semanticist or in the light of the principle of negative feedback, more sobering possibilities loom on the horizon. It would appear that patterns of reverberating circuits constitute a singular manifestation of the behavior of the nervous system. A large segment of the philosophy of TR revolves about reiteration. Repetitiousness characterizes especially the sleep program and the treatment periods. Such perseveration may influence decisively those patterns that already are or can become clinically significant.

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Water of Crystallization in the Plant-Growth Regulator α-Naphthaleneacetic Acid and its Salts[1]

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α-Naphthaleneacetic acid or its sodium salt has been used extensively as a plant-growth regulator. Some laboratories, including our own (*1*), have used this growth substance as the standard of comparison in screening chemicals for growth-regulator activity. However, caution must be used where accurate knowledge of dosage is essential, since the sodium salt may vary in its content of biologically active chemical owing to water of crystallization.

Although the literature does not refer to the existence of water of crystallization for naphthaleneacetic acid or its salts, data reported here indicate that under normal humidity conditions the sodium salt may contain 4 molecules of water and the potassium salt 1 molecule of water, with the free α-naphthaleneacetic acid remaining anhydrous.

Varying degrees of hydration were observed in several lots of naphthaleneacetic acid and its potassium and sodium salts. Pure naphthaleneacetic acid appears to be free of water of crystallization. Drying at 100° C resulted in a weight loss of only 0.6%. Potassium naphthaleneacetate has 1 molecule of water of crystallization under Honolulu storage conditions. $C_{10}H_7CH_2COOK \cdot H_2O$ has a theoretical water content of 7.4%, whereas the one sample tested lost 7.6% on oven-drying.

Sodium naphthaleneacetate appears to have 4 molecules of water of crystallization under Honolulu storage conditions. $C_{10}H_7CH_2COONa \cdot 4H_2O$ has a theoretical water content of 25.7%. Five of 6 samples of this salt tested had a water content of this order of magnitude. The sixth sample contained approximately 3 molecules of water (found = 18.0–20.6; theory = 20.6%) but when placed in a humid environment (80% RH) immediately took up an additional molecule of water; a purified sample of the

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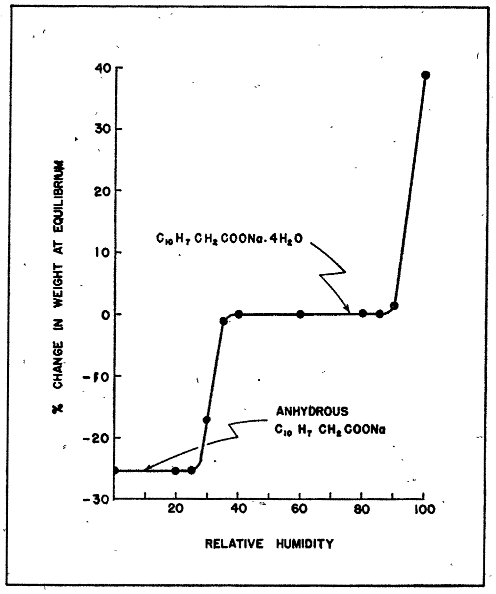

FIG. 1. Effect of relative humidity on gain or loss in weight of hydrated sodium α-naphthaleneacetate.

sodium salt already containing 4 molecules of water of crystallization as evidenced by a water content of 25.5% remained essentially unchanged in the humid atmosphere. Sample #6 was obtained from the Pineapple Research Institute Experiment Station in Wahiawa, Oahu, and apparently had been stored in a dry, hot warehouse, where some of the water of crystallization was driven off.

The effect of humidity on hydration of sodium naphthaleneacetate is shown in Fig. 1. One-gram samples of recrystallized salt containing 25.5% water (100° oven) were weighed into tared beakers and placed in desiccators containing water or 18, 23, 28, 38, 48, 51, 53, 56, 59, or 95% sulfuric acid. These desiccators thus represented relative humidities of 100, 90, 85, 80, 60, 40, 35, 30, 25, 20, and 0%, respectively (*2*). The samples were left in the desiccators for 6 days; all had reached equilibrium in 3 days except in the saturated atmosphere.

