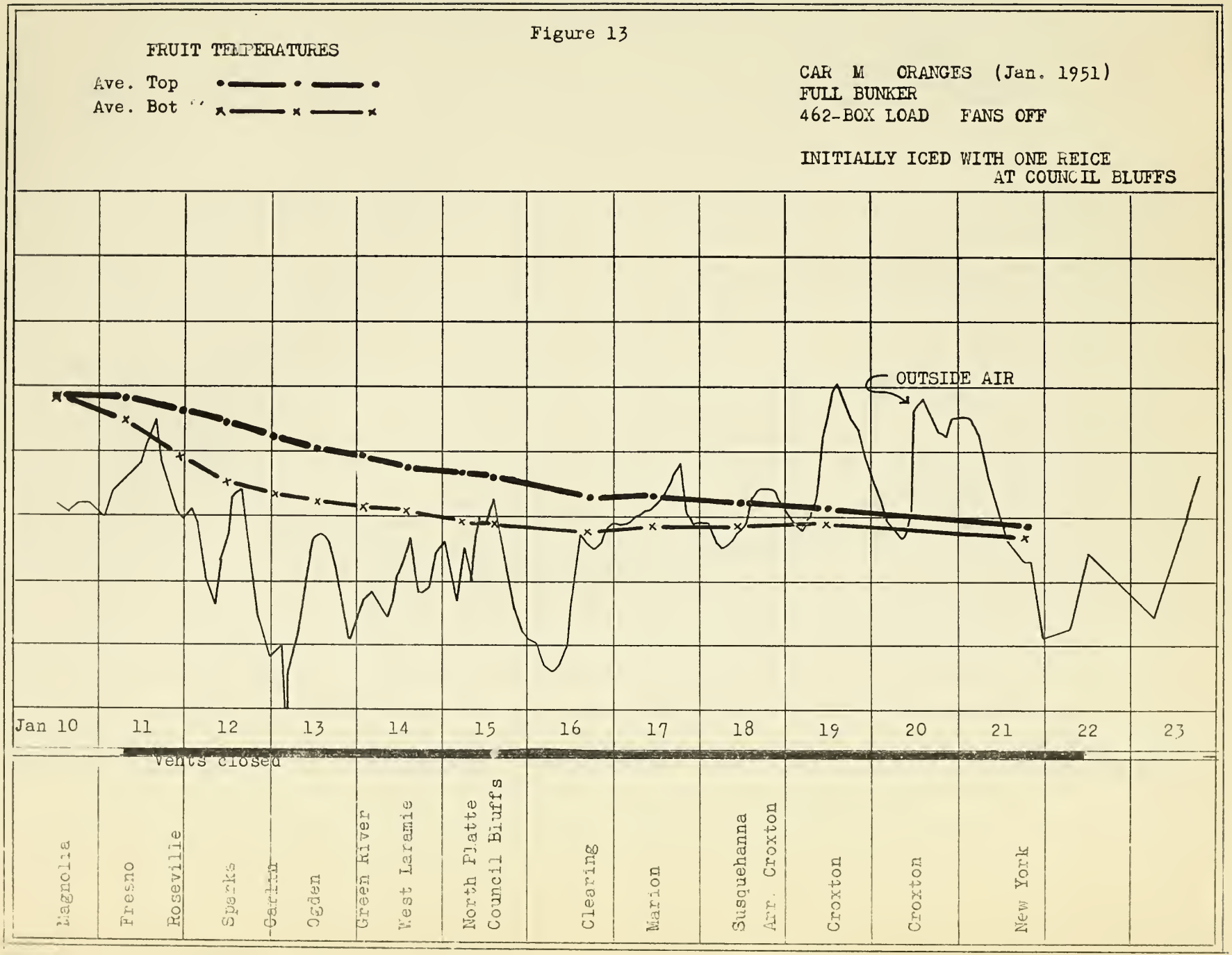
