

alB9 Upr Kwh-Tul,FK,ctrl

To Stan Barnes.

1. Thanks for hospitality. (Any bin to Harry?)

2 p. 59, statement re "demand" not very clear.

a. Pump use not ~~repeated~~ itemized

b. Perc. from irrd. fields not mentioned.

c. 'Demand' undefined. Is this diversion capax. or what?

Is there really capacity to accept 1,340,000 a/cy? Got less than that in '67, but spilled.

3. Now floods are controlled, is there a prospect of Tulare Basin following in footsteps of CCID, ~~a KCLC even~~, and ~~not~~ having a wtr. co. serve small owners? Or KCLC serve small tenants? Combo. of flood control & firm wtr. shd. attract small farms.

4 p. 60, why limit farm opns. to 10,000 a.? Isn't Burrell 100,000? Or how do you define opns?

If 10,000 a. is not a misprint but the true size of opg.

unit. & if GB owns > 100,000, there is a little misleading to emphasize that there are many small ownerships that leave to big opns. suggests that opg. cos. are cause of scale. If B's big holdg. is split into many smaller opns. then it is the invt. characteristics of land that make for size.

5 Why say str. isn't conducive to smaller farms? Many small farms do grow it. There shd. be some evidence for such a statement.

6 Practically understates degree to which flood control benefits downstream area more than others, esply. in terms of potential. Waste involved in destroying old bldgs. in Visalia - no doubt overstated by AE - is no greater than waste in not bldg. capl. on lake lands.

- 7 p. 65, not clear what "computed flow" means.
- 8 Double-mass plotting, useful technique for inv. analysis. Where can I find more on this?
- 9 ^{p. 65} Why did you have to scale down yr. historical receipts from Cross Crk. to the amt that wd. be received under present conditions? Is yr. position so jr. as to establish no rights at all? Or were there upstream riparians who came to life?
- 10 To what extent was yr. sale of yr. rights due to their precarious nature; subject to continued riparian expansion, plus possibly reduced return flows etc. If rip. rts. were saleable, wd. you have preferred to buy out the sleeping ripans?
- 11 Your method of reducing rip. rts. to annual equivalent ~~is~~ seems a good deal for you, since their rt. is not reduced by non-use. Why did they accept that?
- 12 Why, p. 70, omit LSD from list of Rwh. wt. "entities"? I own 25% of Watch. W.C. ~~It~~ Doesn't affect yr. point here.
- 13 Why omit percolation below ind. fields from opus. study?
- 14 Why omit FK deliveries to Exeter, T. and A., L.S., Lindmore, etc. Don't there add some ground wt?
- 15 Downstream benefited by selling their rts. to upstream, encouraging upstream divisions, reducing flood problem.
- 16 Not clear if they sold shares in cos., in rts., or just quitclaim of possible nuisance value.

Major absurdities on Kameah system:

1. Packwd Canal carries St Johns R wth back to Kameah, to supply Packwd Crk.
2. T.I.D. Canal goes clear back to Wutchumna, crosses both branches getting wth back to T.I.D. Picks up St Johns wth on n. side. Also crosses T.I. Co. Canal; Consol. P.D.; FIC canal again, ^{reverse way; & Packwd Crk.} ^{shd gravity from above, use Foothill Ditch Co. route.}
3. LSID goes to Wutchumna for wth; also, required to sink on well field, repump? - not so stupid if so, use as resr. Also, they divert some directly, p 144. Col. 2 (Bull 49-B). They store in spring, divert directly in summer. The direct diversion shd come from higher up by gravity. 16 Foothill does it, LS can.
4. Parallel canals to serve n.w. area, 3 indep. cos: Goshen, Modoc, Wutchumna, & a little bit of St. Johns. 11 & X-ing. Poor soil & climate, hi wth table. WWC crosses & recrosses Modoc, & crosses distrib. again.
5. Costs incurred to avoid seepage, ~~that~~ e.g. p 111, Visalia & Kuch wth co. abandoned Lane's Slough for that reason. More e.g. - T.I.D?
6. Extreme fragmentation of W.W. Co, esp.; less so of Consol. P.D., Tulare Farm Co., ~~Evans, Watson, & Jennings~~.
7. Several crossovers: a, Ore. Life Ins. Co. pipe crosses Wutch below Wood Lake. b, WWC ditch crosses St. J's above Barton cut, crosses Jennings D. forks, n. fork crosses Modoc, ~~to serve one fragment~~, crosses laterals 2-3 times more to reach western most. c, 2 Goshen ditches cross each other, Section T. d, e, f, etc. . . .
8. Ketchum Ditch, like Packwd Canal, takes from St. J. to Kuch branch, ~~Jennings~~ same, at least the 25% that goes to Mill Crk. ~~enough all~~
9. Extensive parallel lines, several.

WWC wth to well field or other intake? By pipe to WWC n. of St. J's ~~in Sect 2, R26 & T18's.~~
10. Lakeside Ditch crosses several canals moving south from Kings R.: Lakelands No. 1 Canal, Settler's Ditch (E. & W. Branches), Melga Canal (which itself crosses W. Branch Settler's Ditch), & Melga again. One branch of Lakeside nearly touches Mill Crk, i.e. Kuch R., after long journey.
11. To reach Lakeside Ditch, St Johns wth must flow accross long stretch of poor (Traver) soils, probly lose much. Mill Crk is more direct route, & is large area along it w/o service.

Pump'g up made sense when used Kuch well field storage. But did it allow that to continue?

Kameak absurdities, 2

12. Guel pattern: 50-50 division at McKay Pt. bears all marks of an ~~secret shillbogh~~ sloganeering catchword ~~irrational~~ arbitrary decision. Demand was greater along Kuk branch, to south. Subsequent southward movements hv. had to proceed w/o changing the ~~secret~~ ^{sacrosanct} shillbogh at McKay Pt. - nor WWCo. etc, also n. bank. Poor soils n. of St. Johns, head. pan at Ivanhoe, Troom series along Conrad Ck, probly a cause. also Alta ID return flows. Alt house, p 42, shows S for as big waste.
13. Yokohl Ck crosses Foothill Ditch.
14. Several blank spaces, no service from any w.
15. Overlap areas, served from 2 or more ditches.
16. Deep Ck Cut, for T.I.D., to take some from Deep Ck, which might just as well flow down to T.I.D. intake. (Might be unreliable, but TIO canal was also unlined for long time.)
17. WWCo. Ditch, takes from above McKay pt, carries wtr all way down to Barton Cut, just above Visalia, where picks up more St. J. wtr. Ed hv. let all wtr go down St. J. Doesn't even use Barton Cut any more, tho - probly bes of channel loss. Or has LS now has 70% of upper ditch flow?
18. Now, (1956), LSID's WWCo. entitlement, 24% upper ditch, are pumped into 7K. ^{p. 18} (So? Ask Burr. I thought they stopped. Why does table of LSID stop '52? Probly Holley means "were" so pumped, not "are". This wd. be column 2, p. 144)
- ~~19. After late summer flow has receded to 80 sf at M~~
19. Special 7K connections to wtr users, hopping over & under old systems? - e.g. to Ivanhoe, over WWCo. ? Altho some Ivanhoeians also hv. WWCo. stock
20. Most wtr goes downstream, tho better soil & drainage & climate are on east benches. Ivanhoe area perhaps lacks good soil. Lindmore & Exeter areas & westerly were good in most all ways, but bypassed. ^{claim says Lewis Ck area poor soil.} Service area spreads out bulb-shaped, narrowest at top where demand greatest. But corresponds fairly well to soil map.
21. At lower end, Lakeside sold wtr to Lake interests, for barley etc, tho upstream WWCo. can't export to LSID for citrus!

Kameah absurdities, 3

22. Lands of easiest reach underground recharge, e.g. along Kwh channels, also hv. best surface sts. But as come to depend on underground storage more, should shift surface distn further from channel acer.
23. Surface wth applied where wth table so hi as to be drainage problem, withheld from areas of deep pumping — Lindsay, 175', '40, cf. Goshen, 10', '40. (BAE Kwh Area Proposal, p. 16)
24. Undefined rip sts remain
25. 80% T.I.D. has Alkali problem. Factbook Rpt p. 12. Indicating past overuse of wth. p 5
26. Competitive gnd wth pumping, to avoid outflow. Cd. this explain hi use/acre. Coupled with hi surface applies to mtn those sts!
27. Goshen Co. area extends into very poor soil, where Cross Crk crosses to Kings Co. tab.
28. Area 22. 48% irrigable land not ind. But 36% of 1B & 64% of 2A not ind, whereas 19% of 35 & 11% of 3A are ind. ~~BAE~~ (p. 9, BAE S&V) (See p. 10 for easier summary)
29. Area 22, 34% Cl. 1 not ind., but all Cl. 1 is within pretty easy reach of river & close to or inside major service areas. (p. 10, 44)
30. Fragmentation of entire service area (including even Lakeside W & hold re Lake interests?)
31. WWC service area, includg TID & LSID. All heading at Wutch. Dist.

find
this
source.

This is my best source.

Althouse, Irvin H. ~~Rpt~~ Wtr Requirements of Tulare Cty.

Rpt to Co Bd of Supervisors, 1-4-2. Also submitted as Exhibit C accompanying Statement to Pres's Wtr Res Pol. Comm-n, in behalf of Tulare Cty.

p 9 Different tillage & fung practises change wtr need. "Cover crops" & use, clean tillage reduces it.

p 10 Consumptive uses;

Alf 2.6 af

Ctn 2.2

Citrus &

Olines 2.55

Decid &

Walnuts 2.3

Vines 2.55

Lain .4

Field &

Truck 1.75

First time I ever saw figs like these.
Here is citrus requiring more than
alf! Maybe alf. culture requires more
non-cons use?

(Incl theme of wtr grabbers is that wtr reqs will rise in future.
But progress is toward accomplishing more & more w. less new intels.)

(If wtr cost is small % TC; & wtr shortage is limitational;
then wd follow shd build surplus facilities. But in fact this has
not been done by local IOs. Contrary, use ditches at midnight; &
even Kwh won't build its own storage).

Althouse, 2

p 11 Takes 600' contour as max limit for bringj wtr.

Ests c. 540,000 irrbk acres, classes 1, 2, 3. - his classes.

Some class 4 now irrd, so he adds 25% cl. 4, $\leq 594,000$ a.

p 12 Lands 500-600' are lower % class 4 + than lands
cl 1, 2, 3

above ~~proposed~~^{7K} canal & below 500'. i.e. higher lands
may ave. better.

In genl, lands above canal enjoy longer frost free pd.

	Acres	acre ft		
		Present ave. supply	Total req.	Addnl req.
1940 acreage	<u>372, ±</u>	756 ±	<u>825 ±</u>	140 ± ^a
Classes 1, 2, 3	<u>540 ±</u>	756	<u>1217 ±</u>	461 ±
" 1, 2, 3, & 25% of 4	594 ±	756	1326 ±	570 ±

Note problem - plan to import wtr for present lands, or all irrbk lands?

a The Addnl req. exceeds the ~~diff of~~ excess of req. over supply
bes local surpluses "can not now be diverted to areas of deficiencies".

