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The Toxicity of the Vapor of
Aroclor 1242 and of Aroclor 1254

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The Toxicity of the Vapor of
Aroclor 1242 and of Aroclor 1254

(Supplement to Report of June 22, 1955)

Scope

This supplemental report presents the results obtained when separate groups of animals were exposed, respectively, to Aroclor 1242 and Aroclor 1254 in lower concentrations in the atmosphere and for a longer period than were those employed in the experiments described in the report of June 22, 1955. Since these experiments involved a different period of time and a different season of the year, a new group of control animals was included.

Summary of Results

1. In an experiment in which, for 7 hours per day on 150 days over a period of 214 days, animals were exposed to air bearing Aroclor 1242 in the concentration of 1.9 micrograms per liter (0.18 ppm), the incidence of mortality among the various species, with the exception of the rabbits (which died during an epidemic of pulmonary disease), was no greater than that encountered among a similarly constituted control group. The growth of the experimental animals was unaffected.

No gross or microscopic evidence of general or specific injury was found in the tissues of the animals as a response to their prolonged exposure to Aroclor 1242.

2. In another experiment, in which animals were exposed to air bearing Aroclor 1254 in the concentration of 1.5 micrograms per liter (0.11 ppm), for 7 hours per day on 150 days over a period of 213 days, the incidence of mortality was no greater than that observed among corresponding groups of controls. The growth of the experimental groups did not differ significantly from that of the controls. No relevant gross pathological changes were observed in the animals, but microscopic lesions of a mild, nonspecific, toxic type were found in the livers of some of the guinea pigs and mice and in all of the rabbits and rats. Similar changes were also found in the renal tubules of the rats. Although microscopic abnormalities of this type are often found in the tissues of "normal" animals, those observed in certain of the control animals were not as severe as they were found to be in the corresponding species of animals that had been exposed to Aroclor 1254.

The conclusion seems to be warranted, therefore, that prolonged respiratory exposure to Aroclor 1254 is capable of causing some injury to the tissues of susceptible animals, under conditions in which the atmospheric concentration of the material is of the order of 0.11 parts per million.

Exposure to the Vapors

The method of volatilization of either of the Aroclors from a heated glass well was similar to that described in the earlier report (June 22, 1955), except that in these experiments the temperatures of the Aroclors in their respective wells were decreased and the rates of air-flow over the surface of the liquids were increased. In the case of Aroclor 1242, which was heated to 55° to 60°C, the air passed over the liquid at the rate of 600 liters per minute as measured by a venturi-meter attached to an inclined manometer. Aroclor 1254 was maintained between 115° and 125°C while 700 liters of air per minute passed over its surface before entering the chamber.

During a 7-hour period on each of 5 days per week, 3 groups of animals (2 experimental and 1 control) were confined simultaneously in separate 600 liter chambers as described earlier. Each group consisted originally of 1 cat, 6 guinea pigs, 10 mice, 4 rabbits and 10 rats. When an animal in any of these groups died, it was replaced soon thereafter.

The content of Aroclor in the air was determined daily by the turbidimetric method described in the previous report. In these experiments samples were collected by passing air at the rate of 1 liter per minute for 45 minutes through a Willson

combustion furnace and then through 2 midget bubblers in series, each containing 10 ml of 0.1 N sodium hydroxide.

Experimental Results

Aroclor 1242, Experiment No. 3. The pertinent data relating to the fate of the individual animals of this experiment are detailed in Table 1 and summarized in Table 4. One cat, 5 guinea pigs, 6 mice and 9 rats survived following their subjection for 7 hours on each of 150 days (over 214 days) to air bearing the vapor of Aroclor 1242 in the concentration of 1.9 micrograms per liter (0.18 ppm). Seven additional animals, introduced as substitutes for animals that had died during the experimental period, were alive at the conclusion of the final period of exposure; these are listed to show their species and, in parentheses, the number of periods of exposure to which each was subjected is given, as follows: 1 guinea pig (26), 2 mice (45, 135), 3 rabbits (8, 13 and 34), and 1 rat (107).

In the initial group, 10 fatalities occurred as follows: 1 guinea pig after 124 periods of exposure; 4 mice after 14, 14, 102 and 150 periods, respectively; 4 rabbits after 17, 116, 118 and 129 periods, respectively; and 1 rat after 43 periods. In addition, a substituted mouse died after 135 periods of

exposure, and 11 substituted rabbits died, for the most part, during the first 2 weeks after they had been introduced. Ten of the 15 rabbits died within a period of 3 weeks during a severe epidemic of pneumonia.

Except in the case of the rabbits, the incidence of mortality was no greater among the experimental animals than among the controls (Tables 3 and 4). Among the original group of controls 1 cat, 5 guinea pigs, 4 mice, 2 rabbits and 9 rats survived throughout the entire period of their confinement, for 7 hours on each of 150 days over 213 days in a chamber supplied with conditioned air. Three other animals, 1 rabbit and 2 mice, were killed after 34, 109 and 113 periods of confinement, respectively, in a chamber in which air containing no Aroclor was conditioned with respect to dust, humidity and temperature. Other control animals, introduced as substitutes for those that had died or been killed, survived during the indicated numbers of periods of confinement, respectively: 1 guinea pig, 55; 6 mice, 5, 5, 13, 37, 41 and 66; 2 rabbits, 115 and 119; and 1 rat, 115. Seven fatalities occurred among the original group as follows: 1 guinea pig after 94 periods of confinement; 4 mice after 84, 112, 137 and 141 periods, respectively; 1 rabbit after 30 periods, and 1 rat after 29. Two mice used as substitutes died after 4 and 33 periods of confinement, respectively.

In summary, in each of the original (experimental and control) groups, 1 guinea pig, 4 mice and 1 rat died.

No specific signs of intoxication were observed in the members of either the experimental or control groups.

The weights, observed at weekly intervals, of the individual animals (cats, guinea pigs, mice, rabbits and rats) exposed to Aroclor 1242 (Experiment No. 3) are shown in Figures 1 to 3, 5 to 7 and 9 to 14. The average weight of the original groups and the greatest and least weights attained by individuals within these groups of guinea pigs, mice and rats that survived are plotted in Figures 4, 6 and 14, respectively. Comparable data for the controls are to be found in Figures 30 to 44. The average changes in weight of the various survivors of the original groups (experimental and control) are shown in Table 5. The application of the widely used "t" test indicates that the growth of the animals exposed to Aroclor 1242 did not differ significantly from that of the control group.

All of the animals were examined post-mortem, and the viscera of most of them were examined microscopically. Among the exposed group, 1 guinea pig, 5 mice and 15 rabbits that died, and 1 rat that was killed when moribund, were victims of incidental infectious disease. The cat, guinea pigs, mice and rats that survived had normal viscera. The 3 rabbits used as

replacements survived. Two of them were found to have hepatic lesions of coccidiosis and the other had no gross microscopic abnormalities.

The control animals that died were found to have pneumonia. Of those that survived, 1 rat, 2 guinea pigs and 1 mouse had focal or diffuse cytoplasmic vacuolation of the hepatic cells, the etiology of which was not apparent. The remaining animals that survived had essentially normal viscera.

Aroclor 1254, Experiment No. 2. The pertinent data relating to the changes in weight and fate of the individual animals subjected to prolonged intermittent exposure to the vapor of Aroclor 1254 are shown in Table 2 and summarized in Table 4. One cat, 4 guinea pigs, 6 mice, 4 rabbits and 9 rats from the original group survived following their exposure for 7 hours on each of 150 days over a period of 213 days to air containing Aroclor 1254 in the concentration of 1.5 micrograms per liter (0.11 ppm). One guinea pig and 1 rat from the original group were killed after 30 and 149 periods of exposure, respectively. Seven animals introduced into the group later survived. They are listed by species and periods of exposure, in parentheses, as follows: 2 guinea pigs (49 and 120); 4 mice (49, 66, 115 and 135); 1 rat (139). Among the original group only 4 mice and 1 guinea pig died after 12 to 101 periods of exposure, and

a mouse, which was a replacement, died after 18 periods of exposure, the incidence of fatalities among them being slightly less than that encountered among the controls.

No general or specific signs of intoxication were noted among the experimental animals during or after their exposure.

The weights, at weekly intervals, of the individual animals (i.e., cat, guinea pigs, mice, rabbits and rats) exposed to Arcelor 1254 are presented in Figures 15 to 17, 19 to 21, 23 and 24, and 26 to 28. The average weight of the original groups, and the greatest and least weights attained by individuals within these groups of guinea pigs, mice, rabbits and rats that survived are presented graphically in Figures 18, 22, 25 and 29, respectively. The rates of growth of the experimental groups did not differ significantly from those of the control group (Table 5).

All of the animals were examined post-mortem, and the viscera of most of them were examined microscopically. The guinea pig that died exhibited chronic pyelonephritis, pulmonary hyperemia and edema, and degenerative lesions in the brain and liver. The visceral lesions were related, no doubt, to the renal infection. The deaths of the 4 mice were attributable to acute bronchitis and pneumonia. The viscera of the cat that survived were normal. Of 7 guinea pigs that were living when the experiment was terminated, 3 had normal viscera and four had slight

alterations of hepatic cells characterized by cytoplasmic vacuolation. Ten mice survived and of these 6 had normal viscera and 4 had slight degenerative changes in the liver. Four rabbits killed 1 to 15 days after the last period of exposure had diffuse hepatic degeneration. The character of the lesions varied from cloudy, hyaline or hydropic degeneration and included varying degrees of fatty metamorphosis. The other viscera of these animals were normal. All of the rats were examined and found to have degenerative lesions of the liver of slight to moderate degree. The lesions of greatest severity were found in the rat that was killed and examined on the first day after the last period of exposure. Two rats had chronic pyelonephritis, and the remainder had slight degeneration of the renal tubules.

Discussion

The preceding report (dated June 22, 1955) indicated that no harm resulted to animals that inhaled Aroclor 1242, intermittently, over periods not exceeding 4 months when the concentration in the atmosphere approached that of saturation. The present report demonstrates, in terms of rates of growth, incidence of mortality and non-occurrence of pathologic changes,

that no injurious effects resulted from more prolonged, intermittent exposure (more than 6 months) to the concentration of 0.16 ppm in the atmosphere (1.9 micrograms per liter). This concentration is nearly twice that (1 microgram per liter) recommended by the American Conference of Governmental Hygienists (Arch. Ind. Hyg. Occup. Med., 2:530, 1954) for a chlorinated diphenyl of unstated chlorine content.

The exposure of animals to Aroclor 1254 failed to induce harmful effects in the form of retardation of growth, or of mortality, but histopathologic evidence of apparently reversible hepatic cellular injury was found in the animals. These findings cannot certainly be attributed to the effects of Aroclor 1254 because of the appreciable incidence of pneumonia among both experimental and control animals. When these nonspecific toxic changes in the viscera of the animals were associated with pneumonia, they were readily explained thereby, but they were also found in animals that had been exposed to the vapor of Aroclor 1254 and were free of pneumonia. That these may have represented toxic effects of exposure to Aroclor 1254 finds support in the fact that the livers of the exposed rats (report of June 22, 1955) were significantly heavier in relation to their body weight, than were those of control rats. It would appear that this material, which is reported to contain 54

per cent of chlorine, is somewhat more toxic than is Aroclor 1242, which contains only 42 per cent of chlorine. G.K. Drinker proposed (J. Ind. Hyg. Toxicol., 21:155, 1939) as a threshold concentration for a sample of a chlorinated diphenyl that contained 50 to 55 per cent of chlorine, the value of 0.5 microgram per liter, which is about one-third of the concentration of Aroclor 1254 to which the animals were exposed in this experiment.

