

ties of salicylic acid can not be expected in the body after administration of salicylates, and therefore, the alleged biochemical rôle of the compound is not sustained. This agrees with the negative results of chemical isolation, and also with the vast majority of results on excretion which show that the salicylates are excreted mainly unchanged.

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Duck Disease Studies. III. Salt Content of Soils in Disease and Non-disease Areas.*

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It has been shown¹ that oral administrations of certain inorganic salts, alone or in combination, are definitely toxic for ducks. The greatest toxicity in these experiments was found in sodium chloride and sodium sulphate mixtures containing in addition either magnesium or bicarbonate *together with nitrate ions*. The symptoms exhibited by the birds after feeding with these mixtures resembled in many respects those noted in "duck disease". The salt composition of soils from disease and non-disease areas was studied to attempt to correlate these experimental findings with the naturally occurring condition.

Soil samples were obtained from the following areas:

A. Disease Areas. 1. San Joaquin Valley (West of Pond, Calif.). 2. Tule Lake (Modoc County, Calif.). 3. Government Sump (South of Klamath Falls, Ore.).

B. Non-disease Areas. 1. San Joaquin Valley (Los Banos area). 2. Isolated ponds south of Klamath Falls, Ore.).

All samples were taken near the surface of the soil and within a few yards of the water's edge. Analyses were made on water extracts. Carbonate, bicarbonate, and chloride were determined by titration. Calcium, magnesium, and sulphate were approximated

* Part of an extended cooperative study between the California Fish and Game Commission, the Hooper Foundation for Medical Research of the University of California, and the Department of Pharmacology of the University of California Medical School, San Francisco.

¹ Shaw, P. A., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, xxvii, 6.

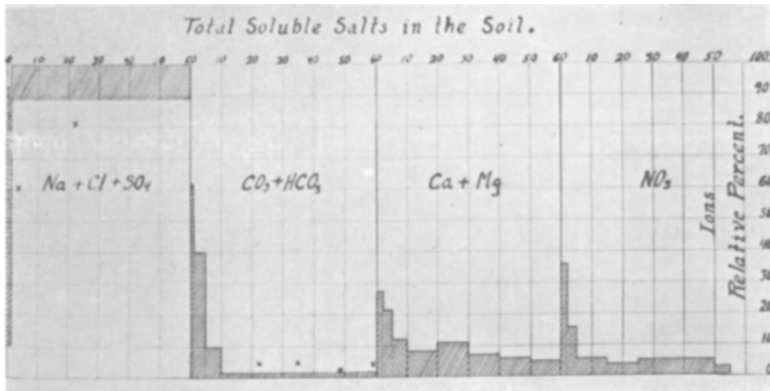


FIG. 1.

Diagram showing relative percentages of the different groups of ions in relation to total soluble salts in the soil.

(after precipitation) by comparative turbidity tests. Nitrate was determined by aluminum reduction followed by distillation and titration. Qualitative tests only were made for nitrite. Sodium was computed by difference in the reaction value of basic and acidic ions. The ions were grouped for study as follows: 1. Chloride, sulphate, and sodium. 2. Carbonate and bicarbonate. 3. Calcium and magnesium. 4. Nitrate.

In Fig. 1 are shown the relative per cents of the different groups of ions in relation to increasing amounts of salts in the soil. This chart includes 50 samples from all areas and is presented for the purpose of showing the general character of the soils studied. Above 2% total solubility, chloride, sulphate, and sodium ions comprised 89% or more of the soluble salts except in 2 instances. Below 2% solubility the relative amount of these ions fell to a minimum of 11%. This indicates, in the areas studied, that the major increase in total salts is composed of sodium chloride and sodium sulphate.

The charts for the 3 remaining groups of ions indicate that the highest values are found in waters or soils of low alkali content, the relative amounts rapidly decreasing for higher alkali concentrations. In many samples one or more of these groups were entirely absent, which is indicated on the chart by the shaded areas extending to the base line.

The chief point of interest is shown in Table 1, and graphically in Fig. 2. The data is divided in two portions; one showing analyses of 7 soils collected in the 2 non-disease areas; the other, of

TABLE I.

