ley. The nature and extent of the variations are shown by the arithmetic mean of cases included in the 25′ lift range intervals for Subareas *A* through *P*, as illustrated in the drawing. Because of those variations, the over-all arithmetic mean for the entire sample reveals little consistent information regarding the interrelations of total pumping lift and other well characteristics. No constant relationship existed between total lift and horsepower, horsepower and discharge in gallons per minute, or either lift or horsepower and kilowatt hours per acre-foot.

It is evident that geography and ground water conditions, as well as pumping lift, affect remaining well characteristics. Any analysis of irrigation costs and their effects upon farm organization and earnings must recognize these variations and relationships.

The 16 subareas used in this analysis indicate some of the major geographic interrelations with pumping lift and well characteristics. Subarea boundaries were drawn on township lines for convenience in classifying the test data, but were oriented to hydrographic areas.

Total pumping lift tends to increase from east to west, and from north to south in the San Joaquin Valley. Wells in Subarea *A* on the lower Tuolumne, and Subarea *B* on the lower Fresno River had the smallest average total lift in their class intervals; each averaged about 40′. The greatest amount of lift, 424′, occurred in Subarea *P*, on the Westside.

Over-all plant efficiency averaged 52% for the entire 11,000-well sample. It was highest—62%—in the two subareas with the maximum lift and horsepower and about 10 points lower at the minimum lifts, but showed no consistent evidence of this relationship to lift between the two extremes. Horsepower does not always increase in proportion to increased total lift. In the areas abutting the Eastside foothills, the pump lifts are relatively high but the wells are low-producing; this combination probably reflects the physical characteristics of the aquifers—water-bearing strata. Therefore, operators in that area use smaller motors.

This progress report summarizes preliminary information on irrigation well characteristics in the San Joaquin Valley. Later reports will extend the analysis by adding adjustments for seasonal drawdown and fluctuations in the water table over time due to ground water overdraft and recharge programs. Data on the depths of drilled wells, size of casings, total investments, well and pump life and repair charges also are being accumulated and analyzed. All these data, in combination, will provide valuable insights on pumping and other irrigation costs.

Trimble R. Hedges is Professor of Agricultural Economics, University of California, Davis.

Charles V. Moore is Assistant Research Agricultural Economist, University of California, Davis.

Number of Wells in Sample by Total Lift and Pump Characteristics for Selected Geographic Areas, San Joaquin Valley, 1949–54

Feet of Lift	Area																
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Total
0– 24.9	14	5			3	5		3	6	5	1		3				45
25– 49.9	187	877	30	34	35	182	14	22	99	278	0		19		2	1	1,780
50– 74.9	137	629	169	184	46	504	47	118	120	412	2	8	47	1	1	2	2,426
75– 99.9	54	62	79	70	31	434	21	184	167	680	17	20	43	1	2	3	1,867
100–124.9	9	10	39	48	17	92	3	48	93	504	96	44	64	0	5	5	1,078
125–149.9	3	5	26	73	15	9		9	17	285	171	51	84	1	4	4	756
150–174.9		4	21	48	18	5		2	5	214	145	43	104	3	14	10	634
175–199.9		4	9	28	20	1			4	111	111	30	82	14	20	7	430
200–249.9		8	11	21	32	1			3	83	212	36	139	9	58	30	648
250–299.9			3	3	23					19	174	24	105	4	69	37	466
300–349.9			1	2	2						121	15	30	0	74	49	298
350–399.9			3		2						67	3	7	1	48	61	191
400–449.9					4						40	1			27	83	152
450–499.9											20				7	75	102
500 and above											15				8	99	126
Total Lift	39.8	40.9	60.8	62.7	62.3	62.2	62.3	87.1	87.2	88.1	137.3	139.3	162.6	221.0	325.9	424.3	
Horsepower	22.2	11.3	23.9	26.2	32.6	18.4	17.8	20.8	9.9	17.2	32.2	46.8	17.2	21.4	147.8	163.8	
Discharge G.P.M.	1344.5	654.1	1074.6	1084.6	1486.6	759.9	757.7	653.8	246.2	481.7	638.6	917.9	241.0	197.6	1427.0	1220.7	
K.W.H./acre foot	81.8	87.3	110.7	125.4	114.9	124.5	123.9	166.1	219.2	193.9	268.8	272.8	386.9	533.6	533.8	677.4	
Plant Efficiency	52.4	50.0	58.0	52.9	60.5	53.6	54.6	55.2	44.8	48.7	53.6	54.7	46.6	44.3	62.0	61.9	

R. J. WEAVER

Gibberellins on Grape

Tests with gibberellins indicate several uses in grape production. They were found to produce an excellent set in Black Corinth. They also greatly increased berry size of Thompson Seedless when the sprays were applied at the proper time for girdling. Gibberellin can be applied in conjunction with girdling or separately. In some cases gibberellin applied separately produced larger berries than those obtained from girdling only. The largest berries resulted from a combination of girdling and treatment with gibberellin.

Prebloom sprays of gibberellin greatly elongated the flower clusters so that clusters of compact varieties were loosened. In addition to the elongation some shot berries were formed. The loosening of compact-clustered wine grapes should prevent, or at least decrease, the amount of rot that may develop.

Prebloom sprays of gibberellin also hastened flowering. Sprayed vines flower three or four days earlier than the nonsprayed. In some varieties such as Zinfandel the ripening may also be hastened. The berries color and sugar up earlier. In most varieties, however, gibberellin failed to hasten ripening.

Spraying gibberellin on seeded vines during the summer or fall often delayed foliation the following spring. Such sprays may be valuable to retard bud break in the spring and thereby serve as a protective measure against early frost injury.

R. J. Weaver is Lecturer in Viticulture, University of California, Davis.