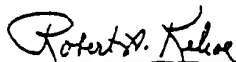
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Table 1

The Mortality, Length of Survival, and Changes in Weight of
Animals Exposed to the Vapor of Aroclor 1242 in Air

(Experiment No. 3)

Concentration 7/1 ppm		Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Sur- vival After Last Period of Exposure Unless Otherwise Stated
					During Period of Exposure	After Period of Exposure		
1.9	0.16	150 x 7.0	Cat A-499	1.730	+ 115.0	- 2.6	Survived	Killed 8 days
		150 x 7.0	Guinea Pig B-599	434	+ 22.8	-	Survived	Killed 1 day
		124 x 7.0	Guinea Pig B-600	476	+ 34.2	-	Died	1 day
		150 x 7.0	Guinea Pig B-601	462	+ 36.8	+ 0.8	Survived	Killed 8 days
		150 x 7.0	Guinea Pig B-602	583	+ 66.0	- 7.0	Survived	Killed 8 days
		150 x 7.0	Guinea Pig B-603	570	+ 36.7	+ 3.8	Survived	Killed 15 days
		150 x 7.0	Guinea Pig B-604	520	+ 53.1	+ 2.7	Survived	Killed 15 days
		26 x 7.0	Guinea Pig B-628	562	+ 1.1	+ 4.1	Survived	Killed 8 days
		150 x 7.0	Mouse B-567	22	+ 4.5	-	Survived	Killed 1 day
		150 x 7.0	Mouse B-568	24	+ 16.7	- 4.2	Survived	Killed 8 days
		14 x 7.0	Mouse B-569	27	- 11.1	-	Died	1 day
		102 x 7.0	Mouse B-570	25	-	-	Died	1 day
		150 x 7.0	Mouse B-571	24	+ 25.0	-	Survived	Killed 8 days
		150 x 7.0	Mouse B-572	21	+ 52.4	- 9.5	Survived	Killed 8 days
		150 x 7.0	Mouse B-573	28	+ 17.8	- 28.6	Survived	Killed 8 days
		150 x 7.0	Mouse B-574	24	+ 12.5	+ 4.17	Survived	Killed 8 days
		150 x 7.0	Mouse B-575	23	- 13.0	- 8.7	Died	12 days
		14 x 7.0	Mouse B-576	25	- 52.0	-	Died	1 day

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Table 1 (Page 2)

Concentration		Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Survival After Last Period of Exposure Unless Otherwise Stated
γ/l	ppm				During Period of Exposure	After Period of Exposure		
1.9	0.18	135 x 7.0	Mouse B-600	23	+ 21.7	+ 4.35	Survived	Killed 15 days
		135 x 7.0	Mouse B-601	23	- 4.35	- 21.7	Died	13 days
		45 x 7.0	Mouse B-921	27	+ 22.2	-	Survived	Killed 15 days
		129 x 7.0	Rabbit H-1061	3058	+ 18.8	-	Died	1 day
		118 x 7.0	Rabbit H-1062	2688	+ 19.3	-	Died	1 day
		17 x 7.0	Rabbit H-1063	2150	- 11.6	-	Died	1 day
		116 x 7.0	Rabbit H-1064	3022	+ 48.7	- 5.7	Died	3 days
		31 x 7.0	Rabbit J-84	2885	+ 1.0	-	Died	1 day
		79 x 7.0	Rabbit J-324	2431	+ 38.5	-	Died	1 day
		34 x 7.0	Rabbit J-760	2833	+ 10.8	-	Survived	Killed 1 day
		12 x 7.0	Rabbit J-784	2566	- 7.9	-	Died	1 day
		4 x 7.0	Rabbit J-822	3729	- 3.3	-	Died	2 hours
		3 x 7.0	Rabbit J-823	3980	- 6.0	-	Died	During 3rd run
		7 x 7.0	Rabbit J-828	2887	- 11.9	-	Died	0.5 day
		5 x 7.0	Rabbit J-861	3415	- 17.2	-	Died	During 5th run
		7 x 7.0	Rabbit J-862	3343	+ 2.9	- 2.6	Died	2 days
		13 x 7.0	Rabbit J-863	3425	+ 0.6	+ 5.4	Survived	Killed 8 days
		2 x 7.0	Rabbit J-864	3851	- 5.9	- 4.9	Died	2 days
		2 x 7.0	Rabbit J-885	2650	- 14.3	-	Died	0.5 day
		8 x 7.0	Rabbit J-886	2390	+ 6.2	+ 14.1	Survived	Killed 15 days
		6 x 7.0	Rabbit J-887	3592	- 18.7	- 4.7	Died	3 days
		150 x 7.0	Rat L-992	240	+ 28.8	-	Survived	Killed 1 day
		150 x 7.0	Rat L-993	197	+ 33.0	-	Survived	Killed 8 days

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Table 1 (Page 3)

Concentration <u>mg/l</u> <u>ppm</u>		Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Sur- vival After Last Period of Exposure Unless Otherwise Stated
					During Period of Exposure	After Period of Exposure		
1.9	0.18	150 x 7.0	Rat L-994	215	+ 42.8	+ 4.2	Survived	Killed 8 days
		150 x 7.0	Rat L-995	232	+ 25.0	+ 3.0	Survived	Killed 8 days
		150 x 7.0	Rat L-996	213	+ 26.8	- 1.9	Survived	Killed 8 days
		150 x 7.0	Rat L-997	196	+ 34.2	- 0.5	Survived	Killed 8 days
		150 x 7.0	Rat L-998	225	+ 58.2	+ 4.0	Survived	Killed 15 days
		150 x 7.0	Rat L-999	189	+ 69.3	- 0.5	Survived	Killed 15 days
		150 x 7.0	Rat L-1000	216	+ 41.2	- 0.46	Survived	Killed 15 days
		43 x 7.0	Rat M-1	202	- 2.5	-	Killed	Moribund, 1 day
		107 x 7.0	Rat M-445	174	+ 29.9	+ 1.7	Survived	Killed 15 days

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Table 2

The Mortality, Length of Survival, and Changes in Weight of
Animals Exposed to the Vapor of Arcolor 1254 in Air

(Experiment No. 2)

Concentration ✓/1 ppm		Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Sur- vival After Last Period of Exposure Unless Otherwise Stated
					During Period of Exposure	After Period of Exposure		
1.5	0.11	150 x 7.0	Cat A-500	2658	+ 15.2	- 2.9	Survived	Killed 8 days
		30 x 7.0	Guinea Pig B-605	478	+ 7.9	-	Survived	Killed 1 day
		150 x 7.0	Guinea Pig B-606	515	+ 21.0	+ 2.1	Survived	Killed 8 days
		101 x 7.0	Guinea Pig B-607	544	+ 34.9	-	Died	2 hours
		150 x 7.0	Guinea Pig B-608	483	+ 67.1	+ 7.7	Survived	Killed 8 days
		150 x 7.0	Guinea Pig B-609	475	+ 26.3	+ 6.7	Survived	Killed 15 days
		150 x 7.0	Guinea Pig B-610	476	+ 15.5	+ 6.9	Survived	Killed 15 days
		120 x 7.0	Guinea Pig B-672	541	+ 23.8	-	Survived	Killed 1 day
		49 x 7.0	Guinea Pig B-799	550	+ 8.2	- 0.9	Survived	Killed 8 days
		150 x 7.0	Mouse B-577	25	- 12.0	-	Survived	Killed 1 day
		150 x 7.0	Mouse B-578	21	+ 28.6	- 4.8	Survived	Killed 9 days
		150 x 7.0	Mouse B-579	25	+ 24.0	+ 4.0	Survived	Killed 9 days
		150 x 7.0	Mouse B-580	22	+ 31.8	-	Survived	Killed 9 days
		101 x 7.0	Mouse B-581	30	- 20.0	-	Died	2 hours
		150 x 7.0	Mouse B-582	30	+ 3.3	-	Survived	Killed 9 days
		14 x 7.0	Mouse B-583	25	+ 4.0	-	Died	0.5 day
		12 x 7.0	Mouse B-584	29	- 13.8	-	Died	0.5 day
		150 x 7.0	Mouse B-585	23	+ 26.0	- 4.3	Survived	Killed 8 days

Table 2 (Page 2)

Concentration		Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Survival After Last Period of Exposure Unless Otherwise Stated
7/1	ppm				During Period of Exposure	After Period of Exposure		
1.5	0.11	83 x 7.0	Mouse B-586	28			Died	1 day
		135 x 7.0	Mouse B-602	22	+ 36.4	+ 4.5	Survived	Killed 15 days
		18 x 7.0	Mouse B-603	23	+ 26.1	- 21.7	Died	1 day
		115 x 7.0	Mouse B-673	22	+ 22.7	- 4.5	Survived	Killed 15 days
		66 x 7.0	Mouse B-863	18	+ 72.2	- 16.7	Survived	Killed 15 days
		49 x 7.0	Mouse B-919	19	+ 15.8	+ 10.5	Survived	Killed 15 days
		150 x 7.0	Rabbit H-1065	2740	+ 40.1	-	Survived	Killed 1 day
		150 x 7.0	Rabbit H-1066	3457	+ 53.5	+ 5.1	Survived	Killed 8 days
		150 x 7.0	Rabbit H-1067	3000	+ 43.0	+ 1.5	Survived	Killed 8 days
		150 x 7.0	Rabbit H-1068	2633	+ 41.1	+ 3.8	Survived	Killed 15 days
		150 x 7.0	Rat M-2	247	+ 22.7	-	Survived	Killed 1 day
		150 x 7.0	Rat M-3	214	+ 32.7	- 2.3	Survived	Killed 8 days
		150 x 7.0	Rat M-4	228	+ 37.3	+ 1.7	Survived	Killed 8 days
		150 x 7.0	Rat M-5	202	+ 33.2	- 5.0	Survived	Killed 8 days
		150 x 7.0	Rat M-6	208	+ 10.6	- 9.6	Survived	Killed 8 days

Table 2 (Page 3)

Concentration V/I ppm		Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Sur- vival After Last Period of Exposure Unless Otherwise Stated
					During Period of Exposure	After Period of Exposure		
1.5	0.11	150 x 7.0	Rat M-7	206	+ 15.5	+ 11.2	Survived	Killed 8 days
		149 x 7.0	Rat M-8	226	+ 49.6	- 7.5	Survived	Killed 15 days
		150 x 7.0	Rat M-9	222	+ 37.8	+ 1.8	Survived	Killed 15 days
		150 x 7.0	Rat M-10	225	+ 29.8	- 0.9	Survived	Killed 15 days
		150 x 7.0	Rat M-11	243	+ 18.1	- 0.4	Survived	Killed 15 days
		139 x 7.0(1)	Rat M-140	226	+ 11.9	- 1.3	Survived	Killed 15 days

(1) An eleventh rat was added to this group after the 11th period of exposure.

Table 3

The Mortality, Length of Survival, and Changes in Weight
of Animals Exposed to Conditioned Air

(Experiment No. 2)

Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Survival After Last Period of Exposure Unless Otherwise Stated
			During Period of Exposure	After Period of Exposure		
150 x 7.0	Oat A-510	3329	- 7.8	- 2.1	Survived	Killed 8 days
94 x 7.0	Guinea Pig B-611	434	- 34.3	- 3.0	Died	1 day
150 x 7.0	Guinea Pig B-612	516	+ 78.7	+ 4.3	Survived	Killed 9 days
150 x 7.0	Guinea Pig B-613	542	+ 24.4	-	Survived	Killed 1 day
150 x 7.0	Guinea Pig B-614	477	+ 52.2	+ 5.5	Survived	Killed 9 days
150 x 7.0	Guinea Pig B-615	453	+ 42.4	+ 1.3	Survived	Killed 15 days
150 x 7.0	Guinea Pig B-616	514	+ 75.7	+ 1.2	Survived	Killed 15 days
55 x 7.0	Guinea Pig B-798	640	- 8.9	+ 0.2	Survived	Killed 9 days
141 x 7.0	Mouse B-587	30	- 46.7	-	Died	1 day
150 x 7.0	Mouse B-588	27	+ 11.1	-	Survived	Killed 1 day
150 x 7.0	Mouse B-589	26	+ 30.8	- 3.8	Survived	Killed 9 days
84 x 7.0	Mouse B-590	27	-	-	Died	1 day
113 x 7.0	Mouse B-591	25	+ 4.0	- 14.0	Survived	Killed acci- dentally, 4 days
137 x 7.0	Mouse B-592	27	- 7.4	- 11.1	Died	3 days
112 x 7.0	Mouse B-593	24	- 37.5	-	Died	5 hours

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Table 3 (Page 2)

Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Survival After Last Period of Exposure Unless Otherwise Stated
			During Period of Exposure	After Period of Exposure		
109 x 7.0	Mouse B-594	24	- 16.6	-	Survived	Killed accidentally, 1 hour
150 x 7.0	Mouse B-595	25	+ 20.0	- 4.0	Survived	Killed 9 days
150 x 7.0	Mouse B-596	27	+ 29.6	+ 3.7	Survived	Killed 9 days
66 x 7.0	Mouse B-864	20	+ 35.0	-	Survived	Killed 9 days
41 x 7.0	Mouse B-933	21	+ 14.3	- 4.8	Survived	Killed 9 days
33 x 7.0	Mouse B-935	22	-	-	Died	1 day
37 x 7.0	Mouse B-936	19	+ 21.05	+ 5.3	Survived	Killed 15 days
13 x 7.0	Mouse B-967	24	4.2	-	Survived	Killed 15 days
4 x 7.0	Mouse B-968	22	-	-	Died	0.5 day
5 x 7.0	Mouse B-969	22	+ 9.1	+ 13.6	Survived	Killed 15 days
5 x 7.0	Mouse B-970	22	+ 4.5	-	Survived	Killed 15 days
150 x 7.0	Rabbit H-1069	2728	+ 31.0	-	Survived	Killed 1 day
150 x 7.0	Rabbit H-1070	2907	+ 27.1	+ 2.7	Survived	Killed 8 days
30 x 7.0	Rabbit H-1071	3132	+ 16.5	- 2.6	Died	2 days
34 x 7.0	Rabbit H-1072	2800	+ 8.2	-	Survived	Killed 1 day
119 x 7.0	Rabbit J-183	2661	+ 66.5	+ 7.9	Survived	Killed 8 days
115 x 7.0	Rabbit J-202	2193	+ 84.2	+ 9.3	Survived	Killed 15 days

Table 3 (Page 3)