Doesn't say why not. These surpluses are 71 ± af. Another
69 ± af dev. by storage on Kwh-Tule.

(So local supplies wd take care of whole thing)

p 13 Shd refill gnd wtr. But "There is ample evidence in this
co. of the ruination of 1,000's of acres bes of the wtr plane hvg
risen too close to the ground surface."

p 13 Huge underground resers, Kuch, Tule, Deer Cr, White R, & "So-Basin".

p 14 Could recharge, & irr. entire ^{all 1,2,3 lands} co. & finish recharge in 12 yrs, by importing 800,000 a ft. Asks for 600,000. (But they are getting perhaps more than that, & w/o irrig alone FK huge block he included.)

(But why build huge canal for 12 yrs use? What next?)

(Most FK wtr used for recharge, large surplus coming available in a few yrs. ∴) But Althouse not coherent, can't pin down his assumptions.

p 15 Tulare ID is one of oldest.

First irrn, lowlands, Visalia. Alta & Tulare IDs after 1887.

p 16 1900, discounted value of "higher plains & hillsides". Pumped wtr to them.

also artesian, but they stopped. None now.

Many irrd props wd be abandoned, at present levels, going as deep as 250', but for hope of new supplies.

(May be puts it, are unrec. "for the crops now being raised." Maybe w/o hope of new wtr, wd go into higher yielding crops?)

p 21 1920-29, & '29-'36, were a very few abandonments -

$\frac{10,012}{316,943}$, and $\frac{8,447}{218,512}$

. These were mgnt lands re wtr, largely. (But negligible on the whole)

Althouse, 4

p 21, T VI, Crop acreages '40, by Tuspl Range, Tulare Co.

Very good.

p 33 1890-1940 Runoffs.

1922-40 runoff
was well below ave of
1890-1940.

	Kwh	436 t at
	Kwh + minor assoc. streams	517 t at
Tule group	{ Tule	130 t
	{ Deer	20
	{ White	4.9
	{ Rag	1.2
	<u>Total</u>	673

Deer is smaller than Limekiln Cr, 28 t at.

Ctrud is 18 t

Yokohl 14 t.

pp. 34-40, An record all streams, 1890-1940

Return. TC 425
T8 A3

Much more good detail.

~~the~~ changes are lessened by linking areas, then downstream flows
probly steadier than upstream, bes more tricks.

Althouse, 5

p30 Lewis, Yokohl, Mehrten, Horse, Greasy, Limekiln, Ctnwd, Niggerhead, and Sand Crks either flow directly onto the plains or into Kwh R below gauging stations where Kwh runoff is msred.

p31 Plate 1. Relation of runoff of minor wtrsheds to precipn index. (The precipn index is just one for entire area, made by H. Holley).

Runoffs per square mile of watershed vary greatly: ~~from~~ in index = 100 year, from 300 af/sqmi for Mehrten Crk to 850 af/sq.mi for Limekiln or Dry Crk.

On Plate 1, the order of the streams never changes, in respect to runoff per square mile of watershed, as precip index increases. With very low precip, all fall to nearly zero. As precipn increases, Limekiln's runoff/sq.mi increases rapidly, Mehrten's slowly. But this relationship among all the curves is too consistent to be realistic -- must be fudging.

There is a marked tendency for larger watersheds to have more runoff/sq.mi, but with exceptions.

p30 explains, there is some conjecture in these estimates, which Holley worked up by interviews etc, for ungauged streams.

Stream	Watershed	Runoff @ Precip index = 70 (about the mean) Runoff per square mile, that is
Limekiln	88.6	320
Greasy	14.15	260
Ctnwd	82.5	230
Horse	26.5	220
Yokohl	72.5	210
Sand	30.4	160
Niggerhead	23.9	120
Lewis	21.7	110
Mehrten	20	100

in
As precip increases, runoff/sq.mi increases at an ~~and~~ decreasing rate -- i.e. curves are concave downwards to the right. ~~This seems wrong to me.~~ First rain should be mostly lost, then later rains, when soil is saturated, should all runoff. ~~Makes me wonder if he knew what he was doing. Write / Hozleyzandzask.~~ Precip is on ordinate, runoff on abscissa.

p32 On Tule R., are no streams below GS gauging station which contribute enough water to be recognized.

White R and Rag Gulch flows were est. simply as %s of Deer Crk -- so don't take seriously computations made with these data. Rag Gulch only includes that part of est flow entering Tulare Co. Tule R. msrd at Success. Deer Crk by TBID since 1919, before that est. by precip index.

Kwh. outflows
pp42-3, Plates 2&3, waste from Kaweah ~~and~~ thru Cameron Crk and Elk Bayou, and St. Johns ~~thru~~ into Kings Co. Even in pretty low years, e.g. 1927, 15,000 af or so from Cameron Crk and Elk Bayou alone escaped -- (as much as LSID was taking) And in 1937-38, flood years, 60-80,000 af. From St. Johns, more escaped, and a higher % of flow: 70,000 af out of 230,000 in 1927; 230,000 out of 440,000 in 1938.

Althous, 6

✓ p42, Kaweah Branch begins to waste when annual runoff reaches 300,000; St. Johns at 70,000 (p43); Alta ID when diversion reaches 100,000 afa -- not much waste in this case -- St. Johns is the big % waster; Tule R. at 90,000

✓ p46 Annual average waste from entire Kaweah Basin to Kings Co and the lake is 84,000 afa. AE found it feasible to conserve 51,000 afa of this, in flood control ("") study.

p47 1903-39, Average annual runoff from Kaweah Basin into Kings Co was 85,000 afa, of which St. Johns Branch contributed 64,000. Extremely variable of course. Zero in 1923-24, 1930-31, and 1933-34; to max of 300,000 in 1905-06, 237,000 in 1937-38. *but Lakeside D. is in Kings Co.*

✓ p47 I should have reproduced. Shows runoffs after upstream diversions, increased variability.

Also shows that there was no trend towards reduced flood flows in this whole period, despite increased irrigation. 1903-39.

p48 Tule R. waste into Lake averages 20,800 afa, 1901-39

p49 Alta ID waste into Kings Co $\neq$ averages 6,590, 1920-40

✓ p54, Plate 6 5 yr moving ave, indices of seasonal wetness, 1855-1940, Tulare Co. Dry period, 1923-1933, was worst in 100 years, by a good deal.

p56 The loss from Alta ID could be entirely conserved.

p58 Table 17 As you move up, upper Kaweah, % of citrus gets higher and higher, until the belt 500'-600' is almost all citrus. 1940

✓ pp 58, 58a, 58b, 59, and 60 give detailed acreages for crops by subareas, ~~K~~ Tulare Co. Areas defined on p91, map. Get reproduced. *Did I ever?*

p61 Cites Cal Bul 3, c. 17-21% water used is recovered for re-use. Vague, tho.

p69-70 Orange Cove area needs water more badly than any area in co. Has two small inflows, Sand and Niggerhead crks. Operators there have struggled and maintained some agric., with remarkably little water.

Lewis Crk runs into LSID area.

Mehrten, Yokohl, and Ctnwd flow into upper ~~Delta~~ Kwh area.

✓ p71 Much of Alta ID has had too much water in years past. Ground water rose to surface, ruined much land, esp. southern part of district. (And Orange Cove area so close by, too).

p69 Reuse est. at 27% applied water, "Kaweah area".

✓ p72 95% wtr diverted from Tule is applied in unit right along its channel. Pioneer Ditch takes Tule wtr north (another counter flow to FK canal) out of channel unit, over towards LSID.

Vandalia ID pumps Tule R wtr south -- is to Tule what LSID to Kaweah. Other wtr used south of Tule R is all from underground flow.

Althouse, 7

✓ Alpaugh ID imports up to 20,000 afa from wells in Kern Co. p74 via 14 mile canal. This is practically all its water. (another reverse flow)

p74 Alpaugh ID has low use per acre, grows much grain. Tight subsoil, little seepage thru. (Yet 20% acreage was alfalfa)

p74 LSID soils very tight, so use little water and get little recharge.

Vandalia is all citrus, but half her wtr from pvt wells. *44% to be exact. Uses more per acre than LSID - 2.9 af/acre, 1930-40. Recall this is highest cost per af. So LS too wd. have paid more, but met an absolute block.*

p76 White R area, n.e. of Delano, more porous soils, Hanford sandly loam and Hesperia loam, use more water/acre, get more deep percolation.

✓ p88 Some class 5 soils used for citrus and truck, along foothills. This is a 12-group or class classification, of Storie and Weir, as modified by BR. Well no, at this point he has gone back to original weir and Storie 6-class system, so Class 5 is way down the line.

Now then on p94 he shows areas classified as 1-3, various units. There is a lot: and a good deal is above the proposed CV canal, (altho most is below it, but above it is most advantageous climate, which makes big diff. He has already observed, p. 88, that class 5 soils often used for citrus or truck along foothills, but seldom in sw lowland area.)

(If BR had a consolidated service area to work with it could install one big pump, elevate FK wtr just s of Tule R or thereabouts, serve huge thermal area

Area	Acres below canal	Acres above Canal		Total
		Below 500'	Above 500' Below 600'	
Kaweah				
Ctnwd	2055	1696	2611	6362
Upper	18760	9791	1326	29877
Tule				
Delta	24241	14036	4127	42404
North	13913	3644	934	18491
Deer Creek				
Upper	17366	18677	13269	49312
Lower	16782	--	--	
White R	25555	20361	14448	60364
County Total	427038	76142	40384	543654 Many units omitted)

Remember these are just classes 1-3, in Tulare Co. p94. Is much other land too.

✓ T26, p96, sums up well. Deer Crk and White River areas, he adds land in all classes, 1-8. Most of it is in 1-3. Most is unirrigated. 88,000 acres in Deer Crk unit, and 69,000, White R. area.

Althouse, 8

p96 Orange cove unit has 19,000 acres, classes 1-8, of which 4965 irrd 1940, but quality not nearly so high as Deer Crk and White River areas.

Upper Kaweah unit likewise has poor soils (this unit includes Lemon Cove, Woodlake, Exeter, just misses Ivanhoe, and extends on nw to Alta ID.

✓ So all these foothill areas: Orange Cove, Ctnwd, Upper Kaweah -- have pretty poor soils, until you get south to Tule R. But then this is the area not getting water from CVP or anywhere. "Too happy dry farming??"

✓ p97 In northern part of Tulare Co., rough terrain near canal precludes much development ~~above~~ below 600', except some on Orange Cove area, and a good deal in Kaweah channel area. But . . .

"In the southern portion of the county, in the Tule Deer Creek and White River areas, there is a very considerable body of land to the east of the canal and below the 600' contour. This is, generally speaking, very good and highly productive land having advantageous climatic conditions. In this area lie the large citrus developments of the southern part of the co. as well as many acres of truck crops. Further development has, up to this time, been restricted because of an insufficient water supply.

