R. R. Snowden.
Chemist 320 Stimson Bldg.

Los Angeles, Cal., July 29th, 1911.

Messrs. Olmsted Brothers,

Panama-California Exposition,

San Diego, Calif.

Gentlemen:-

I submit below report on the six soil samples sent by you for analysis, as follows:

	northern	Sefton?	Western
Your Number:	1	2	3
Laboratory Number:	775	776	777
	per cent.	per cent.	per cent.
"Fine Earth" (passing a 1/50 in. sieve)	71.10	69.40	72.50
Contained in the "Fine Earth".			
Lime (CaO)	0.88	0.43	0.13
Magnesia (MgO)	0.12	0.10	0.09
Potash (K_2O)	0.39	0.35	0.45
Phosphoric Acid (P_2O_5)	0.33	0.17	0.13
Contained in the "Whole Soil"			
Chlorine	0.009	0.005	0.044
(Equivalent to Sodium Chloride in pounds per acre-foot	519	288	2538)
Nitric Nitrogen	0.0005	0.0007	0.0014
(Equivalent to Sodium Nitrate in pounds per acre-foot	106	149	297)
Humus	1+	1+	0.5-
Total Soluble Mineral Salts	0.031	0.051	0.179
Reaction	Alkaline	Alkaline	Alkaline
Equivalent in pounds per acre-foot	1084 lbs.	1784 lbs.	6261 lbs.

Your Number:	4	5	6
Laboratory Number:	778	779	780
	per cent.	per cent.	per cent.
"Fine Earth"(passing a 1/50 in.sieve)	76.60	77.50	70.78
Contained in the "Fine Earth"			
Lime (CaO)	0.14	0.58	0.16
Magnesia (MgO)	0.15	0.22	0.19
Potash (K_2O)	0.41	0.53	0.45
Phosphoric Acid (P_2O_5)	0.18	0.13	Strong trace
Contained in the "Whole Soil"			
Chlorine	0.0064	0.0014	0.0014
(Equivalent to Sodium Chloride in pounds per acre-foot	369	81	81)
Nitric Nitrogen	0.0004	0.0003	trace
(Equivalent to Sodium Nitrate in pounds per acre-foot	85	64	-----)
Humus	1+	1+	0.5+
Total Soluble Mineral Salts	0.025	0.023	0.021
(Equivalent in pounds per acre-foot	875	805	735)
factor is .803 x 43560 x percent			
Reaction	neutral:	bleaches litmus:	bleaches litmus.

In none of the samples was the alkalinity pronounced enough to render the determination of the "black" alkali necessary.

Applications of potash salts would be desirable in the cases of Nos. 1,2, and 4, and in somewhat smaller measure in those of Nos. 3, 5 and 6.

Lime in the form of carbonate is needed in Nos. 4, 5 and 6, and should be supplied as finely ground limestone or as air-slaked lime, at the rate of about one ton per acre. In number 3 the sulphate of lime is needed at the rate of about one and one-half ton finely ground gypsum per acre.

Applications of soluble phosphates--superphosphate--are urgently demanded in number 6, and will probably benefit Nos. 2, 3, 4 and 5; number 1 being well supplied with phosphoric acid. In number 6 this is so deficient as to become a limiting factor, and is doubtless responsible for the almost complete suspension of nitrification since an ample supply of available phosphates is indispensable to the development and activity of the nitrifying bacteria. Superphosphates should be applied a week or two before applying carbonate of lime.

Number 6 is urgently in need of nitrate,--the nitrates of soda and lime being the commercially available forms. Frequent small applications of nitrate would benefit Nos. 1, 2, 4 and 5 as well as number 6, though in the last named the initial application should be larger than in the cases of the others. While number 3 is well supplied with nitrates for immediate demands, this is a variable factor, and it would be advisable to be sure the supply is maintained either by continued nitrification of the soil nitrogen or by successive additions of nitrates.

Humus is sufficient to meet present demands in all excepting Nos. 3 and 6, and is not very deficient in these.

Total soluble mineral salts ("white alkali") is entirely too large in number 3 to be tolerated by some plants, especially when young, also there is enough chlorides in all excepting Nos. 5 and 6 to prove detrimental to many plants. The additions of lime recommended will enhance the resistance of the plants to this injurious action, yet it will be advisable to wash down or out as much as possible of these salts, preventing or retarding their return to the surface by the maintenance of an earth mulch where practicable.

In the case of the seed beds, if it is practicable to have them under glass, evaporation could be minimized by ventilation with air saturated with moisture, seeing that it would hardly be practicable to maintain a mulch under the circumstances. You could have the cover of the seedbed slightly raised for an exit for the air, and have an opening around the bottom for ingress of air, with exposure of water in troughs close to these lower openings. This is only a vague suggestion. You may be able to devise some better means to attain the same end.

I believe that these recommendations acted upon will produce normal soil conditions in these soils, yet if after a reasonable time there still should be trouble with the plants, some special offending substance or substances must be sought in the soils affected.

Wishing you success, I am

Very truly yours,

R. R. Snowden,

Chemist & Soil Engineer.

No 1. North Part of Nsy
2. A little further south of 1 — on edge of Trees
3. Further south at Wistaria
4 – By the gate of nsy – north side of drive
5. In Canyon bottom
6. On Top of Mesa south of [illegible] + north of steep drive