Duration of Exposure (hours)	Identification Number	Initial Weight (kg)	Change in Weight Expressed as Percentage of Initial Weight		Fate	Length of Survival After Last Period of Exposure Unless Otherwise Stated
			During Period of Exposure	After Period of Exposure		
150 x 7.0	Rat M-12	219	+ 32.4	-	Survived	Killed 1 day
150 x 7.0	Rat M-13	206	+ 44.2	+ 1.4	Survived	Killed 8 days
150 x 7.0	Rat M-14	207	+ 40.1	+ 2.9	Survived	Killed 8 days
150 x 7.0	Rat M-15	263	+ 30.0	+ 1.5	Survived	Killed 8 days
150 x 7.0	Rat M-16	208	+ 30.3	+ 2.9	Survived	Killed 8 days
150 x 7.0	Rat M-17	213	+ 34.3	+ 0.9	Survived	Killed 8 days
150 x 7.0	Rat M-18	212	+ 26.9	+ 0.5	Survived	Killed 15 days
29 x 7.0	Rat M-19	212	- 13.2	- 10.8	Died	5 days
150 x 7.0	Rat M-20	214	+ 36.4	-	Survived	Killed 15 days
150 x 7.0	Rat M-21	223	+ 28.7	+ 1.3	Survived	Killed 15 days
115 x 7.0	Rat M-351	186	+ 58.6	+ 1.6	Survived	Killed 15 days

Table 4

Summary of the Data on the Mortality Among Experimental* and Control Animals

Species of Animal	Original Group		Replacements	
	Number that Survived (Number of Periods)	Number that Died (Number of Periods)	Number that Survived (Number of Periods)	Number that Died (Number of Periods)
Experiment No. 3 - Aroclor 1242				
Oat	1(150)	-	-	-
Guinea Pigs	5(150)	1(124)	1(26)	-
Mice	6(150)	4(14, 14, 102, 150)	2(45, 135)	1(135)
Rabbits	0	4(17, 116, 118, 129)	3(8, 13, 34)	11(2, 2, 3, 4, 5, 6, 7, 7, 12, 31, 79)
Rats	9(150)	1(43)	1(107)	-
Experiment No. 2 - Aroclor 1254				
Oat	1(150)	-	-	-
Guinea Pigs	1(130); 4(150)	1(101)	2(49, 120)	-
Mice	6(150)	4(12, 14, 83, 101)	4(49, 66, 115, 135)	1(18)
Rabbits	4(150)	-	-	-
Rats	1(149); 9(150)	-	1(139)	-
Controls - Experiment No. 2				
Oat	1(150)	-	-	-
Guinea Pigs	5(150)	1(94)	1(55)	-
Mice	2(109, 113); 4(150)	4(84, 112, 137, 141)	6(5, 5, 13, 37, 41, 66)	2(4, 33)
Rabbits	1(34); 2(150)	1(30)	2(115, 119)	-
Rats	9(150)	1(29)	1(115)	-

* Experimental animals were subjected to exposure for 7 hours per day on 150 days; controls were confined correspondingly in uncontaminated atmosphere.

Table 5

The Average Changes in Weight of the Survivors
Among the Original Groups

Species of Animal	Number of Animals	Average Initial Weight (kg)	Average Change in Weight Expressed as Percentage of Initial Weight	P
<u>Experiment No. 3 - Aroclor 1242</u>				
Cat	1	1.730	+ 115.0	
Guinea Pigs	5	0.514	+ 43.1	>0.05
Mice	6	0.0238	+ 21.5	>0.05
Rats	9	0.214	+ 39.9	>0.05
<u>Experiment No. 2 - Aroclor 1254</u>				
Cat	1	2.858	+ 15.2	
Guinea Pigs	4	0.487	+ 32.5	>0.05
Mice	6	0.0243	+ 17.0	>0.05
Rabbits	4	2.958	+ 44.4	>0.05
Rats	10	0.222	+ 28.7	>0.05
<u>Controls - Experiment No. 2</u>				
Cat	1	3.329	- 7.8	
Guinea Pigs	5	0.500	+ 54.7	-
Mice	6	0.0257	+ 13.2	-
Rabbits	4 (1)	2.622	+ 52.2	-
Rats	9	0.218	+ 33.7	-

(1) Includes 2 early replacements.

MONS 050127

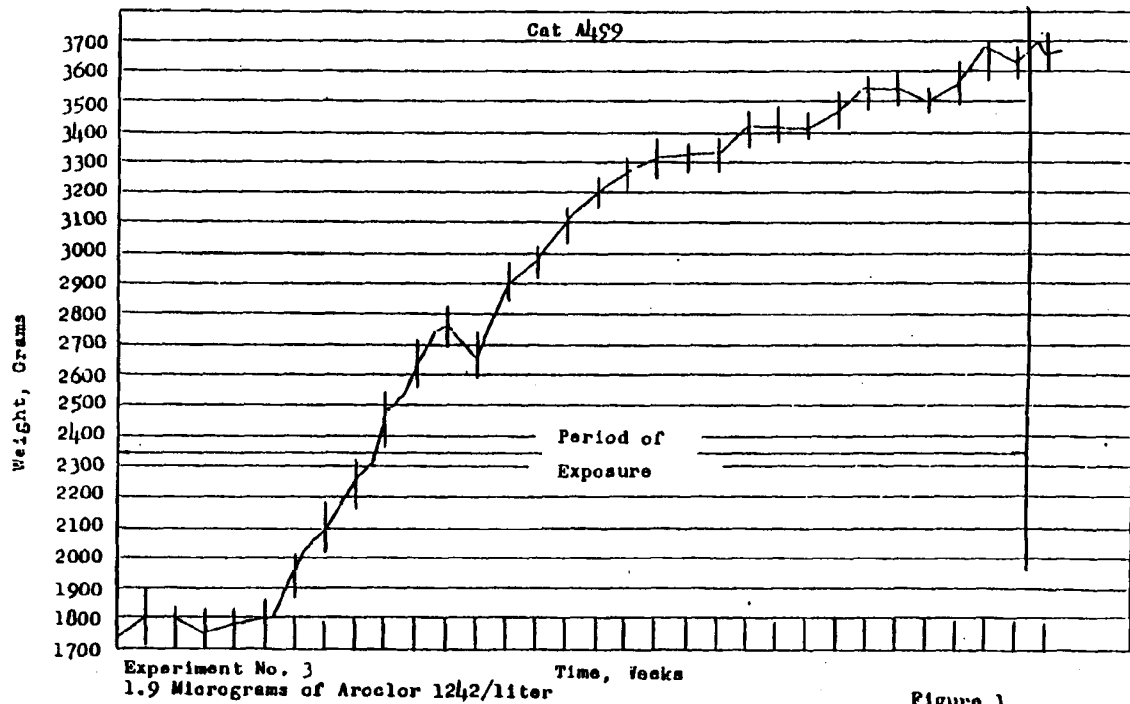
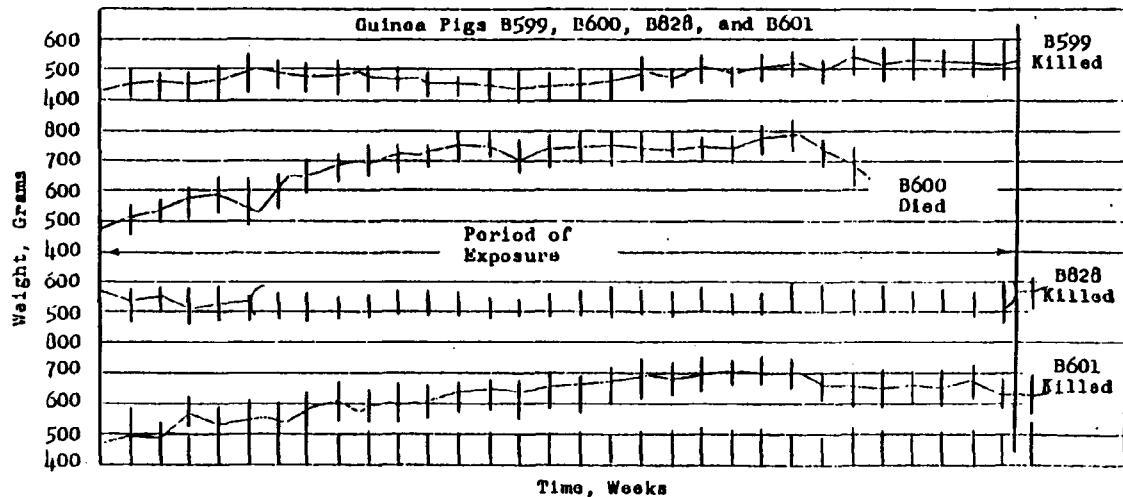
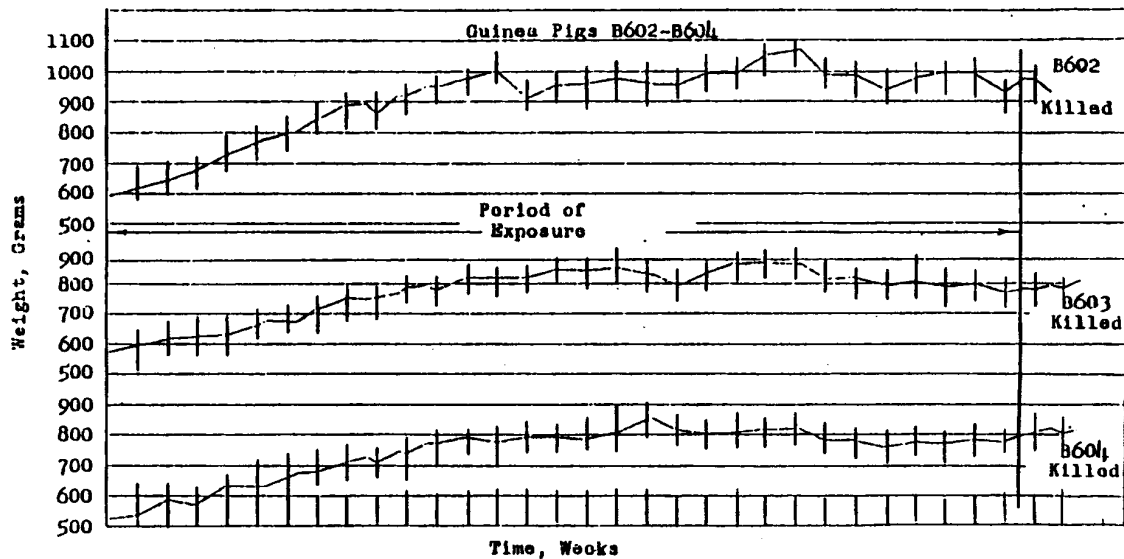


Figure 1

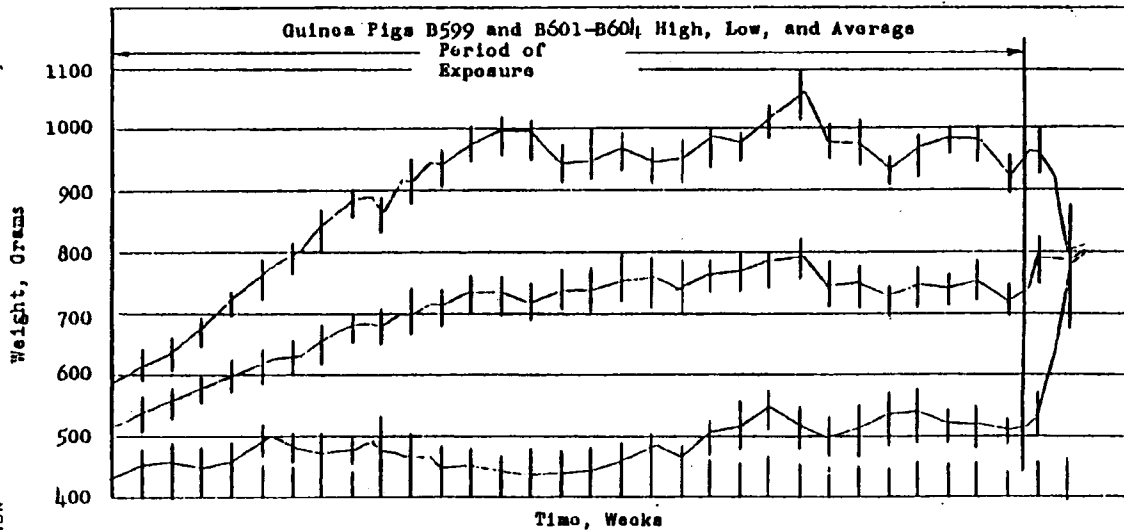


Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 2



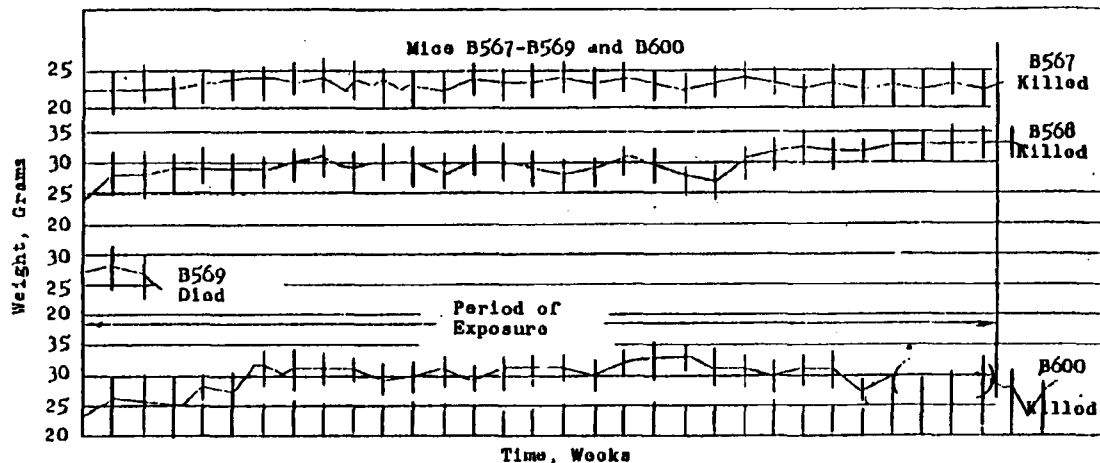
Experiment No. 3
 1.9 Micrograms of Aroclor 1242/liter
 Figure 3.