It is believed that secondary or high line canal should be constructed at about 600 foot contour. Diversion cd be made from the canal at a point near the center of Section 9, 21S, 27E, and the water pumped thru a close conduit about 8000 ft long to the easterly part of section 10, said twsp, to the head of the 2dry canal which then wd follow a min grade and run n and ne-ly into Frazier Valley and another branch southerly crossing the Tule R., Deer Crk and White River areas near the upper limits of the previously mentioned development."

Thus districts here wdn't have to build parallel lifts.

Also, is 10,000 acres or so of "very fine land", 600-700', some of it already developed.

Map, back pocket, shows irrigated acreage, Tulare Co., 1940. Checkerboarding at its mostest. Even in Alta ID, and around Visalia, but growing ever more ragged as one moves toward fringes, in every direction. Have reproduced perhaps.

Althaus,
p. 27

1st - d pasture excluded?

—
UNDELING CHOP VENTURES IN 1940*

[illegible]

Channel losses, mean, 1921 - 39 (wtr yr)

St. Johns Rr. 2690

Kwch Rr. 1790

pp. 120-25

p. 61, cites Bull 3, 1922, re 1920-21.

Applied use of wtr/a₁ i₁rd in 1920-21: Kwch Delta

By ditch 2.9'

By pump 1.7'

Ave. 2.6 (showing were fewer pump than ditch - served acres)

p. 75 Vandavia uses more wtr than other citrus areas partly lies higher, hence higher
nite temps.

Also more intensive planting

p. 12 Assumes 69,000 a₁fy "will be concerned by flood control dams on the
Kwch. & Tule Rivers." Is he underestimating? Doesn't specify dam size.

p. 113 ¶ advises flexible contracts to reallocate wtr when recharge accomplished
(But this wasn't done.)

p. 13 Empty underground storage capac. below 20' depth.

O.C. 21.6 t at

Alta —

* Consolidated —

Kwch 1,102

Tule 914

Deer Crk 503

White R 1191

As. Basin 33 (Alpaugh area)

But area BR is actually recharging is
much less. So surplus shd come
soon.

! (Small s.e. corner of Consol. I.D. is in Tulare Cty., n.w. of Kings R.)

Find ground storage capac. in areas served by FK.

p. 109 1921-35, "Kwh area", mean grnd wtr level dropped c. 31'.

Reps. withdrawal of 1.3m af. (FK replaces this in a few yrs)

Area	Drop in W _{tr} Table	Period	amt of wtr (af)
Kwh	31'	1921-35	1.3 m
Tule	37'	}	.550 m
Deer Crk	45'		.133 m
White R	53'		.660 m

p. 110: TID recharges, on experimental basis tho. also KOWCO

p. 115, T32. In an underground storage column is capac. for over 10% volume in wtr, most areas. -- less as you move east. Thus under each acre, going down 120' and subtracting top 20' to keep empty, is storage for 10 af or more. In Tulare area it is 14%, wd have 14 af under each acre. Lower Tule is 10%.

p. 69 Central Crk upper valley is hotter, w. citrus & vines, but wtr shortage.

Best of 29,303 afy mean runoff Central Crk, upper valley keeps only 10,000 afy in big yrs 1937-39. Normally it is 7,000 afy, or 1.9 af/a. No ground storage much good. p. 69. Gross area, 16,883 a; irrd area, 3660 acres. 1937-59. Shd keep more Crk wtr &/or import from Kwh. } 10,000 afy Central Crk water into Kings City!

Inflow-outflow. Althouse, p. 66 ff.

12

1931-39 inclusive, 3 yr pd.

5-383

<u>Unit</u>	<u>Source</u>				<u>Unit</u>	<u>Source</u>			
Upper Kuth	(67,138 a)				Lewis Crk	(13,581 a)			
	Ditch Diversion	38	650			Lewis Crk	2	315	
	Yokohai Crk	23	710			LS imports	11	850	
	Melinton Crk	3	670			Av. Supply	14	225	
	Ctrwd Crk	10	000						
	Channel losses	20	860						
	Σ	96	950						
	Outflow to Delta	10	000						
	Available supply	86	950						
Delta	(128,074 a)								
Inflow	From Upper Kuth	10	000						
	Channel & seepage loss	39	150						
	Diversion	233	000						
	Σ	282	150						
Outflow	LS ID	16	850						
	To So. Kuth Unit	8	600						
	To Kuth Tulane	55	050						
	Σ	80	500						
	Available supply	202	250						
Kuth Tulane	(105,044 a)								
	(much magnified in these years)								
	Diversion	144	950						
	Inflow	50	050						
	Available supply	195	000						
So. Kuth	(12,764 a)								
	Lewis Crk	2	000						
	From Kuth Delta	8	600						
	Available supply	10	600						

Althouse

p. 91, Map of areas.

Kirk upper, delta, & Tulare, ~~3 big~~ 2 big crescents above TID.

Tulare unit, of e. bdy is e. bdy of R 24e, but turns n.w to hit tab in middle.

Delta unit has Visalia in middle, Ivanhoe just in n.e., Exeter just out to e. This wd. be the wastrel unit.

Map in back cover. Irrigated land, 1940 (a heavy year)

Extremely scattered. No absolutely solid blocks, of used or unused. Showing limiting factor is not water, nor soil — but human enterprise. Marginal oppies are being exploited; intra mgul ones are being neglected.

Importing wtr will not change this pattern.

Fire? No, bus is like suburb, need for public wtr supply is inevitable, scatter makes it costlier.

Very good source

BAE, "Area proposal, Kaweah-Tule Area California." Water Utilization Section, Division of Land Economics. 9-41 (ask Adon who might be working in that now).

Define Zone 1, 440 mi², as Tulare L Basin, subject to occasional inundation.

Zone 2, 1120 sq mi, main valley lands, practically all irrigable.

Zone 3, mts.

(re zone 1, here is another huge potential benefit from storage. Why oh why were these rivers never harnessed by pvt or local people?)

Pop 78,000; 29,000 on farms, 9,000 rural non-farmers, 40,000 urban. Visalia 8700, Tulare 7500, Porterville 6400.

p5 Streams come down very steep gradients. (another benefit from storage. The mystery deepens).

✓ p7 Toward west of zone 2, heavier soils of lower value predominate. (again, water should have been diverted high up and moved south). In these heavy soils, where high water tables predominate, alkali damage.

p10 Kaweah flow near 3 Rivers, 1903-1940, mean 401,000 af; max 1,090,000 af; min. 102,000 af. June is good runoff, but July dries up. (p11, mean goes up to 440,000 below 3 rivers, other tribs come in)

✓ p10 "...no favorable reservoir sites are available..." (how about storing it on other streams? Or using it all to expand agric., and get supplement agric then needs from other streams?)

p10 Cite Stat Div Bull 29, 1931, that only 15% of total stream flow is wasted by evap from Tulare Lake plus overflow into SJ. But latter never measured.

Tule River mean, 132,000 af; Deer Creek, 19,000. (Cottonwood Crk not mentioned, it was full when I passed it last week, May 1958)

p11-12. 9 damaging floods since 1862, along Kaweah-Tule.

p12 Most of valley, wtr table not below 60'; never below 200'.

p13 Hi wtr table, used to seep into Tulare L Basin. a little Kings R seeps in to lower part of area.

✓ p13 Irrign began 1854. Mt. streams diverted. This reduced recharge (so don't let Tule irrig claim ground w recharge? Diff. geology there probly.) But p14, some areas of heavy irrig-n, it has raised table - probly where wtr is imported

Area Proposal Kaweah-Tule, p 2

p13 W_a table has fallen most farther from streams, still source of recharge

p14 1918-35, 18 yr dry cycle! (No wonder people hold on to surplus w_a) Since '35, wet yrs stopped fall, & raised table in some areas, except just w. of Lindsay where conditions disfavor recharge.

Oct, '30, — Sept, '35, "unusually dry cycle"

'20 - '35, Tulare L entirely dry.

p16 Around Lindsay, esp. heavy pump's draws in surround's w_a, table is lower. 175', 1940, down 60' from '29 (so here is where w is valuable, right w-in a small area

Goshen, table 10'

Kaweah Delta WCD provided sink'g basins, but this hasn't helped lands far from river

p17 W_a quality also higher near rivers. Near w-n edge of zone 2, slight alkali. (so need w in lowland?)

p18 c. 300,000 a irrigd (out of 1120 mi² $\approx$ 100,000 a)

80,000 a	by surface alone
120,000	mixed
100,000	ground alone

Area proposal Kaweah-Tule p3

p18 Wta reqs:

Grapes $1\frac{1}{2}$ af
Tree fruits 2
Field crops 2-4 - alf. tops

Bes subsoil is porous, unusually hi 90 irign w perc to subsoil & is reused. So net consumptive use, entire area, 2 af.

(On soil like this a little w goes a long way & shd have hi MP.:)

Mention LSID, TBID, & Vandalia ID, which pump on large scale - otherwise pump is on individ farms.

p19 In Kaweah Delta, 175,000 irigd acres, in balance - w use = supply.

Cf. Tule-Deer Cr area, 100,000 irigd acres, pump irig-n, use 220,000 af, far exceeds supply

p20 Small acreage w of Lindsay & Strathmore, pump lift "fast becoming prohibition" - there is margin, see how far they are will'g to lift, how much pay.

Area Proposal, Kaweah-Tule, p 4

p23 When CVP wtr comes, pumping would have to continue, if for no other reason, to avoid serious drainage problem. There is fairly good line as to when too much wtr is being used I should say -- when have to go to public expense to pump down wtr table.

Why, tho, wd people continue to surface irrigate when wtr table was that high? Couldn't they then subirrigate?

✓ Suggest 75' is ec limit lift for other than citrus and olives; and for them 175'.

✓ Permissible water costs, cite Divn W Res Bull 34, \$8/acre-yr limit for alfalfa, \$7.50 for cotton, deciduous fruits, and grapes, and \$30 for oranges.

(This makes alfalfa look lots better than I had thought. But still doesn't make up for all the extra water it takes). Allow exceptions where farmers extra good, and other conditions.

✓ p26 New deep well turbine pumps, together with direct connected motor and all necessary equipment, to irrigate about 60 acres, cost \$600-1200. To drill and case an average well, \$500-800

Lower Tulare Lake Basin area, how would you decide source of water, with four rivers overflowing into it, and ground water seeping down from all?

Map 1. Goshen (of the 10' water table) is c. 8 mi wnw from Visalia. In this area I suppose anyone can pump water -- and there is little excuse for applying lots of surface water, which would flow down from above if applied there)

Tipton and Pixley, where ground levels fell very much, are also lowland, but farther south, in Deer Creek runoff area. Is close to Earlimart, where gross acre yields are so high. So applying water to Terra Bella area would help good lands down below it, too.

Tipton is right in middle of L. Tule ID, but Pixley is left out of everything. Why?