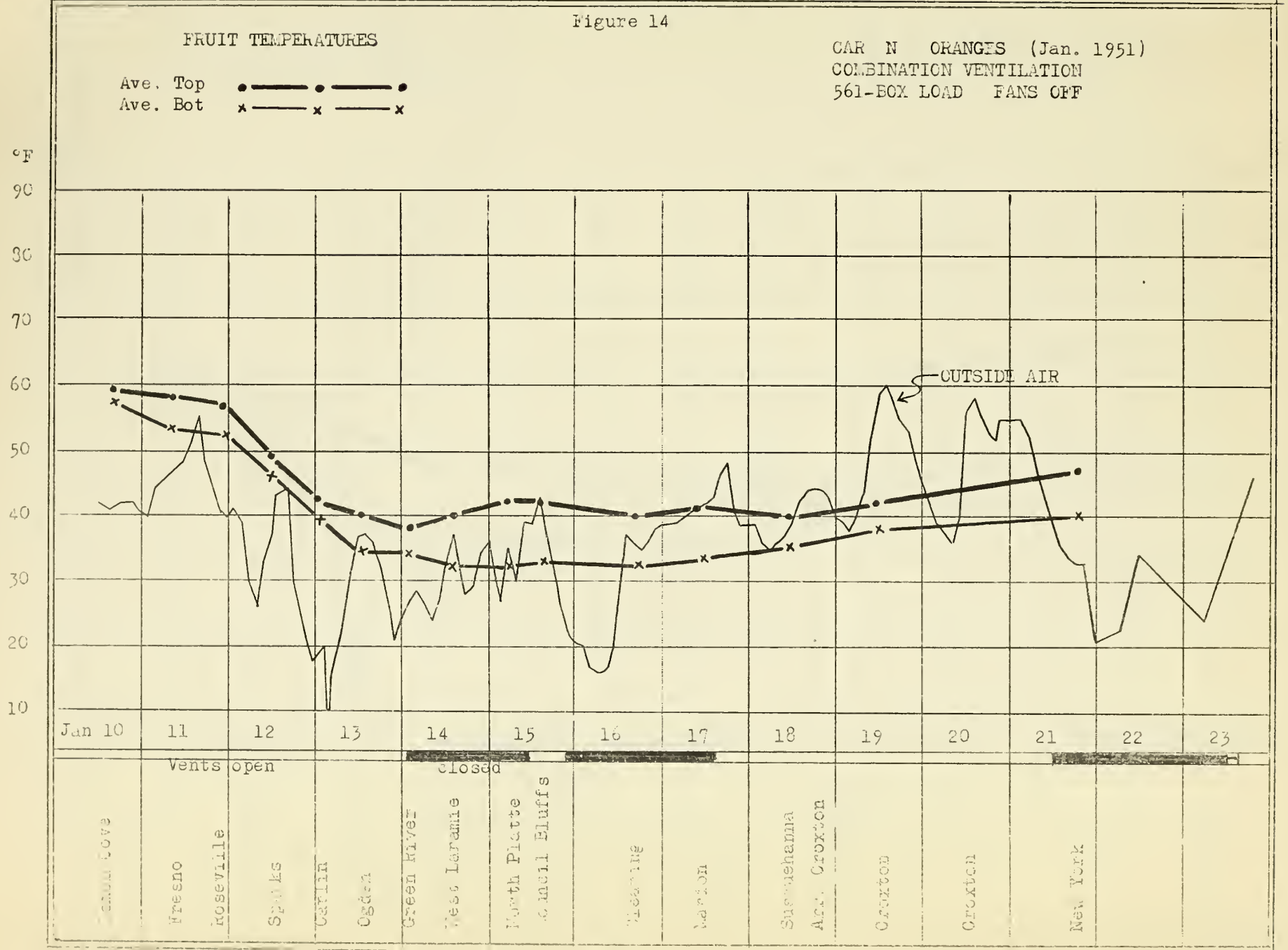