Experiment No. 3

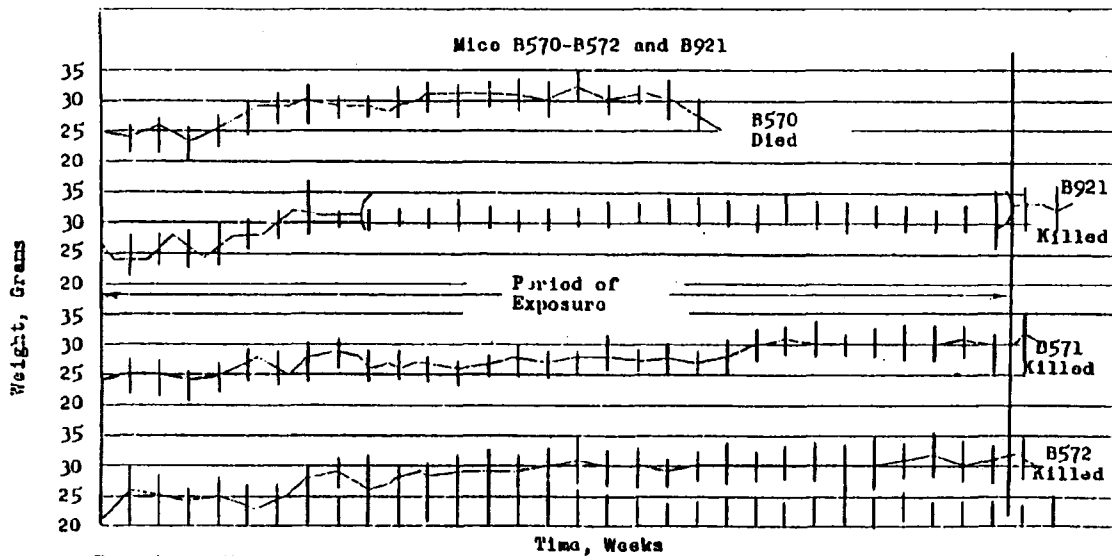
1.9 Micrograms of Aroclor 1242/liter

Figure 4



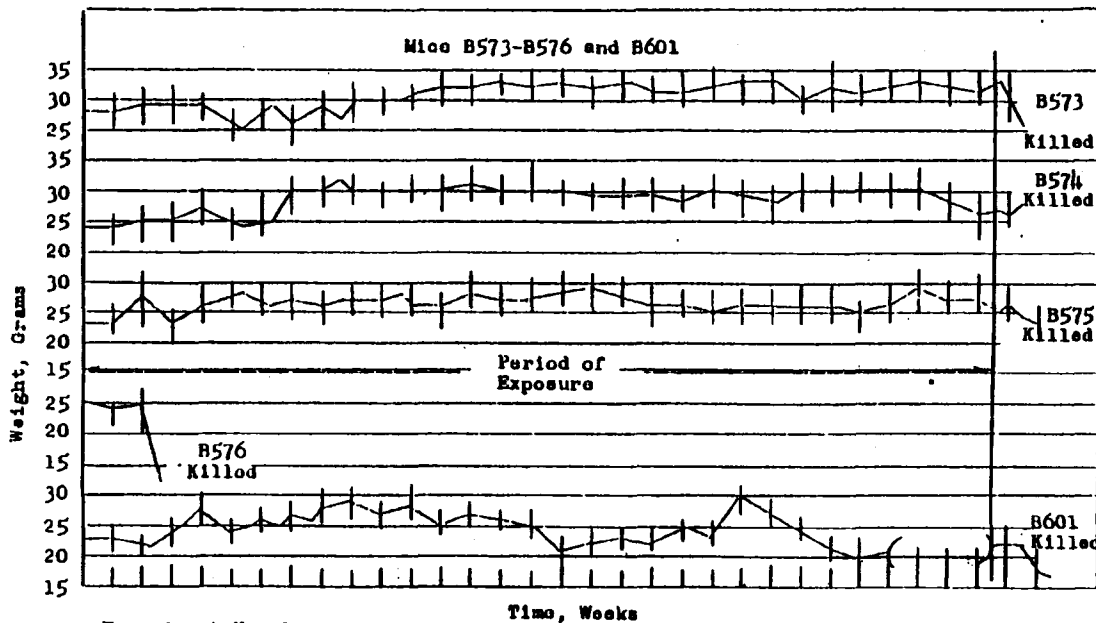
Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 5



Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

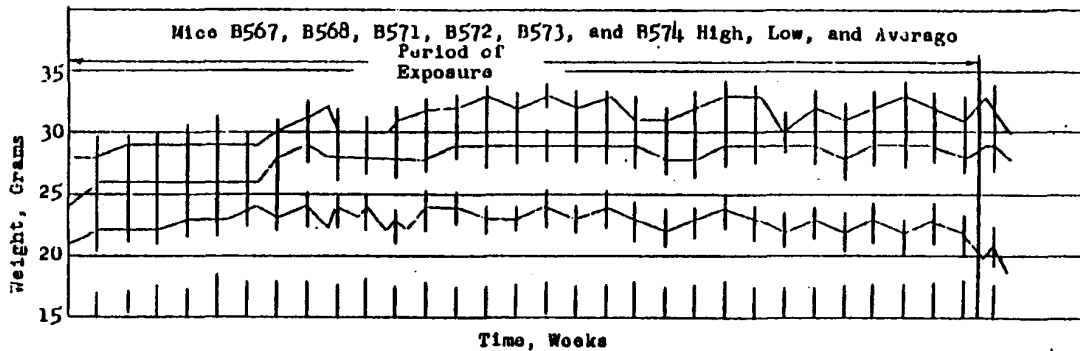
Figure 6



Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 7

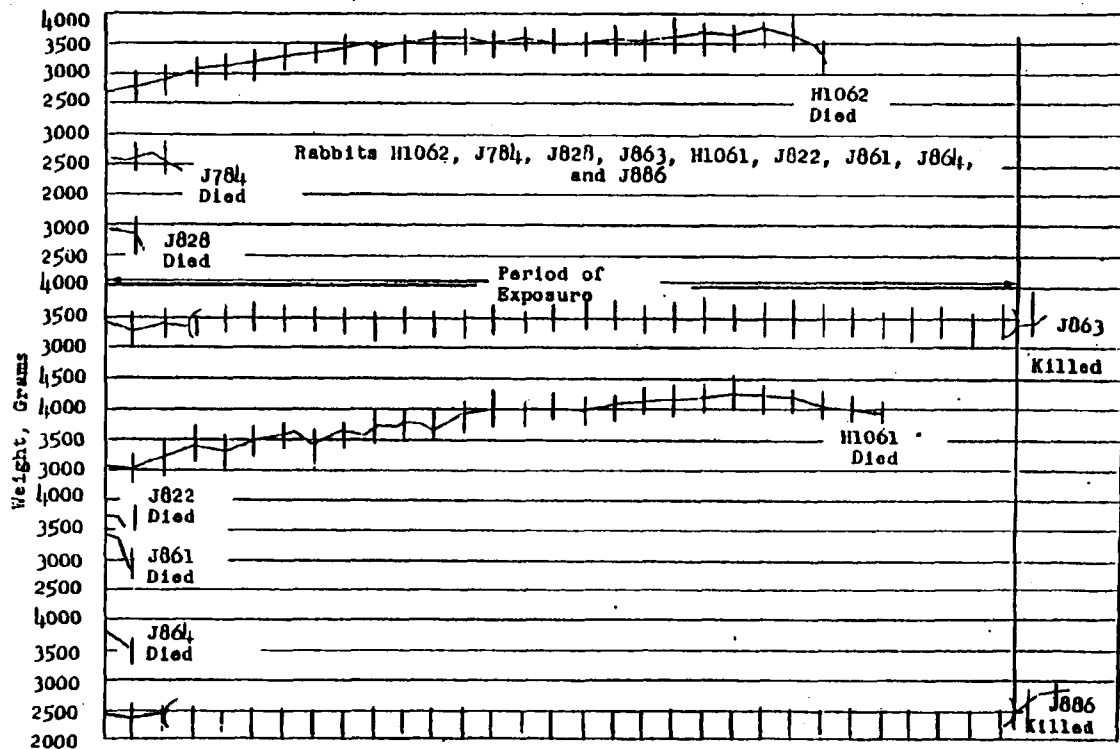
MONS 050133



Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 8

MONS 050135



Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 9

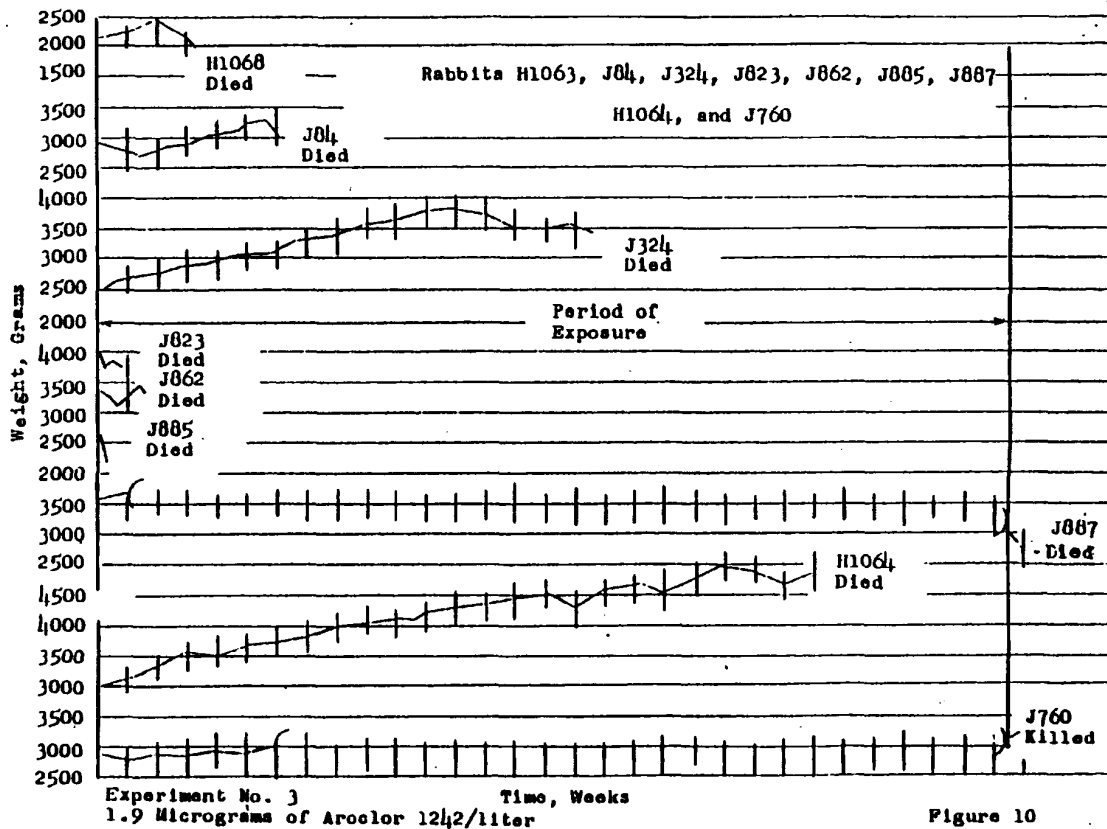
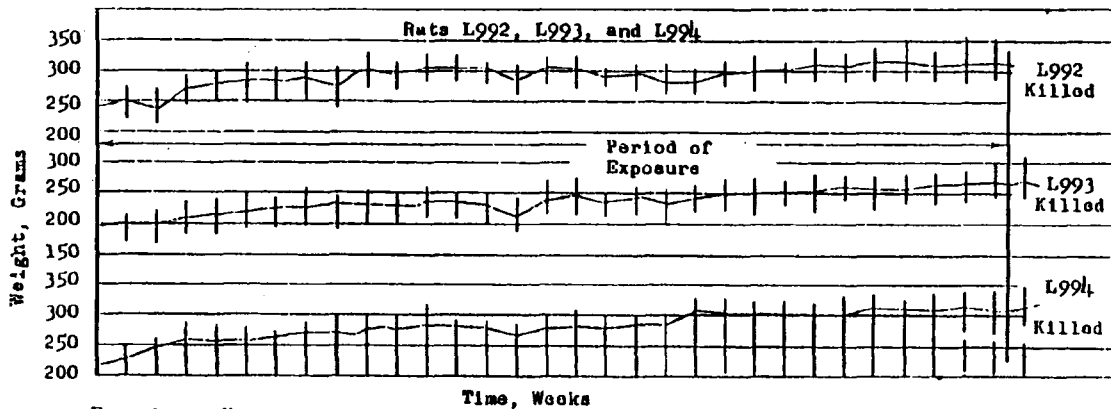
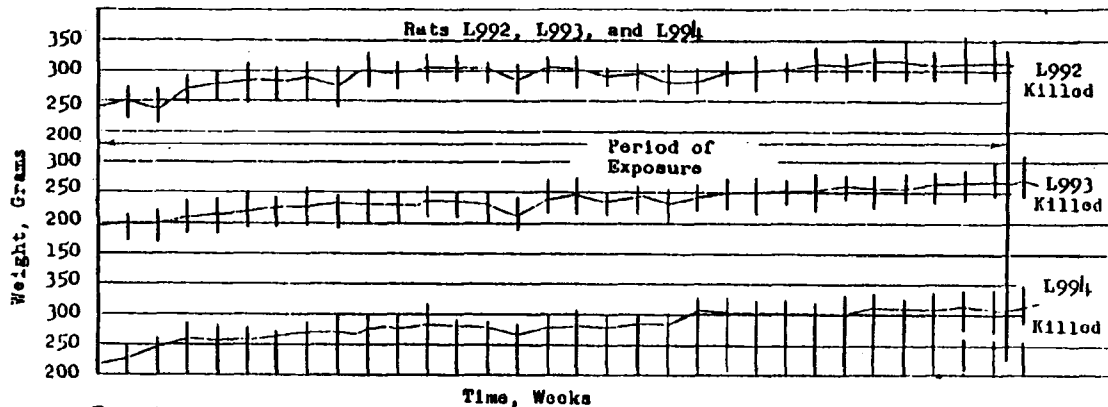