Map 2. Kaweah R splits into, from n to s: St. Johns R; Mill Crk; Packwood Cr.; Cameron Cr. -- which comes in straightest line from major river and perhaps has best claim to be called Kaweah R downstream; Unlabelled one that hits Tulare; and Elk Bayou, which runs into Tule R. presently. And n. of St. Johns there is Elbow Crk, on another map, which just misses Ivanhoe.

From all these distributaries canals take off, down to Kings Cty line about. All pretty short and limited in scope.

Cottonwood Crk takes a great circle around north, heads back sharply south in Kings Cty, after being reinforced by St. Johns and becoming called Cross Crk. Canal takes off from this in Kings Cty tab, splits up some going south. That would be around Hanford, an area already overabundantly supplied with Kings River water.

Area Proposal, Kaweah Tule, p 5

One reason for no storage on Kaweah I imagine is this: alluvial fan provided pretty good storage to build up large agric with vesteds in wtr. Only promoters of storage would then have been outsiders, who would have had to take on vesteds.

Map 3 Lines of equal depth to ground water, 1939.

✓ C. 4 mi so of Lindsay, bottom of trough, 215', very steep gradient, over to 15' on Kaweah R. Another "trough" on hill e of Ivanhoe, 75'. Another hole with bottom 5 mi w Tulare, 75'. Another with bottom 3 mi e of midpoint of line between Tipton and Pixley, 105' -- bot this is not a center, but an arm of a low table area that goes south in foothill belt and gets deeper, down to 175 at edge of map, lat of Earlimart but to east -- Earlimart itself is 75. Contours run to sw from Terra Bella.

Is a little water mountain just n TB, rises to 55', along Deer Cr.

✓ One must beware the generalization that water tables rise as go downhill. Generally true, but notable exceptions. Hole west of Tulare is notable, -- and it is in direct line from Kaweah, too. Something must block flows, they envelope the hole but do not fill it. Area is now in TID, but road map shows blanks there.

Ivanhoe to n, and Exeter to s., could both be served by Kaweah R, they're very close. But downstream rights must block it. Inquire.

✓ Map 4. Lines of equal lowering of water table, 1919-39. It is remarkably like Map 3, contours of wtr table. So it must have been more even back in 1919 -- and who was ever to know which areas would go down and which wouldn't? Sheer chance.

Burn

3 pressure zones in ID, separate balancing res.

(5' drop/mile) - to make water flow faster.

Were used to small flows, old days, so built closed pipe irrign system.

Rancho de K. betw. Kameah & St John. So bought stock in ditch coos, got control of some. Final settlement, had to sell stock

~~LSID~~ LSID pushed amendment '28, to allow export from Kameah.

George Trauger lobbied for it. decided
Judge ~~Shaw~~
Earl Vincent

San Diego voted big for it

TID & many other downstream ripers got after them. Thought they cd break LSID, but LSID had tax power, cd force it, won out.

(Harry Holley, Visalia)

Leg.

TID v. LSID 3 Cal 2d 489

Rank vs King, physical sol-n, collapsible weirs, gives same result as 2,000 st. Probly won't work. City of Fresno is behind it. Still going on.

Burr, 2

Sell ~~Alachua~~ FK wtr to Kings R sometimes.

Hv sold wtr to Salzer, & Crockett & Buie below L. Tule.

Sprinkler, 2,000 a, $\frac{1}{2}$ gal/min., to indiv. tree, plastic hoses.

Saves wtr; saves furring - use ~~not~~ weed killers

Cost 250-\$350/acre.

Benefit is keep wtr at surface, all way down furrow. FK wtr is so good, w/o sprinkles get too little penetration sometimes.

w sprinkles, stop using gypsum, soil conditioner.

Soft wtr in furrow seals bottom of furrow.

Shows up in 4d yields. Must wtr every tree, not too much, affects yields greatly. Takes much labor & skill to irrig. properly, but anybody can mone sprinklers.

Sprinkle entire root zone, area in between trees used fully.

1. 16' / acre under old settlement, so learned to not waste.
Production suffers + ho - $2\frac{1}{2}'$ per net acre. is optimal. No wilt.

Tulare ID et al tried to sink Lindsay. Dynamited works, '20s.
LSID had 17 armed guards on payroll once - Pinks - & mgr carried gun.

(Schus says is some pumps from perched table.)

If no such attacks, probly never wd hv worked together as did. Esp,
never brought in hills - but needed their support. Actually hills
help out, esp of scale they permit, (altho he later backtracks on this,
says wd rather hv several small pumps, not hv to worry re breakdown, &
wdn't need man to watch 24 hrs/day

Orig. system cost \$2,800,000. '20s.

Rebuilt, '30s, WPA labor. Also dug out upper resr, by hand,
took 2 yrs. U.S. paid LSID to employ men.

Many, many groves too old. They peter out slowly. Some trees
die, some get a scale they can't get rid of. And plant too far
apart, modern equipment allows min 140 trees/acre, old groves have
80. Today they use weed killers, needn't cult. w tractors. Prune trees
w circular vertical saws, then fill space. Etc.

Above FK is more rugged country, LS area. But old LS hi line
runs hi above FK, maybe 200-300'. Now idle.

Some flexibility, going in & out. Some men take some land out, put other land in, is ok - they build nec. extensions.

Drs, lawyers, etc, moving in from SC, & locally.

Schu gins e.g., that had alkali land, didn't want put any in in it, kept in lower use. New owner, from outside, applied gyp, made perfectly good.

✓ L51D files, preparing for lawsuit, all available to read.

L Tule ID has 3 impr. dists, for dist. 4th section, near river, needs none, 25' level or so.

L5 server easy - just go turn on meter. Even so, aren't too happy w BR system. Hill etc of LA planned one, cost c. \$1/m, but chose BR's for \$1,400,000, but int. free 40 yr loan - & extra cost was mostly padding.

Lindmar system very poor, inexperienced man planned. Flipped on gravity, so made underground gravity system. Have to open 10-20 checks to place one order wtr. Now hv some pressure from canal head - not clear.

Brief notes on Th. Crocker's notes on TID v. LSI, 3 Calif. 2d, 1935:489-584

1928 Amendment, "reasonable use". Sec. 3, Art XIV, Nov. '28.

p. 490, limits ripn to beneficial use "the same as it wd. be in the case of an appropriator." -

p. 490 (a summary) This is the declaratory injunction case. Art. XIV protects "prospective reasonable beneficial uses" of the riparian as well as actual.

Both actual & prospective uses have priority to any right of the appropriator. But approp. can use until ripn. gets ready. "thus at all times, putting all of the available wtr to ben. uses". (Ha!)

Thus strengthening riparians. No diligence requirement for them. 10 yrs non-use, in 1913 Act, nullified.

Basis of case vs. "exporting" was re ground water, p. 500 or so. Tulare won, LS appealed. Evidently on ripn. grounds? (But Lewis Ck etc. run down to TID.) But origly TID won only for amt needed for use on its ripn. lands.

LS had variety of wtr rts.

Court recognized & regarded Kwh Delta as a hydrologic unit, linked by ground water. [From this it wd. ff. approp. rts, place of use cd. not be changed if someone was injured thereby]

p. 548, LS insists seniors' needs are seasonal, i.e. they don't need winter water. (But LS wanted to store winter wtr in Ranchos? If so, issue of flow vs. stock did come up, & there was a form of storage.)

p. 549 Co. holds senior ("respondents") used entire flow, apr.-July. (Seems to add in view of waste then, but check my figs, maybe none)

Para. 10, p. 526. 1928 amendt passed after Trial Ct. decree, yet "this act must be given effect in deciding the appeal, since the case involves only relief by injunction, and this operates wholly 'in futuro'." p. 528
seems to imply present ownership of future values is subject to intervention by ~~courts~~ statute or public.

Para. 35 p. 549. Court convinced that respondent appropri (downstream senior) has used "practically the entire flow", April-July.
(But this won't argue vs. LS taking ground w/ then, for effect wd. be just long terms, not immediate)

Para. 36. Court agrees srs. did not divert 1000 st in Oct, Nov., Dec. & Jan.

Para 38 Srs. claimed winter flows, too, & Trial Ct. granted. Sup. Ct. disagrees on this, reverses, para. 43.

Para 49, rejects LS contention that overrun. caused by w/ table & injury to soil.

p. 576 Limits approps not just to amounts diverted in past, but times of diversion.

p. 577 Rejects srs. claim there is no surplus, but claim was based on claims only & not on actual use. (Thus mere claims, while a pest to newcomers, are not real security for claimants. Factitious use necessary)

Crocker, 3

Para. 58 LS pumping causes seepage, induced, from St. Johns.

Also intely lowers wt table whole basin. (So ground wt law must have applied to much of their expert, explaining prohibitions.

Still leaves in doubt surface wt. gn, tho.

p. 580, Ct. awards LS 35 sf, but at any time. (Thus they cd. benefit from ground wt storage under Rancho. Probly store WWC. flows there, thus compensate. But Tom's notes don't tell if required to do that.)

TID vs LSID, 3 Cal 2d 489 - 584. Cal. Supreme Ct. Opinion written by Ch. Justice C.J. Waste. May, 1935.

p. 580 LSID gets good deal as to timing: 35 sf, but "at such time or times, & at such rate or rates, as said defendant may desire." —
= net of 35 sf steady flow all year. Even if not in the stream, I judge.
Thus they get optimal time distribn, to compensate for small quantity.

p. 573 Appellant (LS) protested that trial ct (Lamm) had fixed its in a sf, ~~fixed~~ $\geq$ all but highest flows. Wanted them in at. 543 - 46, long double talk justifying sf, tho admitting problem, & mildly favoring. Tho not prescribing or setting, maxima in at.

p. 490 Riparians may protect prospecting uses by declaratory injunction.

p. 491 Use of entire flow of stream for subirrigation held not a reasonable use.

p. 491 Can abridge rip. rt. under police power.

p. 492 But "Section 11 of the Wt. Comm. Act, in so far as it attempts to declare that ten years' non use, w/o an intervening use, shall constitute an abandonment of the rip. rt, is ~~unconstitutional~~ unconstitutional." (Evidently is constitutional to do it one way, not another).

p. 493 LS use was a "public" one, so could condemn rip. rt, in defense! Cites Collier v. Merced ID. 213 Cal 554.
only if it was already putting them to public use.

p. 494 Burden of proof is on LS, as interloper, to prove surplus.

p. 495 Trial Ct. awarded plaintiffs fixed st. Supreme Ct. says this does not award them the equivalent of that continuous flow, but they only get that max. when river flows hi enough to give it. They seem very pleased to demonstrate that the river can then supply these claims. But leave unsettled the other rates — i.e. 99.99% of the time.

They speak of ^{Kaweah's} variability as exceptional, as tho in other cases low wd. work fine. Again, p. 499

✓ An appropriator is entitled to the customary flow "to the head of his ditch..."

p 495 There was an earlier rule that appropriator was "measured by the capac. of his ditch..." "has long since been repudiated."

Now beneficial use. [But the melody lingers on]

p 496 Use is "reasonable" if up to standard of "the general custom of the locality."

p 499 Ct. agrees that some winter irr. was put to beneficial use. Soil stores it, etc.