Figure 13


FRUIT TEMPERATURES
Ave. Top
Ave. Bot
CAR M ORANGES (Jan. 1951)
FULL BUNKER
462-BOX LOAD FANS OFF
INITIALLY ICED WITH ONE REICE AT COUNCIL BLUFFS
°F
90
80
70
60
50
40
30
20
10
OUTSIDE AIR
Jan 10
11
12
13
14
15
16
17
18
19
20
21
22
23
Vents closed
Magnolia
Fresno
Roseville
Sparks
Carlin
Ogden
Green River
West Laramie
North Platte
Council Bluffs
Clearing
Marion
Susquehanna
Arr. Croxton
Croxton
Croxton
New York

NOTE: This car traveled with thermometers in rear end from loading point to Roseville

Figure 14



NOTE: This car traveled with thermometers in rear end from loading point to Roseville.

Figure 15

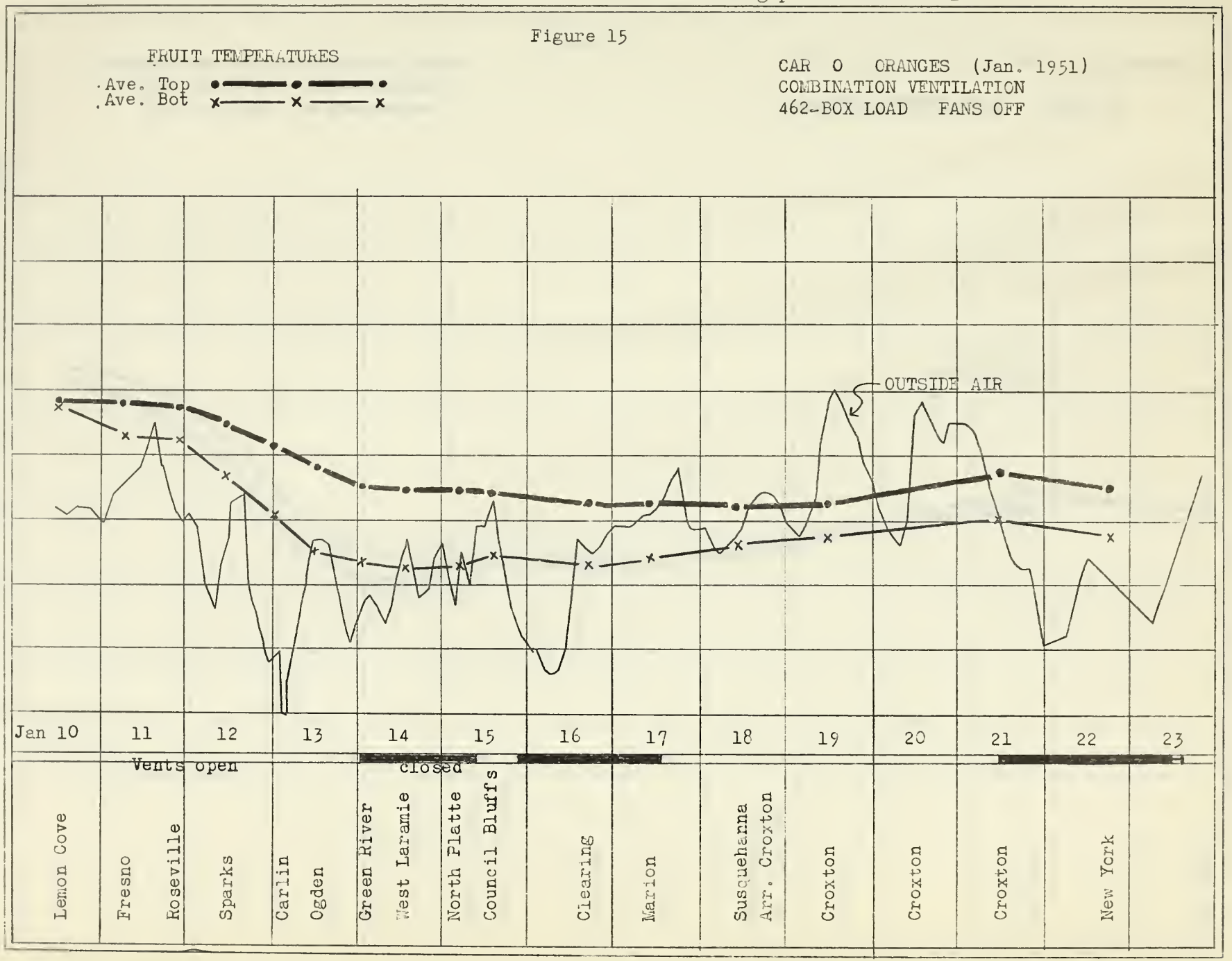
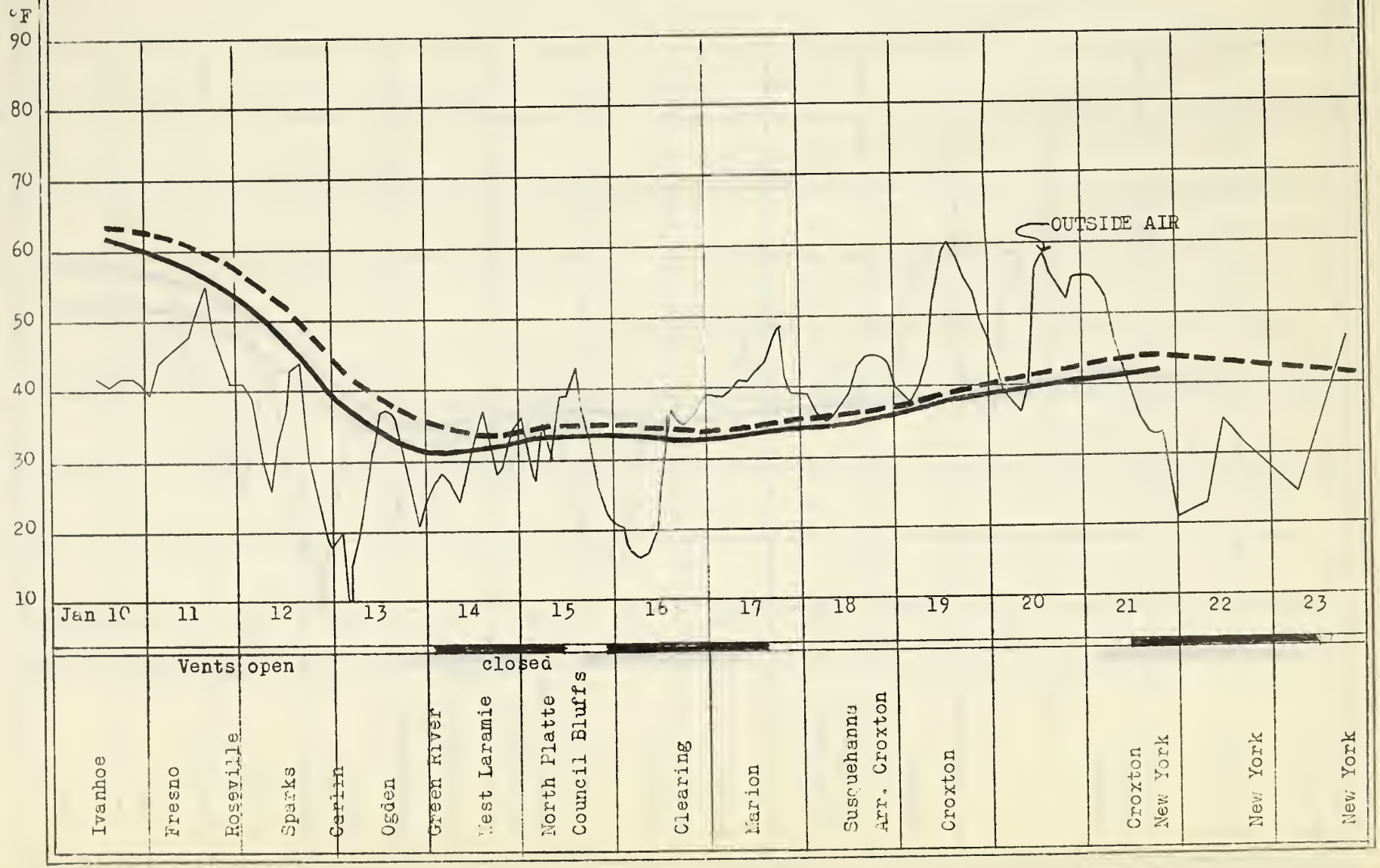