Figure 10



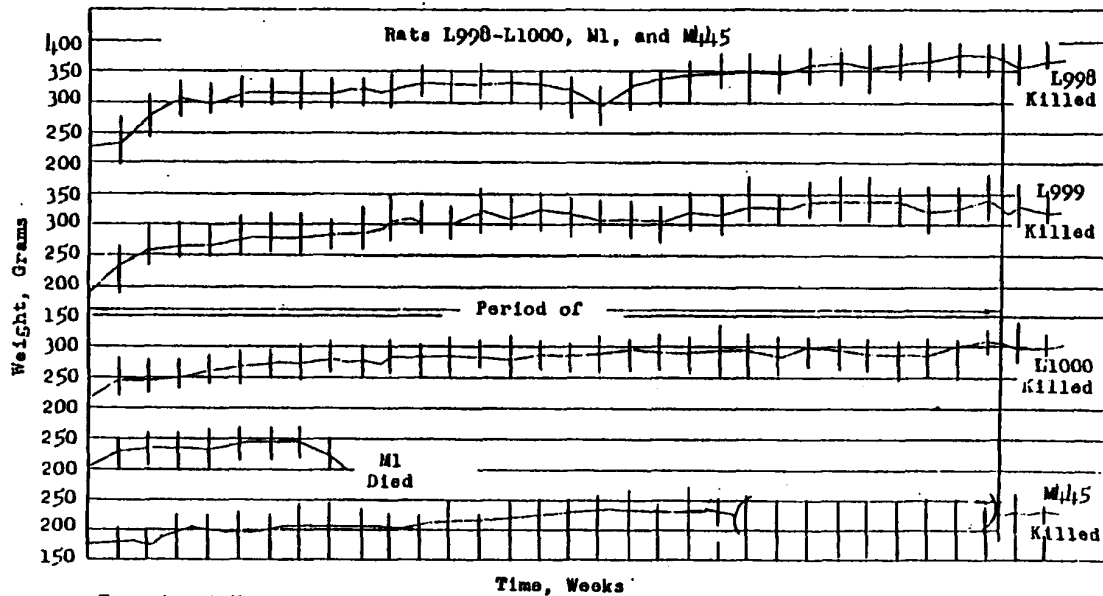
Experiment No. 3
 1.9 Micrograms of Aroclor 1242/liter
 Figure 11

MONS 050137



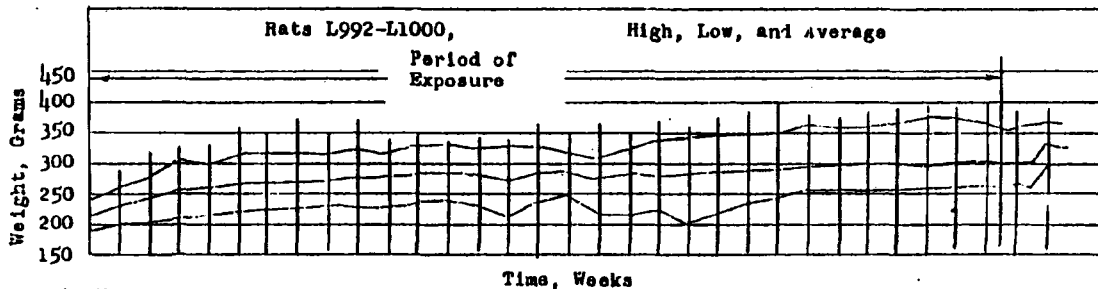
Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter
Figure 11

66T050 050133



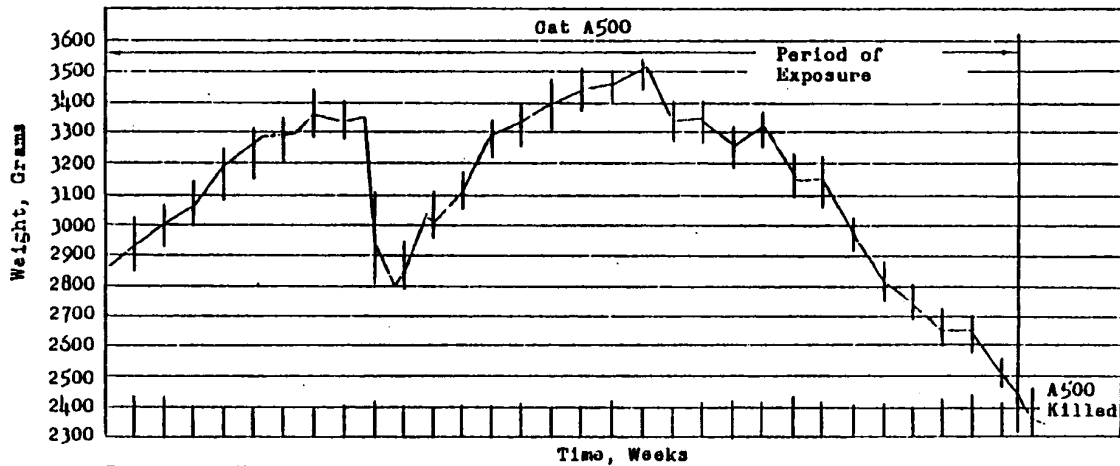
Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 13

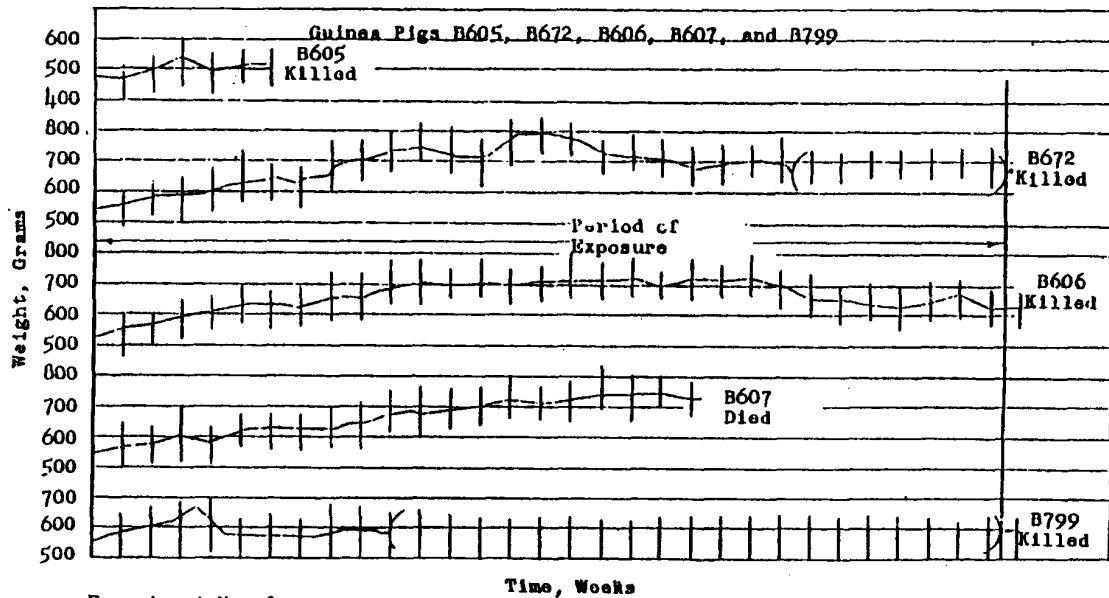


Experiment No. 3
1.9 Micrograms of Aroclor 1242/liter

Figure 14

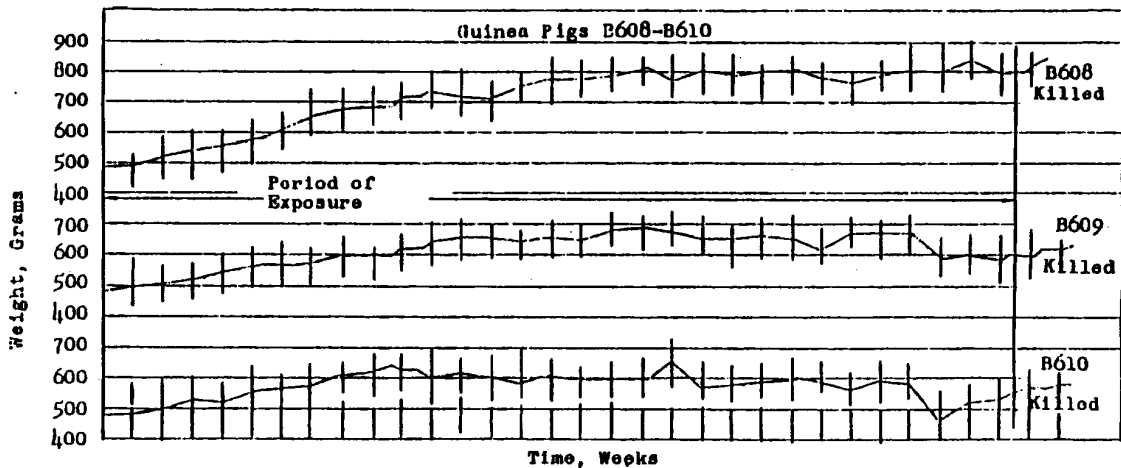


Experiment No. 2
1.5 Micrograms of aroclor 1254/liter Figure 15



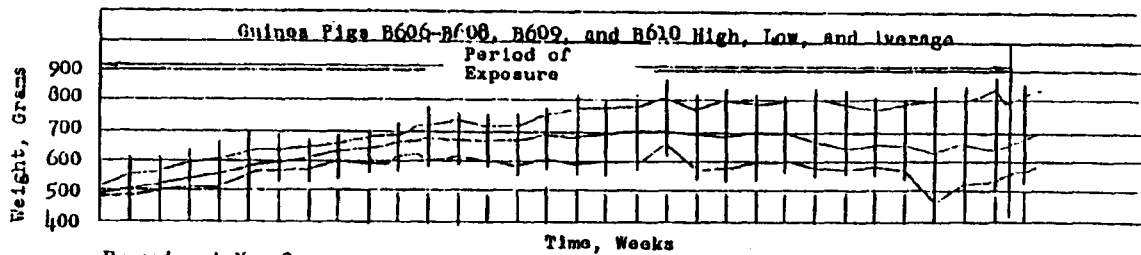
Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

Figure 16



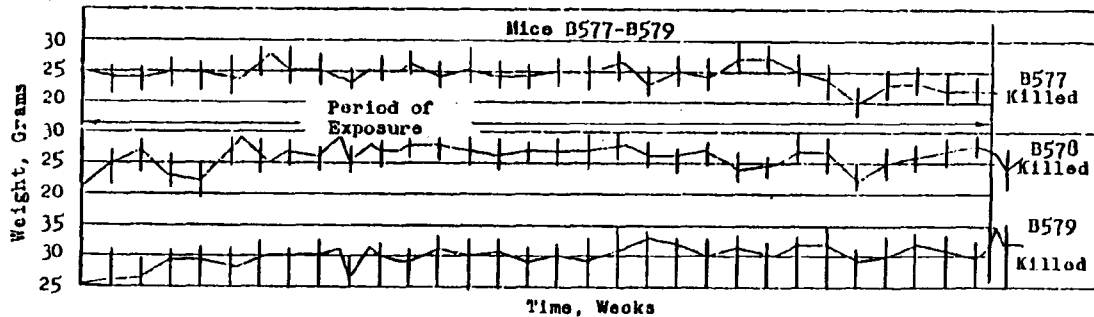
Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