It is clear that hydrated sodium naphthaleneacetate readily loses water of crystallization, even at room temperature in an atmosphere of 25% relative humidity. This is in contrast to the potassium salt, which lost only 0.6% water after 3 days in a desiccator over 95% H_2SO_4, but which lost 7.6% of its weight as water after 1 day at 100° C. Both the potassium and sodium salts rehydrated to 1 and 4 molecules of water, respectively, when the anhydrous samples were again exposed to the open air.

The composition of sodium naphthaleneacetate remains constant over the humidity range of 35–90%, but when the humidity drops from 35 to 25%, all 4 molecules of water come off. This is significant, since in biological testing for plant-growth-regulator activity, the reported dose could be in error by over 25%, depending on whether the chemical was kept in a desiccator or exposed to the atmosphere of the laboratory.

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Increased Mast Cells in the Thymus of X-Irradiated Hamsters[1,2]

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Several investigators have observed an increase of tissue mast cells in the thymus of irradiated animals. However, Murray (*1*) cautions that this increase in mast cells may be more apparent than real, since it may result from condensation of stroma following depletion of lymphocytes in the thymus. Because of the similarities between the granules in tissue mast cells and heparin and the parallelism between the mast cell content and the amount of extractable heparin in certain organs (*2, 3*), an actual increase in these cells may be significant in the occurrence of hemorrhage during the postirradiation syndrome.

Thirty-four hamsters were individually subjected to one exposure of x-rays while confined, with ample turning room, in a No. 4 hardware cloth cage 2.5″ × 3.5″ × 5.0″. Each animal received a total body dose of 995 r or 1200 r, determined in air with a Victoreen r-meter. The factors used were 200 kv, 152 v, and 20 ma, with 1.00-mm Al filter, at 36 cm distance, which delivered 181 r/min.

Four groups of hamsters were used to determine the effect that thymic involution produced by means other than irradiation has upon the number of mast cells. Group 1 received 3–21 subpannicular injections of cortisone acetate (Merck, 0.15 mg/100 g body wt) over a period of 10–31 days; group 2, from 1 to 3 injections of adrenal cortex extract in 10% alcohol (ACE, Upjohn, 50 dog units/100 g body wt) over a period of 1–7 days; group 3, 10% alcohol in amounts and time equivalent to that received by group 2; group 4 was kept on a reduced amount of the regular fod until 30–40% of the initial weights was lost.

For comparison the thymi of normal males and

TABLE 1

Number of Mast Cells Per Cross Section of a Lobe of the Thymus

Group	No. hamsters (sex)		Extremes of age (days)	No. mast cells per cross section of a lobe					
	F	M		18–25	26–50	51–75	76–100	101–200	200 +
Control	6	12	38–387	9	8	1			
Pregnant	14		72–260	3	4	5	1		1
Postpartum	7		93–237	1	5	1			
Fetal tissue		7	78–101	4	3				
ACE	4	11	80–229	6	7	2			
Alcohol	3	7	79–224	3	6	1			
Inanition		5	92–207	2	3				
Cortisone		9	31–300	5	4				
Irradiated									
Stage of depletion									
Slight	2		62–170	2					
Inversion	16	5	96–300				6	12	3
Extreme	1	9	119–382	6	1	3			
Recovery	2		101–172		2				

TABLE 2

Some Postirradiation Relations to Thymic Inversion

Stage of thymic depletion	Days after irradiation	No. animals used	Reduction of thymus from normal	Lymphocytes/cu mm jugular blood	Extreme thrombocytopenia*	Macroscopic hemorrhages*
Early	7–10	2	1/2–1/4	823–1375	1	0
Inversion	3–18	20	1/2–1/10	17– 663	18	11
Extreme	6–10	10	1/4–1/10	28– 653	10	6
Recovery	31–33	2	1/3–3/4	2590–2716	0	0

* The figures indicate number of hamsters.

[1] A preliminary report.

[2] This investigation was supported by the Beta Sigma Phi International Endowment Fund.

[3] We are indebted to the Colorado Sanitarium, Boulder, through the courtesy of Mable Page, director of the X-Ray Department, for irradiating the hamsters; to the Upjohn Company for supplying part of the adrenal cortex extract; and to Merck & Co., Inc., for supplying part of the cortisone used in this investigation.