Figure 16

AVERAGE TOP AND BOTTOM FRUIT TEMPS
For 561 Load
For 462 Load

CAR A (561 boxes) & CAR C (462 boxes)

COMBINED VENTILATION FANS ON



AVERAGE TOP AND BOTTOM FRUIT TEMPS
For 561 Load
For 462 Load

Figure 17

CAR L (561 boxes) & CAR K (462 boxes)
COMBINED VENTILATION FANS ON

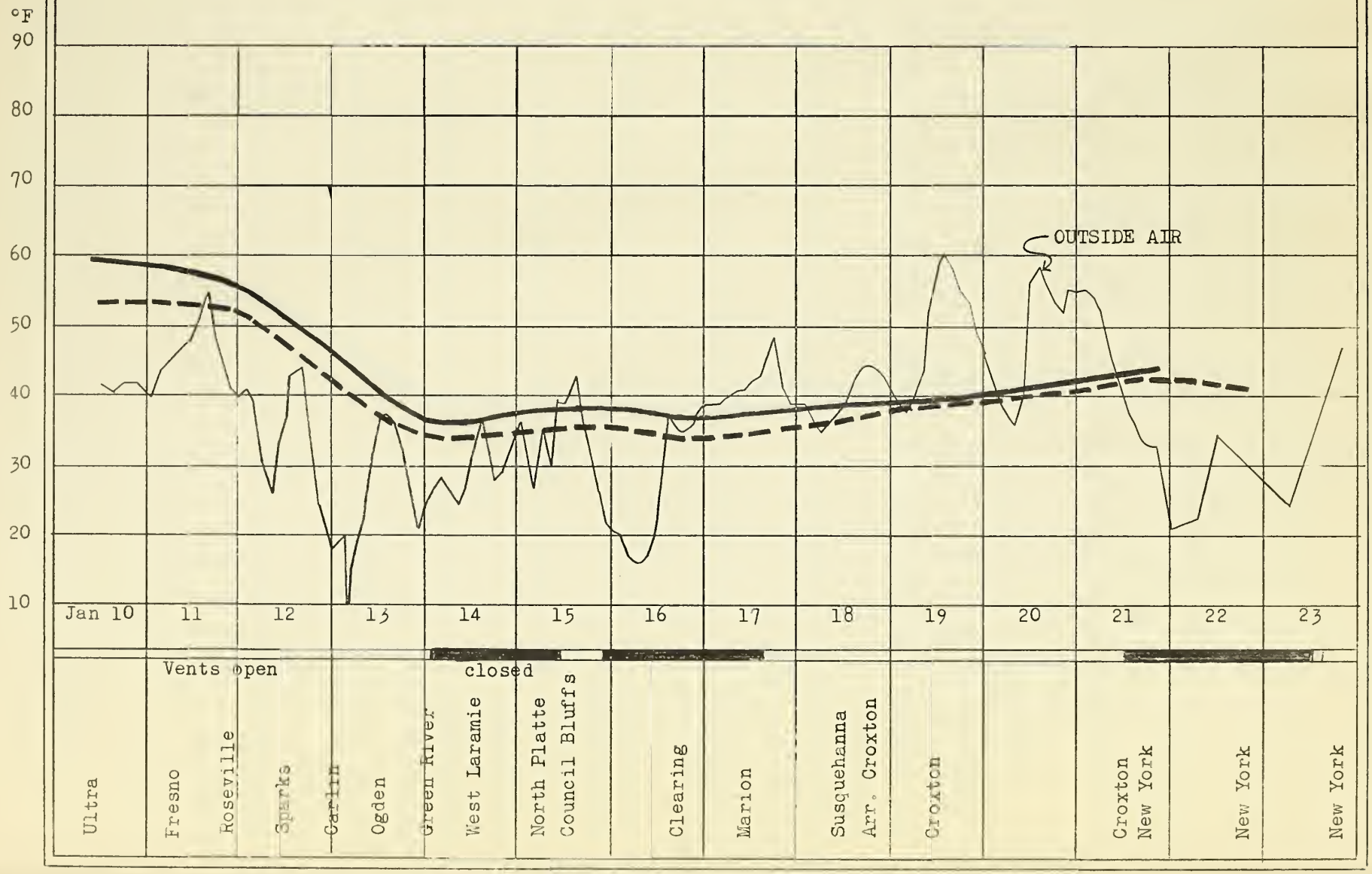


Figure 18

AVERAGE TOP AND BOTTOM FRUIT TEMPS.
For 561 Load
For 462 Load

CAR G (561 boxes) & CAR I (462 boxes)