Non-disease Areas.					
No.	Mgm. per 10 gm. of soil.				
	Total	Cl, SO ₄ , Na	NO ₃	Ca, Mg	CO ₃ , HCO ₃
1	1076	1050	4	11	11
2	2168	2140	2	24	2
3	2304	2060	12	230	2
4	3398	3110	0	258	30
5	4386	4110	0	232	44
6	5550	5495	0	0	55
7	6294	5750	0	302	242

Disease Areas.					
1	2268	2240	2	25	1
2	2346	1910	84	244	108
3	2410	2280	63	53	14
4	2604	2464	84	51	5
5	3293	2937	112	224	20
6	3355	3000	77	214	64
7	3688	3441	184	59	4
8	3727	3430	37	242	18
9	4732	4200	250	160	122
10	4941	4704	109	59	69
11	5508	5000	95	264	149

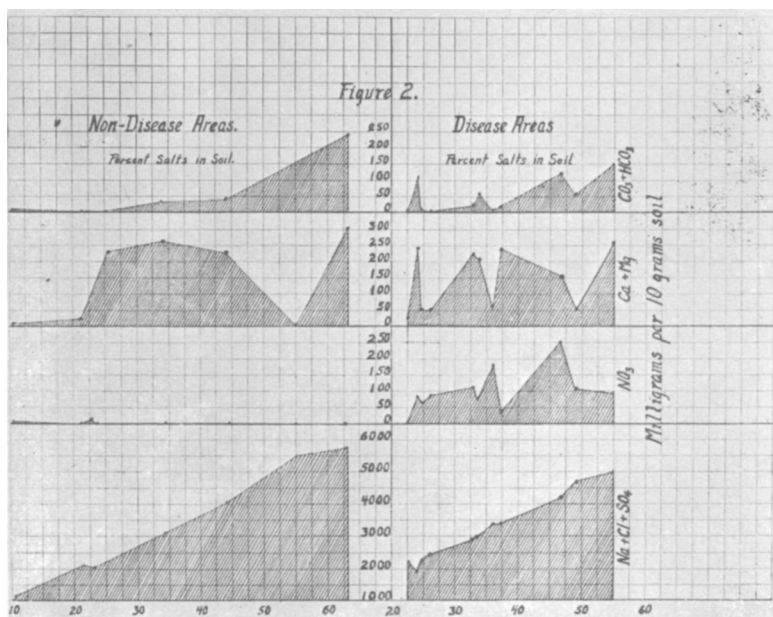


FIG. 2.

Diagram showing mgm. of the different groups of ions per 10 gm. of soil from disease and non-disease areas in relation to total soluble salts.

11 soils from the 3 disease areas. Only soils of comparatively high alkali concentration have been shown. In Fig. 2, mgm. of each group of ions per 10 gm. of soil are plotted against per cent total soluble salts.

The amounts of nitrate ions from disease and non-disease areas alone show a marked difference, being practically zero in non-disease areas studied, while from 50-250 mgm. per 10 gm. of soil were found in all but 2 of 11 samples from the 3 disease areas examined. This observation is particularly significant in view of the marked toxicity noted in ducks as a result of artificial feeding with salt mixtures of sodium chloride and sodium sulphate, containing nitrate ions and also magnesium or bicarbonate ions.

Two additional factors indicate that nitrate may play an important role in the incidence of "duck disease". Sodium nitrate is several times more soluble than the corresponding chloride and sulphate. One may therefore expect nitrate to become an appreciable factor in the surface alkali only at the hottest and driest time of the year. In addition, nitrate is also increased at this time through bacterial decomposition of organic matter. These considerations correspond to the usual incidence of the duck malady in late summer and fall.

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An Experimental Method for the Radiographic Demonstration of the Bronchial and Pulmonary Arteries.

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In a previously described series of experiments¹ it was found that the introduction into the venous circulation of an embolus infected with pyogenic organisms may be followed by widely differing pathological changes in the parenchyma of the lung. To determine the exact conditions present within the pulmonary and bronchial circulations following the introduction of such emboli a method for the radiographic demonstration of the two circulations was developed.

Anatomically the bronchial arterial system usually arises as one

¹ Holman, E., Chandler, L. R., and Cooley, C. L., *Surg. Gyn. and Obs.*, 1927, xlv, 328.