PAGE OF COSTS

COST OF PUMPING.*

In estimating the cost of the water (for any purpose) it is necessary to take into account the original cost of the wells, pumps, engines, reservoirs, ditches, and other equipment, and the cost of operation, which includes fuel, oil, repairs, labor, and other items. In considering the original cost as a factor in the cost of a unit quantity of water it is most convenient to estimate the amount of deterioration of the plant in one year and to add this to the annual interest on the total amount invested in the plant. The sum should then be divided by the number of units of water pumped in a year. Professor Slichter advises that the charge for depreciation and repairs should be estimated at not less than 10 per cent. of the first cost of the plant.

The following tables give the results of a number of tests of small pumping plants in the Arkansas Valley, Kansas,[b] and in the Rio Grande Valley, New Mexico:[c]

Tests of Small Pumping Plants, Arkansas Valley, Kansas.

Kind of pump.	Horse-power of engine.	Fuel used.	Price of fuel per gallon.	Total lift. Feet.	Yield of well per minute. Gallons.	Cost of fuel per acre-foot[d] of water.	Cost of fuel for each foot that an acre-foot is lifted.
No. 3 centrifugal	6	Gasoline	$0.22	22.1	272	$2.93	$0.13
Menge	10	do.	.20	15.5	394	2.90	.19
Two vertical, 6 by 16 inch cylinder	1½	do.	.22	15.06	91	3.75	.25
Chain and bucket	7	do.	.21	17.0	540	1.37	.08
do.	2½	do.	.22	15.8	215	2.78	.18
No. 4 centrifugal	10	do.	.12¼	22.13	363	2.10	.09
No. 3 centrifugal	6	do.	.12½	17.60	198	1.67	.09
No. 14 centrifugal	80	Coal	[e]4.00	23.00	2,300	.85	.04
Two horizontal, 5 by 5 inch cylinders.	3½	Gasoline	.12½	21.7	96	1.09	.05
No. 4 centrifugal	5	do.	.12½	21.47	420	1.20	.06

[a]Water-Supply Paper U.S. Geological Survey No. 184.

[b]Slichter, C.S., The underflow in Arkansas Valley in Western Kansas: Water-Supply Paper U.S. Geological Survey No. 153, 1906, pp. 55 and 56.

[c]Slichter, C. S., Observations on the ground waters of the Rio Grande Valley: Water-Supply Paper U.S. Geological Survey No. 141, 1905, pp. 34 and 35.

[d]An acre-foot contains 325,850 gallons of water, which is enough to cover 1 acre to the depth of 1 foot.

[e]Price per ton.

Principal data derived from tests of Rio Grande pumping plants.

Horse-power.	Fuel used.	Price of fuel.[a]	Total lift. Feet.	Yield per minute. Gallons.	Cost of plant.	Interest and depre-ciation per hour.[b]	Labor and other cost per hour.	Fuel cost per acre-foot.	Total cost per acre-foot.
10	Electricity	$0.05	38.93	378	$1,200	$0.108	$0.050	$3.43	$5.75
8	Gasoline	.14	30.70	269	800	.072	.120	2.26	6.13
5½	do.	.14	27.80	258	800	.072	.140	1.58	6.02
28	Crude oil	.03	36.70	938	3,000	.270	.180	.70	3.17
22	Gasoline	.14	41.45	1,325	2,200	.198	.150	1.43	2.79
15	do.	.14	35.87	658	1,500	.135	.150	1.73	4.10
5	do.	.17	45.58	658	1,200	.108	.120	1.34	3.47
12	do.	.17	40.30	131	1,200	.108	.150	3.73	13.20
21	do.	.17	40.45	725	1,800	.162	.150	2.52	4.87
8	do.	.17	26.85	648	900	.081	.120	1.48	3.16
12	do.	.17	34.77	325	1,200	.108	.150	5.14	9.57
8	do.	.17	36.05	271	800	.072	.120	5.10	8.95
10	Wood	2.00	34.16	351	1,200	.108	.180	3.47	7.91
28	Gasoline	.17	43.35	464	2,000	.180	.150	4.34	8.19
20	Wood	2.25	29.55	1,000	1,600	.144	.200	2.83	4.70
12	Gasoline	.17	23.89	837	992	.090	.090	1.04	2.21
12	do.	.17	35.26	191	992	.090	.090	5.80	10.90
12	do.	.17	32.36	750	992	.090	.090	1.16	2.46

[a]The price of gasoline given is for 1 gallon, the price of electricity for 1 kilowatt-hour, the price of wood for 1 cord.

[b]The depreciation and repairs are calculated at 10 per cent. of the original cost and the interest at 8 per cent.

*Arranged from a report by Oscar E. Meinzer, on the Ground Waters of New Mexico.