✓ Ct. agrees that plaintiffs judged com'g w/ supply by snow-pack, & varied acres accordingly. Check data, is this so? If so, shows hi MP w/.

p. 499

TID v L51D 3

Ct. holds approps must show reasonable use, but was ok, bcs
"under the system of irri. there prevailing, the quantity used by each
appropriator was reasonably necessary, ..."

p. 499-500 No doubt approps did not divert "in the most scientific
manner, & bcs of the paralleling of the ditches of some of said approps,
there was an unecon. use of wtr, (but) the various approps were not one
unit & each had his own approp. rt., gained by many yrs of use, & the
cts. cd not, & even if they had the power, should not compel them, at
their expense, to build new systems of diversion; & defendant shd. not
complain of such alleged poor methods of diversion."

p. 500 Conveyance losses of 40-45% & even more are quite ok.

p. 501 Intermittent approps. cd. not claim their max. flow for all
yr. vs LS — but names no names.

Seems to have no fixed judgement — leaves that to a retrial

✓ p. 502 Trial ct. decided vs. LS, but suspended ~~judgement~~^{injunction}, subject to
"certain conditions", pending appeal. (Evidently LS, after losing case, bought
Wutch. stock)

p. 504. Now, in 1935, case is to be decided on ground of whether plaintiffs
put wtr to beneficial use before 1916 (when case opened).

T10 v. LS10 4

p. 505 50-50 at McKay was from earlier decision.

p. 507 all 16,000 acres in LS is irble, & 14,000 good for citrus.

-08 1916, 6,000 acres in citrus.

1935, c. 9,000

p. 508 1913, LS wells began to fail - salty.

Trial ct. found (1926, Judge Albert H. Stephens), LS "lands planted to citrus" worth \$1250/a; w/o wtr, \$50. Not clear, but impln is that he means land + trees w/o bldgs.

p. 509 1918-22, LS pumped 13-15,000 aly.

p. 510 Trial ct awarded flows in st. But divided yr into 2 halves, Feb 1 - July 31, & Aug 1 - Jan 31. Σ sts is 2,000 st & 1,000 st, respectively, for lower approps only.

p. 524 { Rips claimed whole flow, for subirn. & Stephens awarded it. But Waste reversed him, bcs '28 amendment passed subsequently, requires reasonable use by rips. Stephens was ff. rule of M & L v. Madera Canal & Irrn Co., 155 Cal 59; ^{1931 - how come, after 1928 amendmt?} Miller v. Bay Cities Wtr Co. 157 Cal 256; Herm. v. SC & d., 200 Cal 81.

Amndmt ok on basis of police power, changed rule. Pbdy v. Vallejo 2 Cal (2d) 351; & Gin Chow, 217 Cal 673.

p. 525 Now, trial ct. must fix quantity for rips.

But cannot fix quantity of future needs. "Declaratory judgement" does not fix amount. But any amt deemed reasonable at the future time, & approp. it cannot ripen to prescriptive st. in meantime (This jeopardizes all approps!!)

TID v. LSID, 5

(p 539, awards of Stephens)



See p. 3 on McKay sacrosanctity

Some general observations on Kaweah distributions:

1. Some very junior juniors, with high variability: Elk Bayou, T.I.D., Year to year, that is.
2. Occasional elements of flexibility creep in. E.g. mainly thru CVP tho. In fact I can think of few other instances, e.g. Exeter swapped some CVP wtr to Wutchumna for some Kaweah Wtr via Foothill Ditch, 1951. But just once. Floods seem to do same, where wash things out, is temporary accommodation sometimes. *Wutchumna Co. can xfr Benton Cut diversion up to main ditch.*

3. In an exceptionally heavy year, like 1952, Kaweah River will reach 5,000 sf. Ordinarily about 2200 sf, reached in May or June, is max., and certainly that capacity in canals would capture about all the available flow. Total diversion capacity might come to 5,000 or 6,000

4. I will want to note whether max diversions are simultaneous, with each ditch. Better, when river is ^{should they be?} at max, and presumably some wasting, are all ditches diverting at max? May 27 & 28, 1952, was max flow of Kaweah at Three Rivers, 5170 sf. A few ditches reached their maxima simultaneously, but most did not. Natural overflows like Mill Crk went to capacity simul. Cross canals, like Pakwood and Tulare I.D., went out of use, presumably because water was not needed. -- thus that canal capacity is of utterly no value in handling heavy flows. Several canals showed no response whatever to heavy flow. Altho below their max. physical diversion capacity, as well as max. recorded flows, tho less so the latter.

Set up columns: flow on May 21, 1952 $\div$ capac.; *do.* $\div$ max. recorded flow; date of max recorded flow; days before or after May 27.

5. Some ditches are nearly absolutely steady for weeks, then suddenly change. If by chance the mean should light on one of these values, modes, wd it not give a spuriously low impression of σ ?

Other hand, whatever advantage there may be in micro-steadiness is not registered by σ . Balancing these 2 out, probly for many cases, σ ok.

6. Every entitlement is stated in terms of a flow, not volume.

This is an advance, bcs if volumes per yr were criteria, then cd. be no schedule, hard to partition spring flows etc. Yet this becomes a straight-jacket.

7. Large areas are served by canals only, w/o suppl. pumps - p 11 - c. $\frac{1}{2}$ of "net canal served area".

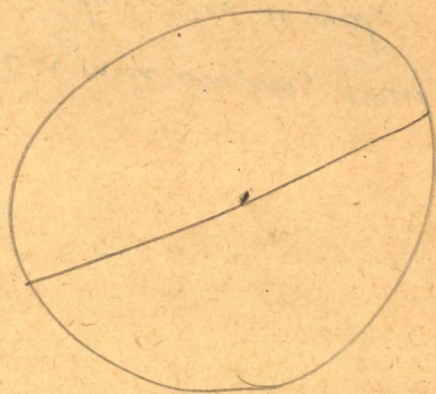
So non-pumping is def. possibility, with good canals, 2 index of dry periods is important.

8. 100,000 acres receives service, normal yr. 6,000 sf capacity is enough to serve how many af in 6 mos? 1 sf-day = 2 af. $6,000 \text{ sf} \times 180 \text{ days} = 1,080,000 \text{ sf days}$
= 2m af. Cut in $\frac{1}{2}$, is still excess capacity, esp when is also pumping capacity.

9. Note in text, some farms hr rts in 2 or more canals, thus may stabilize supply more than data show. But also reduce area served. 100,000 a. served by river whose ave. an. runoff is c. 400,000 cfs, change notation to afy. Is AL pump acreage, but that is partly river & partly net draft.

10. A few diversions are not used: Goshute Ditch, 5,550 acres, is largest. Sec. 15. But it gets little supply.

11. Acreages given in text are gross - is overlapping. Estimate areas of overlap from map, using Areagraph. ~~Allocate~~ In computing use per acre - here is for Holly. Do farms have to apply w/ under their rts inside limited area? That was not so with Wutchumna, obviously, tho is with Lemore. Probly can move around overlap's holders cd spread canal rts over more land. Lacking more land. Some, so is no presumption of uniformity inside cost breakdown below co. level, however, ~~probly~~ use that ass-n. Then overlaps don't matter



Karveah distr., 3.

11. (cont.) of Fairist ass-n w. overlaps is that these areas have same water intensity as the more intensive of the 2 overlapping cos.?

Maybe. But much the easiest is assume gets same amt per acre from ea. co. as does rest of co. area. Trouble is, this makes overlapping areas much more intensive than others, perhaps falsely. In some cases, tho, no doubt truly, e.g. Elk Bayou & T.I.D. overlap.

But these areas are small, & mostly in V&K co. So figure twice: a. ~~Consolidate all V&K~~ (a.) Count overlaps as sum of individual cos. ^{list separately.} (b.) Consolidate V&K, figure overall duty.

Some overlaps are probly just in figures, e.g. Packard area of T.I.D. Check this thru using areagraph.

12. 25% Jennings Ditch flows go to Persian Ditch via Mill Ck. So count only 75% for Jennings.

Good { 13. Give an idea & e.g. of why pts of diversion stay fixed. E.g. WWC. has it to so much above McKay divn. McKay divn is sacrosanct shibboleth betwn Kirk & Stf's assocns. Down the line, its stated as "33% of 1st 200 st to reach head of such ditch." ^{Involves some multiple relations & adjustments.} Change flows & must change defs of its. Some one person ~~person~~ ^{paranoid} feeling swindled cd throw whole thing into court. But WWC. does shift Barton Cut diversion upstream! ^{as a special stipulated privilege - T 25, & esp. p 22} This seems to be regarded

14. Stf. gets nothing, late summer, after flow recedes below 80 st. at McKay. Watchumma etc can even dry up Kirk branch

Kirk distrib. categ, 4

15. A ditch may have both ~~seasonal~~ ^{yr-long} deficit, but periodic surplus flows within the yr. These surpluses may be crudely stored. Yet their ownership prevents others' building to develop the flood wtrs. Crude storage obstructs good storage - whereas no storage at all may not.

a full mass of waste wd. ^{may be instantaneous} flows in excess of what system can absorb. None of flows I've seen on Kirk exceeds or reaches diversion capacity, but ^(on Kings does) how about farther down the system? Etch says one man can handle 3-4 st by wild-floods, max. Border & check methods, handle 15-20 st. Furrow methods, 1-1½ st max. p. 172 Small ditches (This needn't apply to modern area, pipes underground) run along c. 10-20 st, rarely spend much time under 10 st. So waste is not in ditch diversions below what one man can handle, but below, certainly, what requires one gang, & any semblance of formal control, measure, & study.

- Now look for flows above what can handle. I see none above what (over) 16. Low flows, might seem cd. send all to one fm. But equity among members demands some distribn no doubt, esp. if very risky. Yet waste time & wtr handling small heads.

17. Split at McKay may be silly, but it is a fractional division, anyway, moderating harshness of priorities

18. The job of divid'g wtrs has many elements of the tolerable. Many acres get pretty steady service. Of course it cd hardly be otherwise, since river has a certain reliable base.

It cd be worse if priorities expressed in af. That wd be madness. Is it ever done? Mod-Tul Appln 1233, 1919, ~~227~~ 325,000 af. Thus later comers wd have to wait until this (& other) quantities were assured, before diverting!

it seems reasonable as the fms cd. handle. Surely it is far below,
is doubtless rotated.

Wilson & Clouston, p 46, indicates ave. fm size + his area very small, '40

30 acres or so.

Kameah distn, 5

19. Upper lands, east bench, is not only better climate, but better soil & drainage? Probly poorer soils, & poorer percolation. However with faulding to pers. or xpire wd run downhill to be used, not lost.
20. Kwh is by no means worst e.g. Kern may be that. Goes down to Alpaugh & Goose L. areas, very poor soils, by passes fabulous east benches, which have both soil & thermal optima. BAE p. 9 confirms this
21. We can demonstrate wth maldistr. within each BAE wth service area, (from p. 10 etc.) Now is this due to soil variations within service areas? p 10 et. circa shows wide variety crops grown on each soil class in selected sub.-areas; & same crops grown on diff. soils.
22. See if irregular supplies go to those who need them, i.e. those who can store underground.