Figure 17



Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

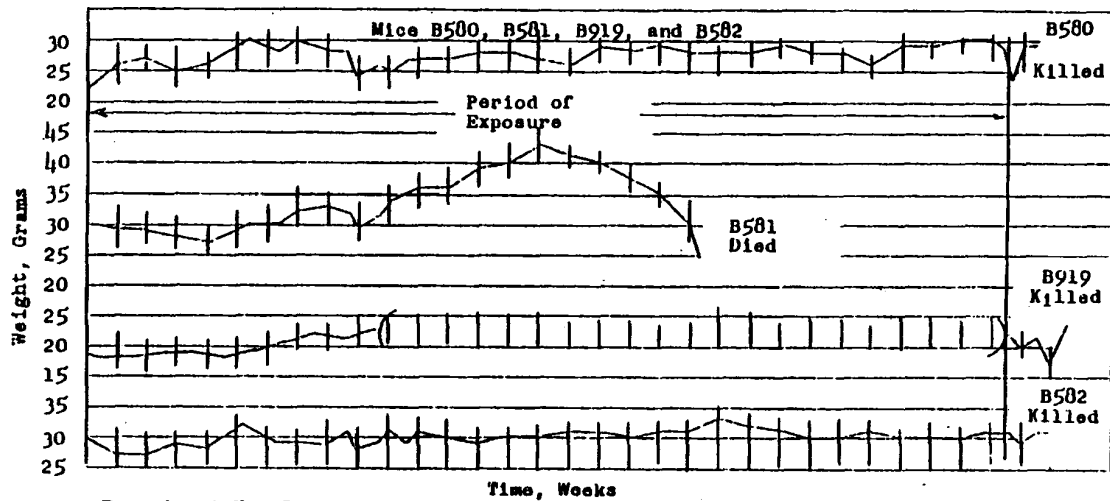
Figure 18



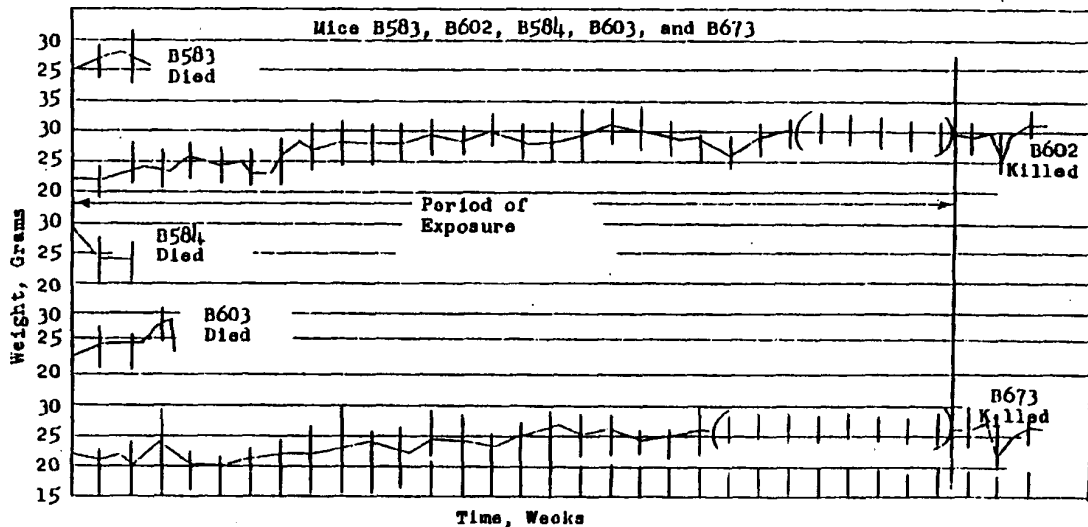
Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

Figure 19

541050 SNOW



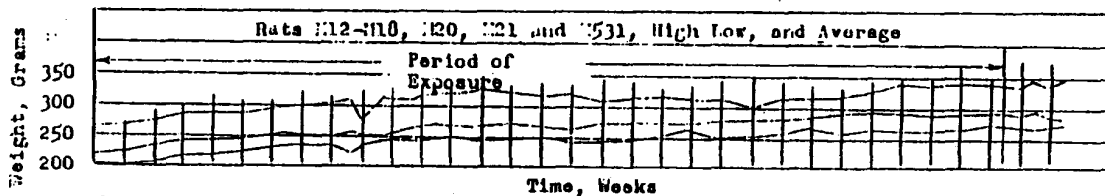
Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter
Figure 20



Experiment No. 2

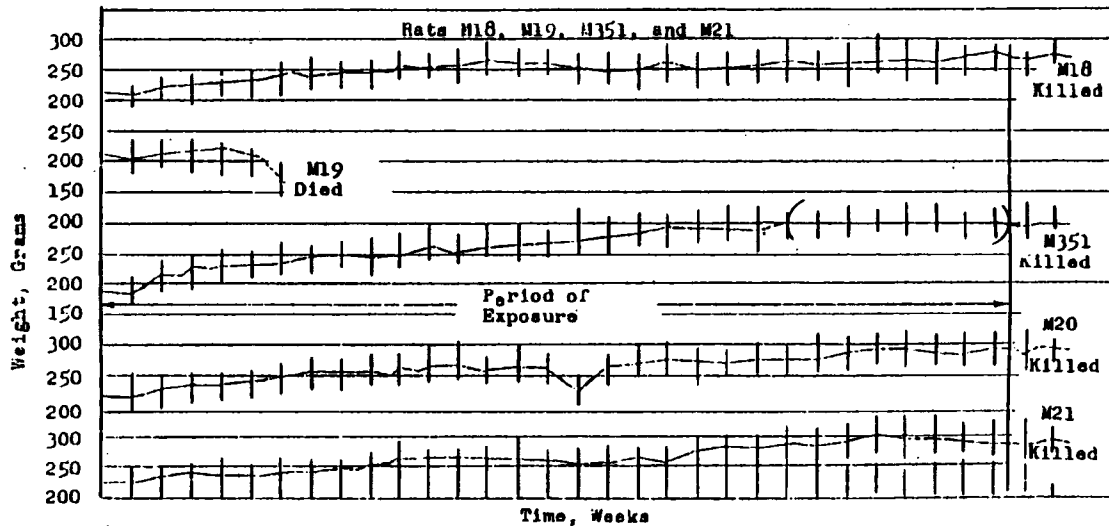
1.5 Micrograms of Aroclor 1254/liter

Figure 21-a

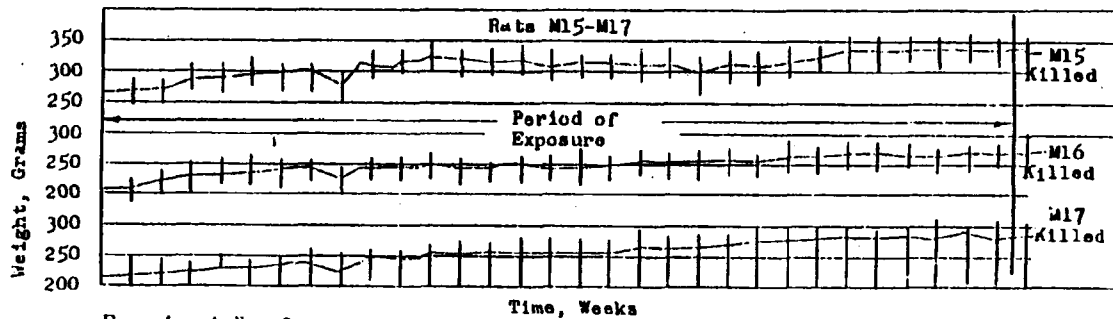


Experiment No. 2
Controls Subjected to Conditioned Air

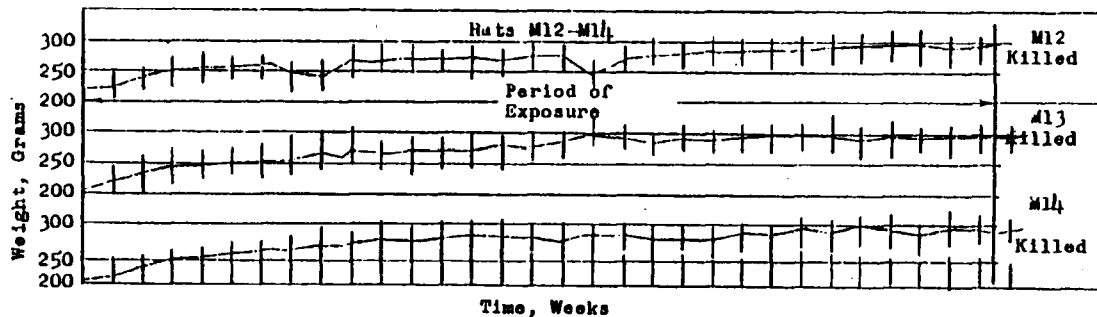
Figure 44



Experiment No. 2
Controls Subjected to Conditioned Air
Figure 43

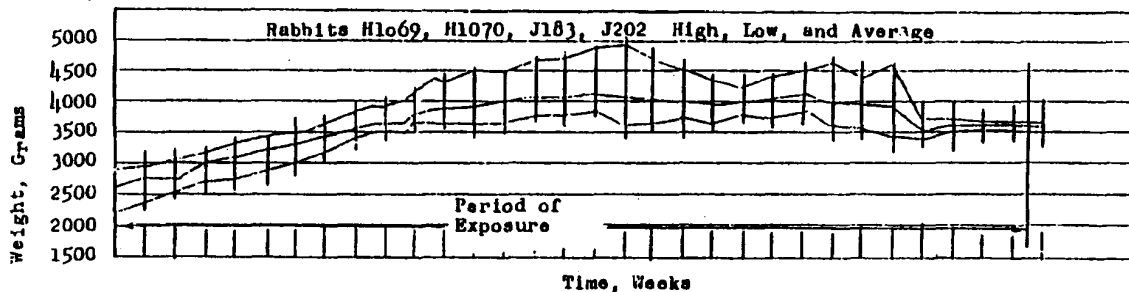


Experiment No. 2
 Controls Subjected to Conditioned Air
 Figure 42



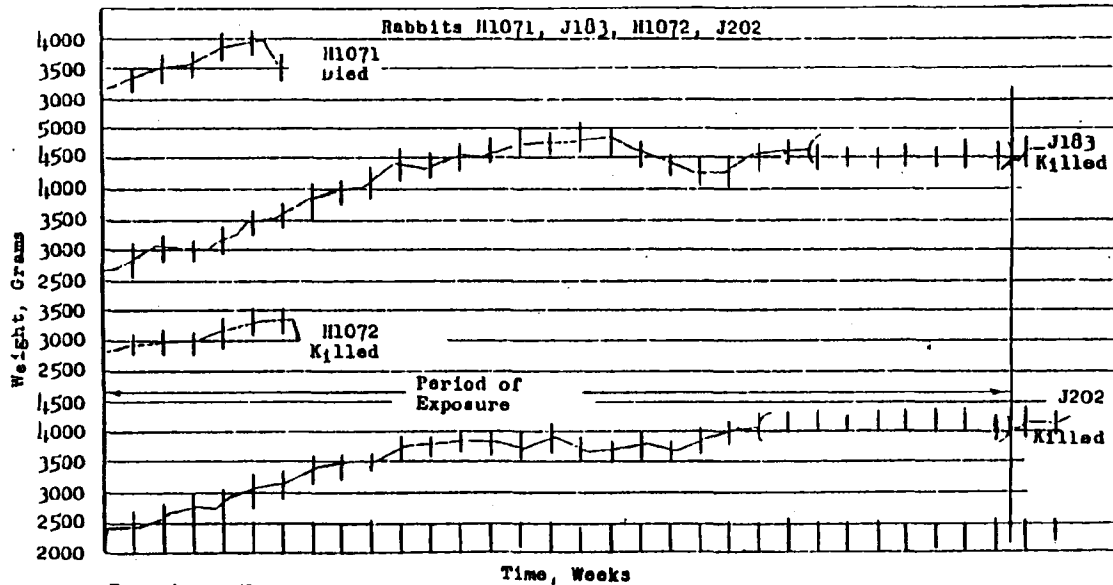
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Controls Subjected to Conditioned Air
Figure J/1

MCNS 050151



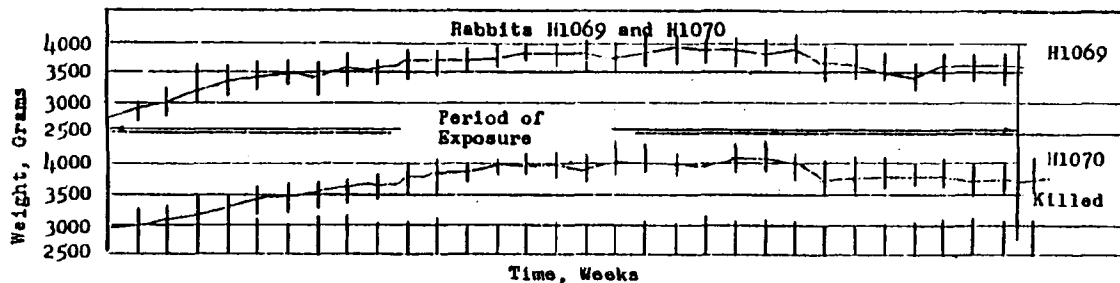
Experiment No. 2
Controls Subjected to Conditioned Air