COMBINATION VENTILATION FANS OFF

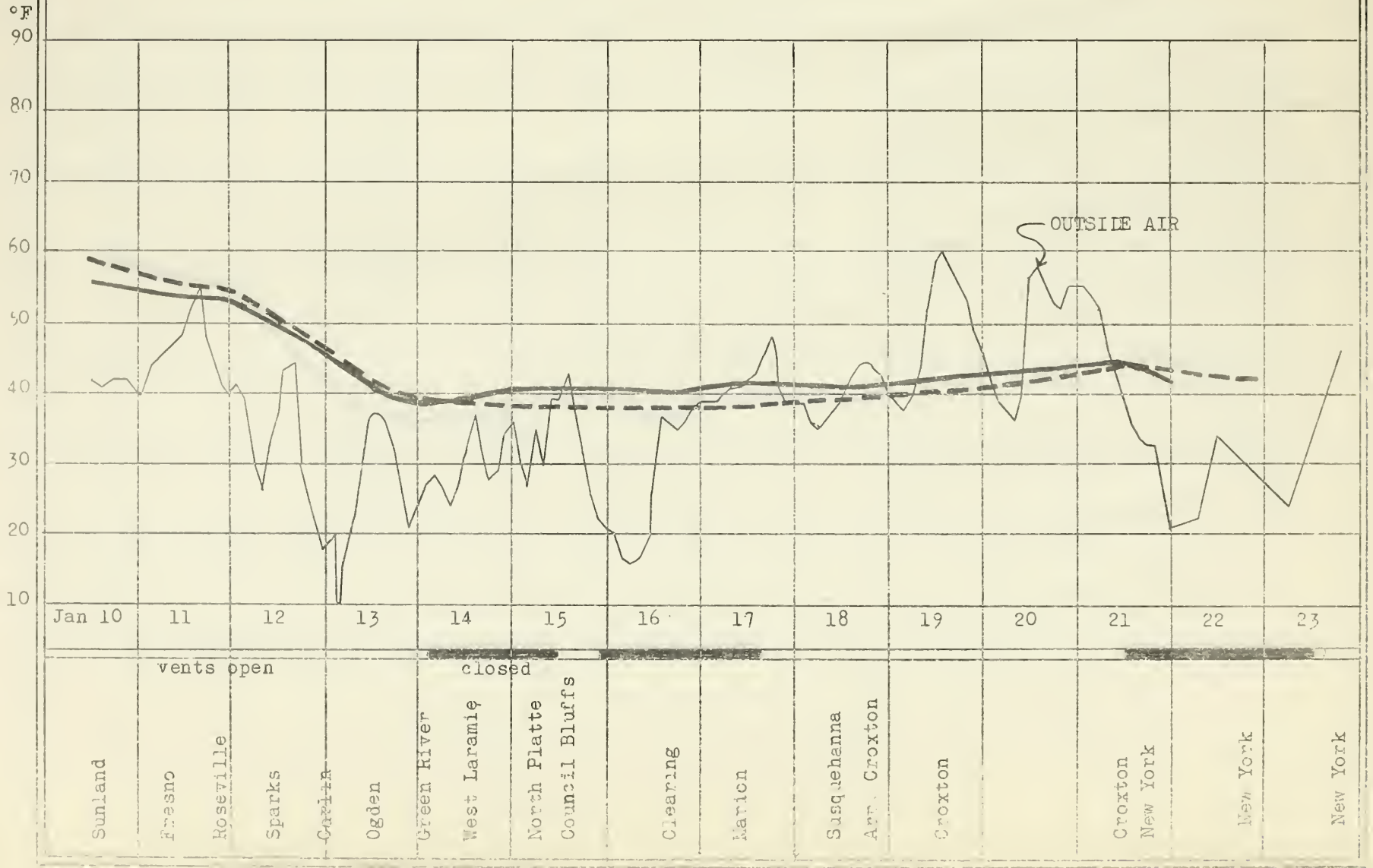


Figure 19

AVERAGE TOP AND BOTTOM FRUIT TEMPS
For 561 Load
For 462 Load

CAR N (561 boxes) & CAR O (462 boxes)

COMBINATION VENTILATION FANS OFF