Don Burr

1. Water - supply data
When get away from 1.76'/acre?
2. Output data.
3. Adams & Crawford?
4. 5-35, Sup. Ct. awards 35 sf or 25,300 af yrlly. But took less - why?
5. Bull 21 shows large delineation outside district boundary. Why, when wtr short? To whom? 1944, 45. In 1946 this amount, 4,000 - 6,000 af, moves into lost or spilled, for recharge. Was it that all along?
6. Season of critical wtr requirements for canals. over

7. Was original LS diversion
allowed bcs of patriotic permissiveness
& expansiveness?

8. Why does Waste call LS real
dependant in *Conrad PD v. Foot hill D.*?

p. 537

9. What season is hi navel demand?

June - Sept. hot wx, says Opitz - Burlingame
sheet; but most critical pd. is at flowering
& fruit setting - when are they?

10. Box, carton weights.

11. Effects of "the prorata" on output,
& expansion?

Notes by Tom Crocker 1 carbon
Typist: N.B. "trail" is consistently used where "trial" should be typed.

Gulare Irrigation District vs. Lindsay - 40²¹
Strathmore Irrigation District, 3, Calif. 2, 43
1935, pps. 489-588²⁰

Brief

Riparian rights - Appropriation - Reasonable Use -
Constitutional Law - Para. 2, p. 489

Sec. 3, Art. XIV, Nov. 1928 of the Const.

"... a riparian, as against an appropriator whose right has not ripened in a right by prescription, is not entitled to the full flow of the stream as it is wont to flow in a state of nature, without diminution by the appropriator, and his rights are limited by the doctrine of reasonable use...."

Injunction - Remedies - Beneficial Use - Con. Law - Para. 3, pps. 488-490

Under Art. XIV it no longer is sufficient to base injunction simply on fact that the owners are riparian

"... the court must determine whether such owners, considering all the needs of those in the particular water field, are putting the waters to any beneficial uses... and from a consideration of such uses, the trail court must then determine whether there is a surplus in the water field subject to appropriation."

p. 490

Necessary for court "to find expressly the quantity so required (for beneficial uses) and so used and it must fix the quantity required by each riparian for his actual beneficial uses, the same, as it would do in the case of an appropriator...."

Para. 4 - p. 490

Any finding which says that the riparian requires a "reasonable amount" is "clearly insufficient and a judgment based thereon must be reversed."

Contradicts P just above?

Art. XIV protects "prospective reasonable beneficial uses" of the riparian as well as "actual reasonable beneficial uses" Para. 5 - p. 490

Both actual and prospective uses have priority to any right of the appropriator

But the appropriator is allowed to use the water "until the riparian needs it, thus, at all times, putting all of the available water to beneficial uses."

Court may retain jurisdiction "over the cause" so, when a riparian claims need for water, the court determines whether the proposed new use is "a reasonable beneficial use and, if so, the quantity required for such use." - Para. 6, p. 490

Art. XIV applies to an overlying land owner and an appropriator just as it applies to a riparian owner and an appropriator - Para. 7, pps. 490-491

It is not sufficient under Art. XIV to find that "... each riparian requires the 'whole of the underground flow of said stream ... to moisten said land from beneath.'" Para. 8, p. 491

"In an area of such need as the Kaweah delta ... the use of the entire flow of a stream, surface or underground, for subirrigation cannot be held to be a reasonable use of the water." Para. 9, p. 491

Since an injunction decree "acts on the rights of the parties in the future," and since this case involved an appeal from an injunction decree, even though "judgment was entered and the appeal was perfected" before passage of Art. XIV, the law at the time of the appeal case is the governing one and not the one at the time of judgment - Para. 10, p. 491

Art. XIV follows due process because it is "a reasonable exercise of the police power" - Para. 11, p. 491

Sec. 11 of the Water Commission Act, insofar as it declares that ten years' nonuse constitutes abandonment of the riparian right is unconstitutional Para. 12, p. 492

Riparian right includes the right to the underground as well as the surface flow of the stream in accordance with beneficial use concept of Art. XIV

Para. 15, p. 492

Riparian's future prospective rights are canceled if an appropriator has taken water and devoted it to a public use prior to the time that the riparian's needs arise, for "a public use has intervened as to the quantity required for such future uses." Para. 19, p. 493

When an appropriator takes water it is up to him to prove that there is an excess supply beyond that needed for "reasonable beneficial use" by those who have prior and preferential rights, but this does not relieve the holders of prior rights from proving that the quantity that they have been using is necessary for their "r. & b. uses." Para. 21, p. 494

Awards to the appropriators in ft.³/sec, together with an ultimate limitation in acre ft., "measured by the maximum number of acre feet used by each appropriator in the past." Para. 26, p. 495

An appropriator, as against subsequent appropriators is entitled "to the continued flow to the head of his ditch of the amount of water that he, in the past, ..., has diverted for beneficial purposes plus a reasonable conveyance loss" as long as this amt. is not more than that required "to supply the area of land theretofore served by his ditch...." Para. 27, p. 495

If an appropriator uses more water than he needs for beneficial uses, he acquires no right to the excess - Para. 28 - p. 495

"No matter how long continued" - Para. 29, p. 495

* "... an appropriator cannot be compelled to divert according to the most scientific method known and is entitled to make a reasonable use of the water according to the general custom of the locality, so long as the custom does not involve unnecessary waste." - Para. 30, pps. 495-496

Burden of proof in injunction proceedings with prior vs. subsequent appropriators lies with prior - Para. 31, p. 496

Prior attempting to secure injunction against subsequent, the plaintiffs must recover upon the strength of their own title and not upon the weakness of the defendant's title, as in any other quiet title case - Para. 33, p. 496

A water corp. which distributes water to stockholders or consumers is not a 'periodic appropriator'; if it requires a continuous flow to distribute water properly, even though the consumers it serves may be only periodic appropriators - Para. 34, p. 496

"In said action, in order to prove a right gained by appropriation, each appropriator had to establish that the quantity awarded by the trial court had been actually, in the past, diverted and used by the one claiming that right; and where there was no evidence that any specific quantity had been diverted during the winter period by any one appropriator, and no evidence as to the area actually irrigated during that period, the evidence was insufficient to sustain awarding a specific rate of flow and all lesser flows during that period." Para. 40, p. 497
Defendant's right to export ground water for "beneficial purposes" - Para. 41, pps. 497-498

* "... what is a beneficial use depends upon the facts and circumstances of each case...." - Para. 44, p. 498
Extermination of pests, "such as rabbits and squirrels," does not constitute a "reasonable beneficial use." Para. 45, p. 498

"... Evidence (presented by 'irrigator experts') indicated that some of the water used in the winter months was put to beneficial uses." Para. 46, p. 499

* Because cause of the extreme variability of the river's flow, the 'average' run-off ~~age~~ has no real meaning Para. 48, p. 499

Therefore, "there was no merit in the contention that the appropriators could only acquire an appropriative right to a quantity of water equal to some amount slightly over the mean low average produced in the watershed...."

*

* Court admitted that there was an "uneconomic use of water" and unscientific diversion of water by appropriators - Para. 50, pps. 499-500

But, since "the various appropriators were not one unit and each had his own appropriative right... the courts could not and, even if they had the power, should not compel them, at their expense, to build new systems of diversion, and defendant could not complain of such alleged poor methods of diversion."

* Since "various state bulletins" showed that conveyance losses on "various irrigation projects" were "far in excess of 40 per cent", the defendant shouldn't contend that such losses should not exceed 30 per cent - Para. 51 - p. 500

(How can the court defend the above on the basis of its statement in Para. 44?)

"An appropriator is not compelled either to irrigate in the most scientific manner known or to divert in the most scientific manner known." Para. 52, p. 500
In said action, plaintiff's appropriative rights, which long antedated any right of defendant to any water at all for use on non-irrigation lands, were required to be protected regardless of the great needs of defendant. " - p. 500

Body

Suit brought by Tulare to quiet its title against L&S to the surface and underground waters of the Hawaiian. Also to prevent L&S from exporting groundwater.
Original decision, before appeal, was in favor of Tulare.
Held that Tulare could only use that quantity

of water which it needed for use on
its Kawaih riparian lands

Respondents owned great variety of water rights
Appropriators, riparians, overlying owners, etc.
Background

Two admitted facts

Rights of L & S as a riparian owner were not
involved in the appeal

L & S admitted that respondent appropriators
had prior rights in time

But L & S contended that the respondent
appropriators have not put all of
their water to beneficial use

Tulare and other respondents evenly divided
flow at McKay Pt. between St John and Lower Kawaih

But when water decreases to 80 ft³/sec
in Lower Kawaih at McKay Pt. after the
snow run off, then all water is
diverted to Lower K. until Oct. 1 and
thereafter until flow again exceeds 80 ft³/sec

"The court found that the flow of the river
'varies greatly in amount of flow and in
rate of flow from year to year, from season
to season, from day to day and from hour
to hour.' " p. 505

Kawaih delta comprises more than 300,000 acres - p. 506

Soils are highly porous and fertile and (red lands)
because of mountains to the east & lands to
the southeast and north through which
water will not readily percolate, the delta
forms a natural ground water reservoir

Ground waters are "diffused percolating
waters" which move generally with
the surface slope and at right
angles to the surface contours
of the delta." - p. 507

The earlier court also found that a falling
water table had increased cost of obtaining
ground water - p. 507

Increase of salinity

Earlier court placed valuation on citrus lands of \$250 per acre with irrigation and only \$50 without irrigation - p. 508

Total cost of G & S irrigation system was \$1,600,000 in 1918 - p. 509

Pump 25,000 acre ft. annually and carry a maximum head of 75 ft. / sec - p. 509

Between 1918 & 1922 G & S pumped 13,000 to 15,000 acre ft. annually - p. 509

Trail court divided year into two six month periods - Feb. 1 - July 31, Aug. 1 - Jan. 31

Fixed rights to rate of flow for each class of respondents

Appropriators

Period 1 - 2000 ft.³/sec

Period 2 - 1000 ft.³/sec

Riparians

A reasonable quantity of surface flow and all underlying ground waters that they were riparian to

Overlying landowners

Trail court said that G & S ground supply & that of above was a common source

But granted no relief to above, for apparently felt that relief was implicit in their capacity as riparian owners

Respondents "collectively claim every drop of surface or underground or diffused percolating water in the delta" - p. 512

In 1923, G & S filed additional defense based on S. C. 11 of 1913 Water Comm. Act which said that 10 years nonuse constitutes

issues abandonment of the riparian right
Issue amounted to whether or not there was a surplus of water in the delta

of 25,000 ft. annually which I & S
could utilize without injury to prior
rights of respondent appropriators

I & S contended that respondents never
diverted the amt. found by the trial
court & that which they did divert
was and is being wasted p. 516

Also contended that respondent
appropriators did not need to divert
any water during winter

Whether I & S's pumping affected surface flow
of St. Johns & early seasonal flow
of Lower Kaweah

If above did scour on Lower Kaweah
what was the feasibility of constructing
an impervious bypass across the cone
of depression created by the pumping?