Figure 10



Experiment No. 2
Controls Subjected to Conditioned Air

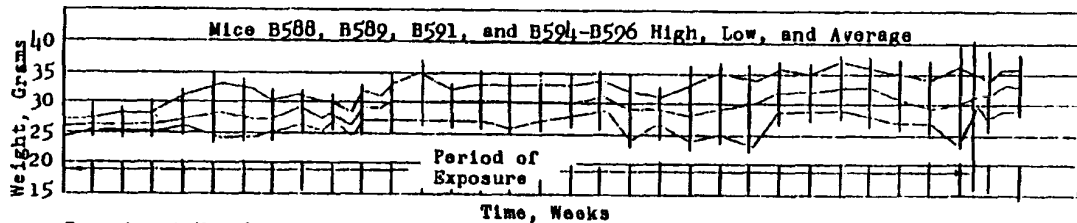
Figure 39



Experiment No. 2
Controls Subjected to Conditioned Air

Figure 30

451050 SNOW



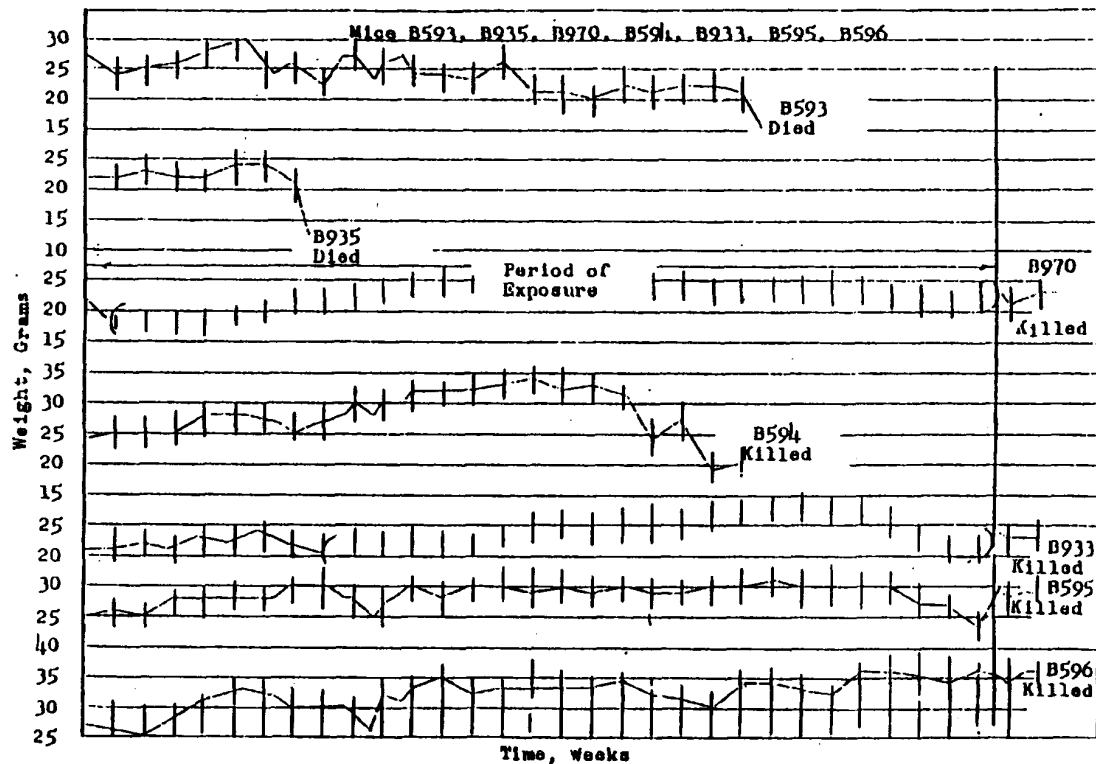
Experiment No. 2

Controls Subjected to Conditioned Air

Figure 37

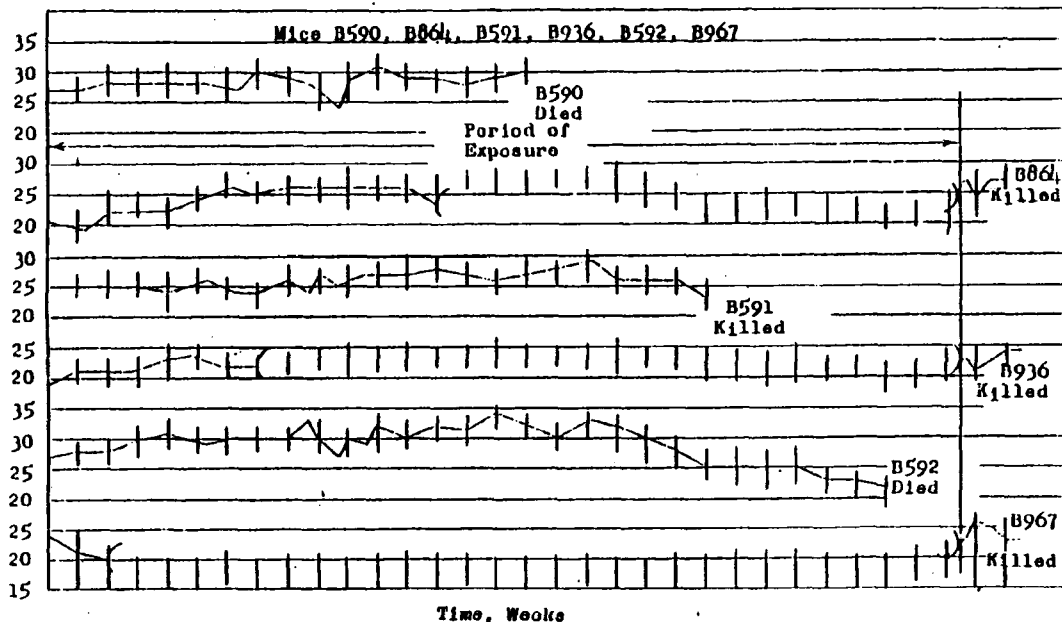
MONS 050155

MONS 050156



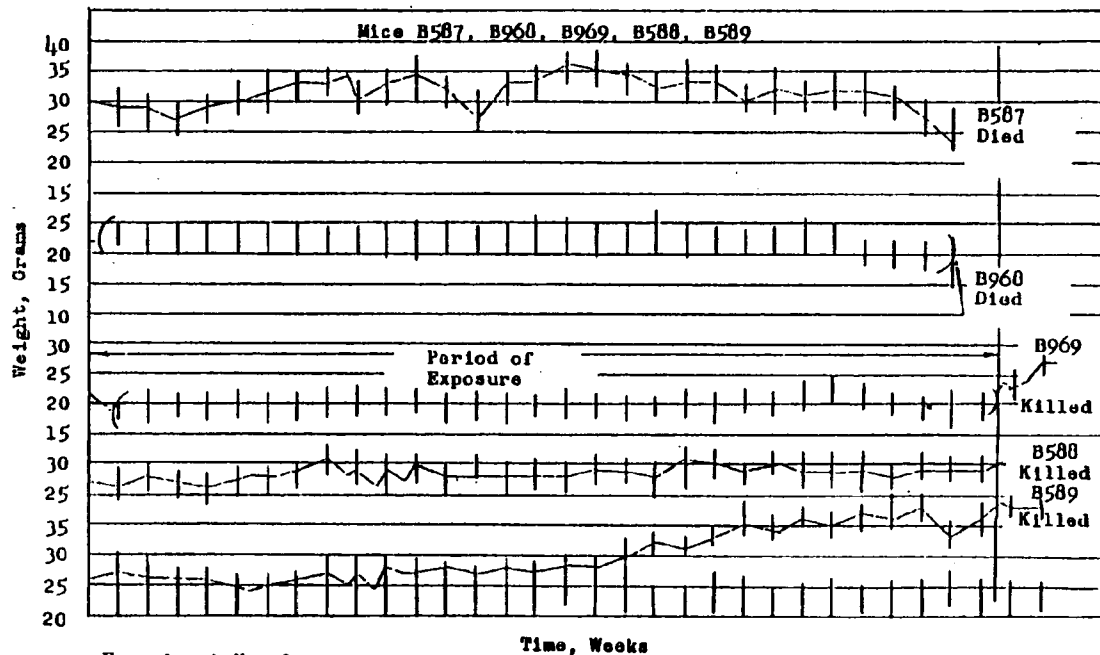
Experiment No. 2
Controls Subjected to Conditioned Air

Figure 36



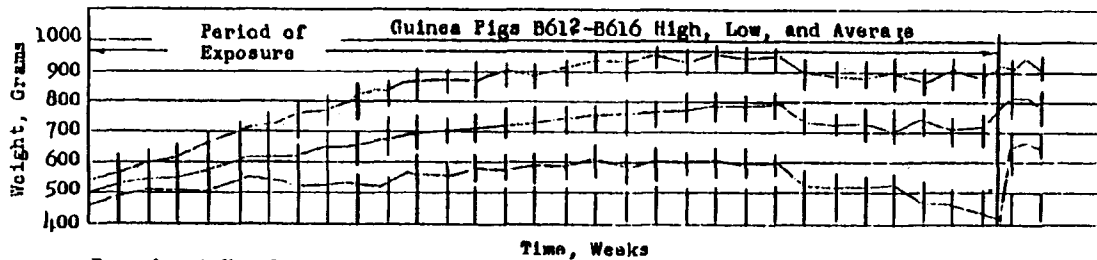
Experiment No. 2
Controls Subjected to Conditioned Air
Figure 35

MONS 050158



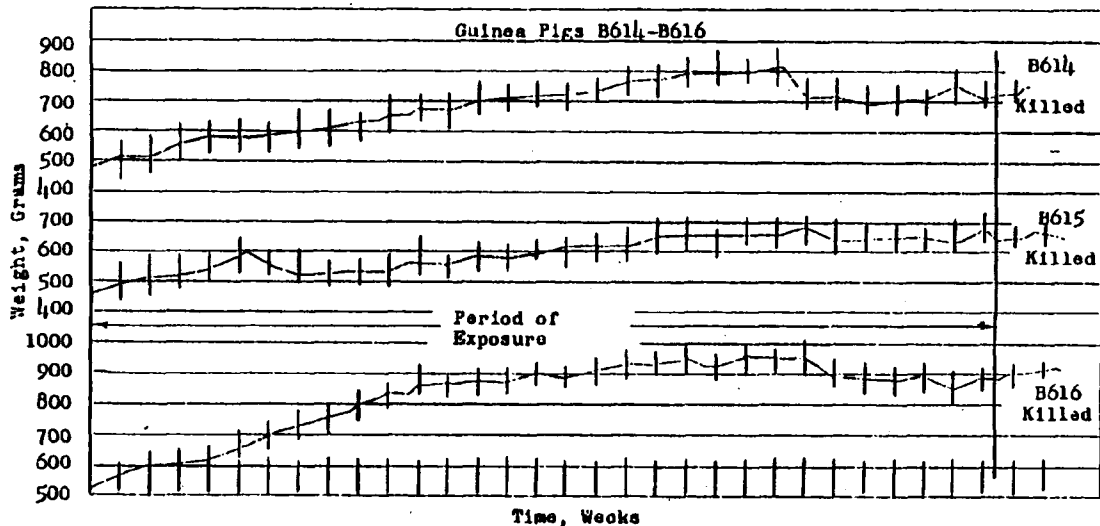
Experiment No. 2
Controls Subjected to Conditioned Air