Whether reasonable needs of respondents
are less than flow of the two rivers
and their tributaries

If there is an excess, is I & S entitled
to any rights respondents may have
under a form of condemnation

One group of respondents made compromise with I & S
in 1931 - p. 518

Gave I & S right to take "at such times
and at such a rate as it may desire, a
quantity of water in each year equal to
the amount that would be produced
by a continuous flow of 35 cubic feet
of water per second during the year
(approximately 25,500 acre feet)." - 1

Paragraph 1

Mineral King Fruit Company gave up all claims
against I & S - pp. 518-520

Same same as above with Marietta R. Gray - p. 520

Paragraph 2

"... the trial court applied the rule that a
riparian as against an appropriator..." see Para 2 (brief)
p. 524

It has the trial court applied the rule that as between such parties riparian and overlying owners are not limited to a reasonable beneficial use - p. 524 But Para. 2

Para. 4 - p. 525

cited above says they are.

Under Art. XIV the court must fix the quantity needed by a riparian for reasonable beneficial use just as it would for an appropriator

Para. 8 - p. 526

Quantities required for reasonable beneficial use must be fixed for all owners under XIV

Para. 10

Although passed after the decree below this act must be given effect in deciding the appeal, since the case involves only relief by injunction, and this operates wholly "in futuro." - p. 528

Para. 34

L & S concedes that respondent appropriators are not periodic appropriators, but does contend that such appropriators' rights and needs are seasonal - p. 548

Para. 35

"... we are convinced that the evidence overwhelmingly establishes that, except in years of extraordinary flow and except for certain exceptional spurts, the respondent appropriators herein, as a group, have used practically the entire flow of the Karak River during the height of the irrigation season for reasonable beneficial purposes." - p. 549

During April, May, June & July, in spite of the fact that these are the months of most dependable supply, "... has been an insufficient amount to meet respondents' needs."

Also during these months L & S has greatest need to export water, but "appellants' needs cannot

justify this court in depriving other property owners of their property rights long since vested."

Para. 36

Court agrees with P & S during Oct., Nov., Dec. & Jan. that respondent appropriators as a group do not divert 1000 ft³/sec "and all lesser flows."

"We are also of the opinion that the evidence does not support the findings that each appropriator diverted for reasonable beneficial uses the specific number of cubic feet per second and all lesser flows..., awarded to it." - pp. 549-550

Para. 38

Three aspects of sufficiency of findings of trail court in regard to awards made for Per. 2
1. Award made to each appropriator by trail court
Consolidated People's Ditch Co.

During Per. 2, was awarded 125 ft³/sec

"... testimony is far too vague and indefinite to support a quiet title decree of a definite quantity of water in this period." - p. 552

Elk Bayou Ditch Co.

During Per. 2, awarded 80 ft³/sec

"Such award, based, as it must be, on past use, finds absolutely no support in the record." - p. 553

Lakeside Ditch Co.

During Per. 2, awarded 200 ft³/sec.

Evidence shows that respondent does not use award

"If the water was not there in any month or for any other appreciable period, it should not have been awarded." - p. 554

2. Whether water during Per. 2 was put to beneficial uses
3. Whether amt. used by respondents & their methods of diversion are reasonable

Para. 39

Packwood Canal Co.

Awarded 75 ft.³/sec during Per. 2

"Not one word of testimony was offered that this ditch, in the memory of any witness, ever had any water during Period 2." - p. 558

"We can agree with the trial court... that the benefits of winter irrigation can be shown by general testimony, ..., but we do not agree with respondents that evidence that winter irrigation was practiced under one ditch can justify or sustain a finding awarding a specific quantity to another ditch." - p. 563

Para. 43

"No water should be awarded any appropriator during any period when it is not seeing it." - p. 567

"Thus awards made to respondent appropriator during Period 2 '... cannot be sustained and that the judgment based thereon must be reversed.'"

Evidence also does not show that water used in winter period was put to beneficial uses

Para. 49

L. & S. held that quantity of water diverted by appropriators each year is in excess of that needed for beneficial uses & that "such excessive use of water has resulted in an injurious high water table with the creation of alkali and deterioration of the soil." - p. 571

"We are clearly of the opinion that both these points are without merit."

Para. 56

"... each of the respondents herein had the burden of proving when the amount diverted by it was actually diverted. The appropriator

is limited not only by the amounts diverted in the past, but also to the times it diverted water in the past." - p. 576

"... if any appropriator's right in the past has been so limited by reason of prior ^{actual} appropriations by others that it did not get and use water in certain periods of the year, obviously it could ~~not~~ acquire no right as against appellant to a continuous flow for the entire year." - p. 577

Para. 57

Since trail court's decision that there was no surplus was based upon the awards made to each appropriator, and since these awards have been held unsupported, "the finding that there is no surplus falls with them." - p. 577

Para. 58

Does appellant's pumping cause seepage loss from S.T. John at all and does it cause these losses in excess of 10 ft. ³/sec - p. 578

Pumping operations of the appellant do materially decrease ground water and do cause induced seepage on S.T. John.

G & S admitted that its pumping does cause ground water reduction on Lower Kaweah, but held that such did not do so "to the extent fixed by the trail court."

Evidence says that G & S is wrong - pp. 578-579

Thus decision of trail court in this question was affirmed

Trail court was directed to modify its judgment as follows:

G & S allowed to export, ^{annually} can take at any time and at any rate that amount of water "which would be produced or discharged by an average continuous flow, during such years of 35 cubic feet of water per second." - p. 580

"...the rights of the respondents must be satisfied before the appellant is entitled to pump any water for nonriparian uses from the waters underlying the Rancho de Kaweah." - p. 583

On Kaweah, might expect neg. correln of wt input & crop output, per acre, bcs hi yrs brought in more acres, probly poorer, lowering output/acre. (for annual crops - not for permanent ones)

On Tuol., hi wt inputs wd result from longer grow'g season, hence be positively related to crop outputs.

Interlib.

✓ Factual Rpt. Orange Cove (D,

BR lib.

CCIO (if any)

Madera - it was active long before

Friant.

Anything pub. besides this?

State
Get Ball 21

LINDSAY-STRATHMORE IRRIGATION DISTRICT

Verified Annual Statement as of December 31, 1957
showing Receipts and Disbursements for the year 1957

Assets and Liabilities
on basis of Receipts and Disbursements
Audit December 31, 1957

ASSETS:

General-Operating Funds	\$ 688,947.19
U. S. Contract (Water) Fund	80,675.40
Bond Service Funds	78,219.77
Repair-Replacement Reserve Fund	236,508.32
Insurance Reserve Fund	1,450.16
Office Revolving Funds	500.00
Notes Receivable, Secured	669,936.84
Current Assets	\$ 1,756,237.68
General Properties and Construction, less Reserve Funds	4,330,844.47
Total	\$ 6,087,082.15

LIABILITIES:

Bonded Indebtedness	\$ 360,000.00
Insurance Reserve	1,450.16
Long Term Obligation, United States	2,079,435.17
Invested in Fixed Assets and Available Surplus	3,646,196.82
Total	\$ 6,087,082.15

RECEIPTS AND DISBURSEMENTS

RECEIPTS:

Water Tolls	\$ 256,803.35 ✓
Tax Revenue	91,072.34 ✓
Land Sales, Rentals, Inclusions	252,520.01
General Income	68,256.80
Total	\$ 668,652.50
Cash and Bonds held December 31, 1956	896,277.11
Total	\$ 1,564,929.61

DISBURSEMENTS:

General-Operating Expense	\$ 255,468.21
U. S. Contract Water Cost	78,960.50
Bond Principal and Interest	39,900.00
New Construction	104,300.06
Total	\$ 478,628.77
Cash and Bonds held December 31, 1957	1,086,300.84
Total	\$ 1,564,929.61

BOARD OF DIRECTORS OF LINDSAY-
STRATHMORE IRRIGATION DISTRICT

By W. C. ZIMMERMAN,

Secretary

Lindsay Gazette, February 20, 27, 1958

20 a, net \$10,000, oranges. Ave. ann 5 yrs. \$500/a.

100-180 orange trees/a.

Cost min \$3/tree, rootstock.

Planting + pipes + land @ 350, min 1500/a. Then comes 5 yrs
bfr. prod-n.

LS system is all pressure, so same change thruout, even below
canal.

Losses 3% last yr.

Burr is mgr of ID, not eng. Only 2 reg. engs are mgrs of
all systems on FK canal. Bill Alexander is one.

Overorders ea. yr from FK for insurance. Then can usually
sell extra for 3.50 - this yr not.

Hv. rts on Wutchumna Ditch. No storage. Top priority, for a
small amt, then rebase some downstream, then get more again.

LSID

\$10/at for occasional w

\$20/at for steady

Rancho de Kanewash well field, orig. same.

Paid \$100,000 ^{in 1916} for 1200 a. 39 wells, 23 mi redwood collect's

lines. But when began pump got lawsuit.

UC College of Ag AES "An Ec. Study of LSID" '32,
typed RL Adams, LA Crawford. Try Alpha.

Well depths, why not individ. pump.

Wtr waste down river

Why no local storage, movement for.

This area vs others for citrus.

Pay \$250/a to get in. Wd pay more? Raised from \$150 last yr.

Changes?

Sell w outside ID?

Hrgs impend'g in Fresno, WRBd.

Gross area 15,201 a.

'51 irrig. 11,155 c. 1,000 non bearing,

Used ~~60%~~ $\frac{1}{2}$ entitlement '51.

95' wth table.

Max wells ~~95'~~, but hi salinity, can't use it alone.

Dev. on F.K. slow.

Stock rental, \$2-4/a. c. \$100/a or less w/o w.

Sales w w, 400 - ~~700/a.~~ \$653, hillside.

\$800 ~~for some~~ usual for flat w. w

\$10/af + \$6.30/a. Are $2\frac{1}{2}$ afa.

Land w pipe, levels, \$1000 - 1100/a.

Perm. sprinkler, \$250 - 300/a. 2¢ a box. Pay

10¢ for pick'g, 23¢ mkt'g, etc etc.

Class II wtr has bn as good as I, but distrib dev. slower than BR expected - e.g. Terna Bella, & Shafter-Wasco, which is exchange deal for Kern W. W tables rising, so many now pump, & Ivanho & Exeter hv gone to flat rates, to get them to take w. (Maybe approp. doctrine & its counterparts are only forces in world for a bit!?)

Highest l.v. on slopes. But op-m easier on flat, about compensates for frost hazard, until get c. 6 mi w Lindsay; no more.

W. is very small cost, is vital, yet they won't spend on for it bcs is direct cost. (& comm-y enterprise etc)

Sprinklers go'g in fast, now c. 2,000 a. Why, at 250/a or so? Better use of w. Not so much to save on w but 4 yields. How much? Get dope on that.