Figure 34



Experiment No. 2
Controls Subjected to Conditioned Air

Figure 33

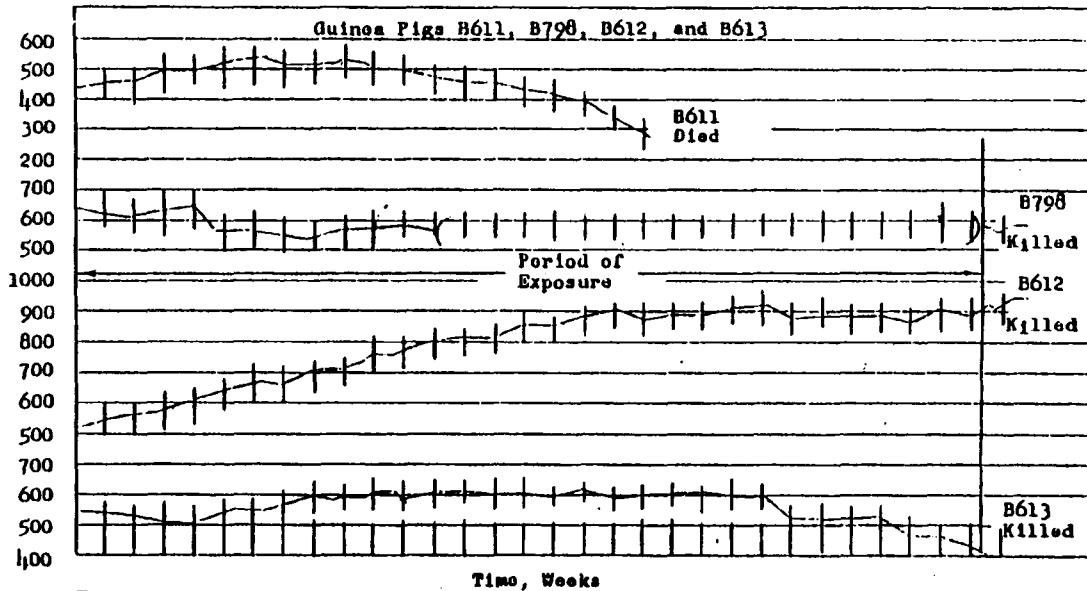


Experiment No. 2
Controls Subjected to Conditioned Air

Figure 12

MONS 050161

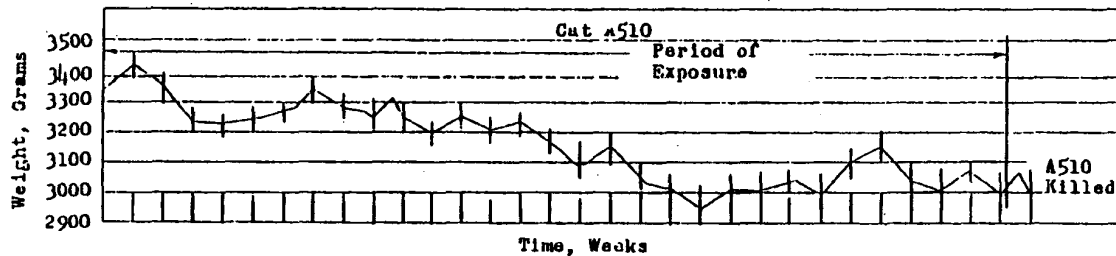
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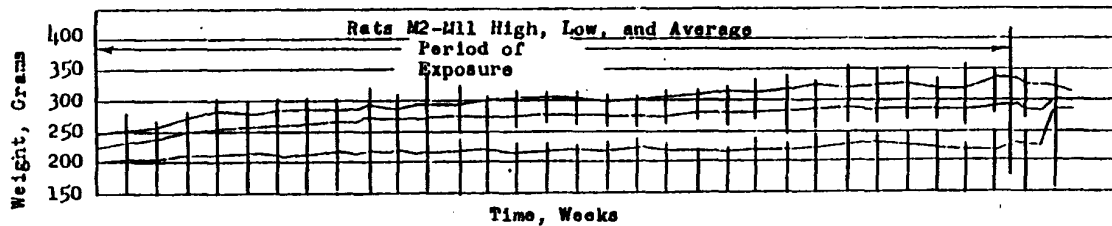
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Controls Subjected to Conditioned Air

Figure 31

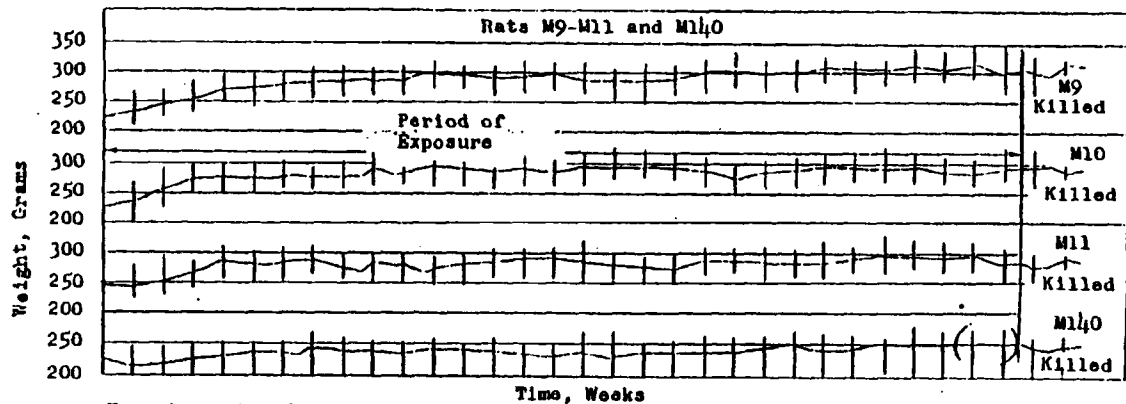
291050 SNOW



Experiment No. 2
Controls Subjected to Conditioned Air
Figure 30



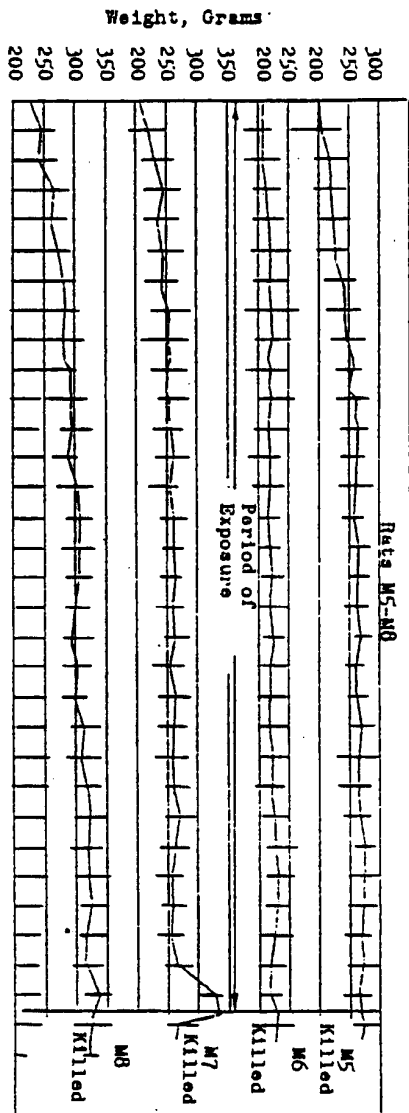
Experiment No. 2
 1.5 Micrograms of Aroclor 1254/liter
 Figure 29



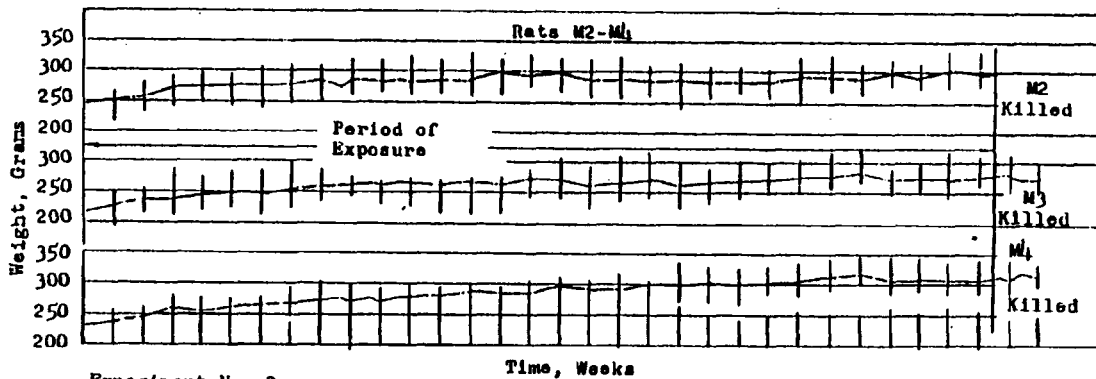
Experiment No. 2

1.5 Micrograms of areolol 1254/liter

Figure 20



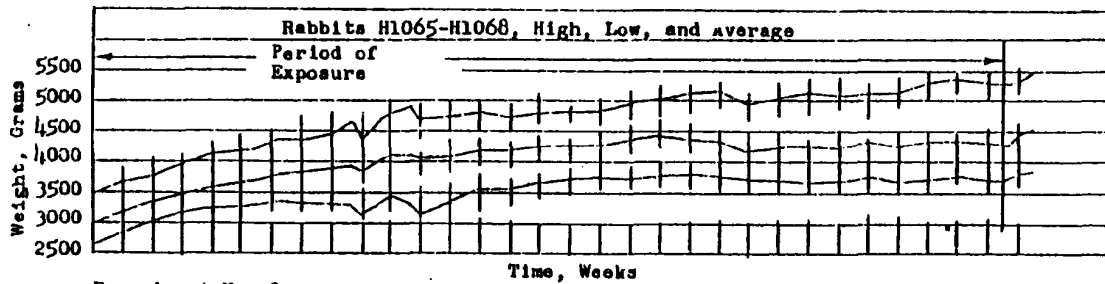
Experiment No. 2
1.5 Micrograms of Aroclor 1254/ilter
Figure 27



Experiment No. 2

1.5 Micrograms of aroclor 1254/liter

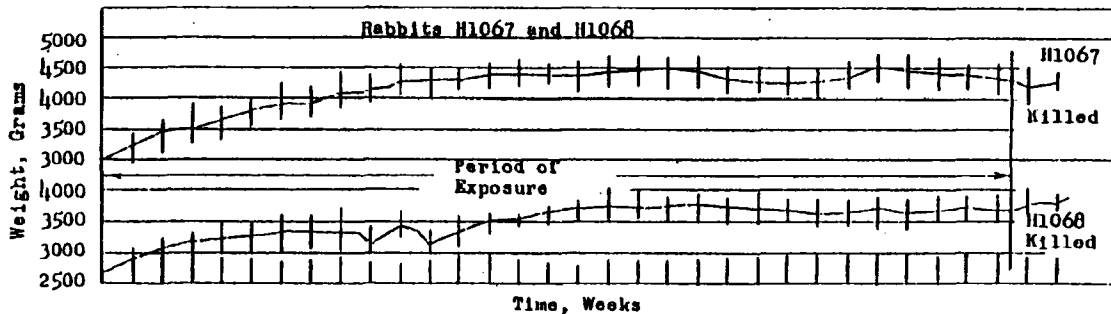
Figure 26



Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

Figure 25

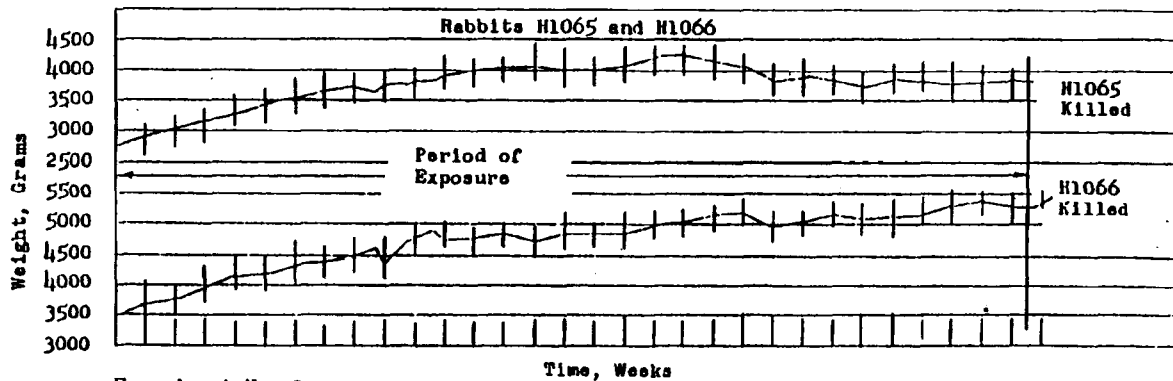
MONS 050168



Experiment No. 2

1.5 Micrograms of Aroclor 1254/liter

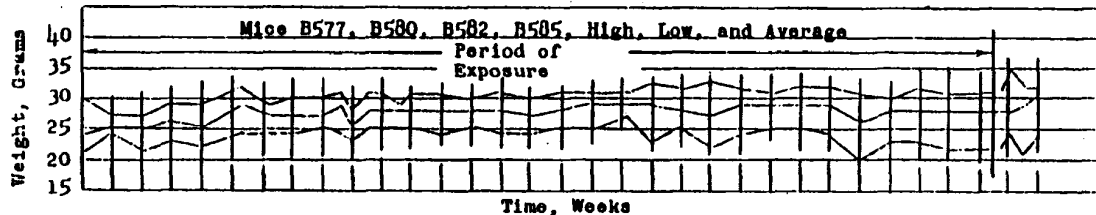
Figure 24



Experiment No. 2

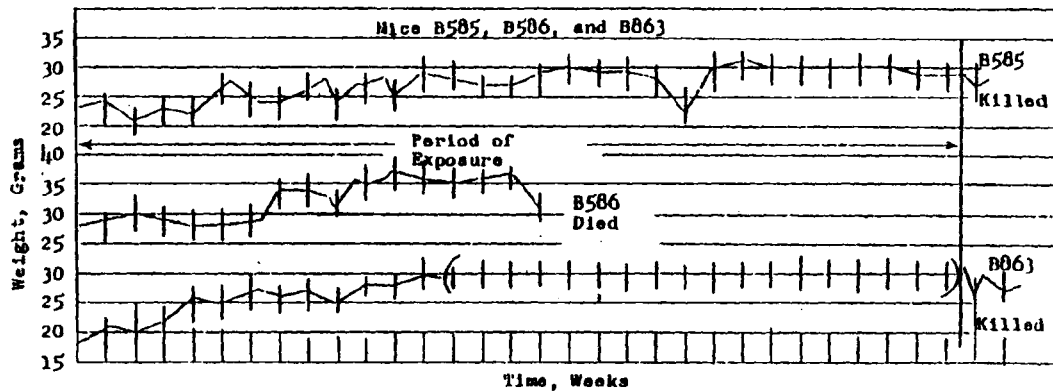
1.5 Micrograms of Aroclor 1254/liter

Figure 23



Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

Figure 22



Experiment No. 2
1.5 Micrograms of Aroclor 1254/liter

Figure 21-b