Get LSID Factual, & ~~Terra Bella~~,
for seasonal demand for citrus.



Karewah system builds up 3 kinds
open to storage:

1, by those w steady flows

2, by " " unsteady flows, but

large invest in distribn channels to
divert large flows, & pumps to supplement.

3. P & E, who wants pumps & fears compn gusty.

Show how much less distribn nec.
if like Mod-Turk, full canals.

Antique wth low prevents flexibility.

So P & E provides it. Cultural overlap.

11 canals etc also make for excess
capac. ? Opposite make it too
costly to provide adequate capac.

Anomalies:

Consol PD crosses both Deep Ck
(Fur's Ditch Co.) & T.I.D. canal.

Another Kameah waste:

Uphill Ditch // Mathews

Ditch

~
Anomaly:

Corcoran I.D. gets Kings R.
wt., but Lakeside Butch Co.,
to north, gets Kannah wt.

Another anomaly:

Fleming Rutch Co. area, in
mesopotamia, is served from so.,
counter to general flow of water.

Price of water —

\$14 - 23 per acrefoot, on
citrus & lines, field & truck
crops, Teapot Dome WD.,
Tulare Cty. 1959-60,
WWN 1-60

Teapot Dome Dist. Contract Oked

Announcement has been made of the awarding of a \$1,208,662 contract to the Cen-Vi-Ro Pipe Corporation of Shafter, California, for the construction of a distribution system for the **Teapot Dome Water District** in Tulare County. The Bureau of Reclamation contract calls for the construction of 16.5 miles of pipe line varying in diameter from 6 to 33 inches, a concrete lined equalizing reservoir and four pumping plants. The system must be completed by February, 1961.

The cost of the system for the 2,712-acre District amounts to approximately \$450 per acre. This sum will be paid off over a 40-year period, following a two-year development period.

High Water Costs

District Engineer **Fred Strauss** estimates that the water will cost ranchers on the east side of the District about \$21 per acre-foot and those on the west side about \$16 per acre-foot. At the termination of the contract for repayment of the distribution system, these costs will decrease. The District has a contract with the Bureau of Reclamation for 7,500 acre-feet of Class I water per year.

The Teapot Dome Water District has been confronted with a serious underground pumping problem. Pumping lifts from 150 to 350 feet have resulted in pumping costs in the range of \$14 to as high as \$23 per acre-foot. Principal crops in the intensively cultivated area are citrus, olives, field and truck crops.

1-60

tions which deliberately harmed waterfowl nesting through rapid lake level raises. They also began to charge the District with causing botulism. In the early fall, they attempted to create hunter support by stating the reason the hunters were not having success was because of the inability to travel easily on the lake.

False Damage Charges

During this period of time, the Service and Bureau showed little or no desire to negotiate on the problem even though the District had asked for a review with the Secretary. At about the time the specific parts of the rules and the District's operation coincided, the Service put stories in the press, charging the District with tremendous damage to the flyway and the District tried to answer by factual statements. The Service finally conceded that perhaps as many as 13,000 birds had not been hatched as a result of manipulations of water levels, including those in the spring at the request of the Service, and perhaps less than 3,000 ducks died of botulism, some of which would have occurred in any event. These figures must be compared with the waterfowl population of 8 to 10 million on the flyway.

District Will Act

The District has not decided as to the final course of action with regard to the notice to take back the pumping plant, but it is certain that definite defensive action will be taken prior to February 14, when the takeover is to occur. It is of particular interest to note the proposed takeover from the District is to occur when the priority of operations is acknowledged in the rules and regulations and the District is in full compliance.

There might be an allegation that Kwh users don't need to economize on Kwh, & do not suffer from underuse, bec it is so cheap to turn to groundwater.

But this overlooks that falling groundwater has become No. 1 problem of the area, & CVP is rationalized to raise groundwater. But better use of Kwh is direct subst. for groundwater, hence for C.V.P.

Extremely low σ for LSID
diversions may reflect not just
a sr. rt., but that plus a
too-small rt., or perhaps just small
enough, so they were scrupulous
each year to take their full
entitlement.

(But is some doubt if they did)

Kameah absurdities.

Did I mention loss of altitude?

Law requires wtr to run fruitlessly downhill. Later rescue projects or development projects then must lift wtr at hi cost to serve bench lands.

Tule R., is even more pronounced.
Poplar ditch is biggest diverter,
serving Porterville I.D. & below

TBID opens new Bradford pump'g
sta., 4-16-60.

Is 1st ID to complete its dist. system
under a BR loan.

WWN, 5-60

H. Holley

Scheduling flows.

Wt ratio

Prices of shares.

Levelling &c with cons-n outlays.

Irrn techniques.

Foresee integrn all systems?

Land values, w & w/o with shares.

How flexible is schedule? adjust open to floating shares?

H. Holley

System very rigid. Schedule all worked out when he came here, 40 yrs ago. From ct. decisions.

Shares trade very seldom. Lake interests bought much of Lakeside shares, but they had a ditch going by there, needed only a little cut to get wt in their ditch. But Holley cannot change

✓ diversion pt of any wt. Thus share in one ditch co. cannot move to another, ordinarily. Thus Lakeside cd. sell for barley but not citrus-olives. Truck.

✓ Why did TID etc not fight Lake interests as they fought LSID? *Probably has below them.*

TID suit began vs LS 1916 or so. Cost \$1,25m, both sides. Finally judge prevailed on lawyers settle out of ct. Did so, for a few thousand \$.

(?)

Everyone joined w TID in suit. Was in their name but on ID. Even a few ripns joined. But Kirk St-Johns Assoc. supported LS in backing '28 amendment, but recognized injustice of ripn position, unlimited undefined rts. (Probably hoped this wd appease LS.)

Core. clay under Lake, they put well thru it, but found wt was coming from above it.

✓ When wt table goes 200' deep or so, Lindsay area, grind resin useless. Takes yrs for wt to get down, & pumps won't pick it up until it gets down.

✓ Citrus belt, 200' is prohibitive pump depth but strike rock. W side, go down very deep easier, strike many aquifers on way.

Holley, 2

Mentions \$200,000 as price for PD share within the yr.

Lake people hv $\frac{2}{3}$ now, no gn of control. Hc controlled Bd for last 15 yrs or so.

Boswell bought out Crockett - Gambogy.

Ask him? re direct diversions.
LS, to get Wutch wtr to ID, had to pour it on well field, then pump — otherwise wd be chang'g diversion pt? guess.

Then pumped 200' to canal. Needed wtr badly, their wells were hitting salt. (Cf. this to Lemoore, when wells hit salt, just vegetated)

✓ Ditch cos, no sprinklers, bcs it is to get wtr so many hrs, then shut off. Just has to take it all then

✓ TID has Wutch stock, has to take from Wutch ditch, then cross river — another anomaly for the list. Across both rivers!

✓ KDWCD wd pay BR up to \$2.50/at for storage wtr, if cd. get it.

Are beginn'g to realize wtr worth more than had thought. Got in line slowly at 1st, thought BR changing too much. Now buy all

✓ they can. Watching Arvin-Edison, hoping. . .

2-3 yrs like '58, & artesian wtr wd flow again, Lake. (Thus Lake needs no direct wtr, just recharge aquifer above.)

Flows go by the schedule, not by firm demand. Rigid.
(Here the law is master, not servant)

Holley, 3

✓ TID wd hv ~~can~~ lined ditch, FK wth, but KD WCD paid for seepage.

Tried to get several ditch cos to join, from ID, nw Visalia.
Got parties together in room, roof blew off. Everyone afraid
someone wd get some wth he wasn't getting before.

Levelling has proceeded fairly well.

✓ Values of land very hi now. \$1,000/acre, bare, if can get wth.
Ditch stock or no.

— Lemon Cove has lined canal - only one to do so.

— Wutch always had more wth than needed. Ask Burn
how much paid?

Taggart etc. say output in FK area hasn't Ad much, but project still ecky justified bcs were tak'g from ground storage, now replacing.

But this overlooks that higher wtr table, ~~for~~ shorter pump lifts, cheapen water, so they should be applying more.

Systematize data I have on pump lifts, correlate with output.

TIP. Tables 10, 11, 20, 21-c, 23, 30

In July, '54, only T. 30, Wutchumna
ditch source, was flowing.

So?

Tulare I.D. has been growing
fast since 1940, is most
obvious basis for overall leadership
& control now. Should have
interviewed them; can still
write.

On Kaveah, even those with
very steady supply need supplemental
pumps, ^{but no storage.} Hence they don't benefit much
from the steadiness of supply.

Yet fact they have it means
no one else can provide storage.

Kameah

Several ditches have heavy rights in March-May, but cut out in June-Aug.

Yet conservers can't store these wtrs — they wd hang onto spring wtr claims, be free — & thus deprive selves & others of dearer summer water.

Several diversions are poorly correlated with each other.

So Σ diversions should be steadier than average (weighted) of individual diversions.

Some diversions hardly decline in dry years, or expand in wet.

Thus they are not helping adjust to system's problems.

But are elements of rationality. E.g. Foothill Ditch has steady supply, & needs it bec no ground water.

Subarea 22-13, (BTE pp 70-71)

land class 25 is more in vineyards
& orchards than 1B, which goes
more to alf.

Tulare ID, '41, with hi %
best class land, (BAE p. 44)

g & good share Kwh. wtr, grows
mostly alf. & ladino (p 69)

Subarea 22-13 crescent, on its
cl 1B land, alf. has 29%.
(p. 70)

They either lack good climate,
or are goofing off.

B.R. Tee Pat Dome WD. Ch. IV, W₂ Supply. 10-57.
(Between P₁ & LTB)

p17 Ave. well yield 236 gpm
life 145'

Acres irrd per pump 42 a. (1 sf/80 a)

Annual pump deliv. 91 af (2.17 af/a)

M₂ size 15 hp

Am. costs/af \$12.78

per af-f 9¢

Pump Costs.

Energy used, (376.3 kwh/af) 34,243 kwh

∴ charge: (1st 15,000 kwh 1.4¢ = \$210
2d 15,000 .75¢ = 112.50
4,243 .57 = 24.18

Service charge (15 hp @ \$6.50/hp) = 97.50
444.18 am. pump cost.

Pwr cost/af = \$4.88

∴ ∴ ∴ ∴ ∴ = 3.4¢

Pump inv. \$2,650.00

Int, 5%

Maintenance & repairs, 4%

Taxes & ins., 2%

Amortn. (15 yrs, 5% sinking fund)

132.50

106

53

122.80

414.30 am pump cost

Next p.

Tea Pot Dome, 2

Well costs

Well investment (280' @ \$11.90/ft) \$3,332.

Perforations (100' @ 1.17/ft 117

Testing & dev. g 352
3801

Annual costs

Int. @ 5% \$190

Amort. - 20 yrs @ 5%
sinking fund

115
305.

Total ann. costs 1163

Ann costs/af 12.78

Ann costs/af + .09

p18 Gndwtr, Drvle & TB, good quality, but worsens w. depth.

Agenda, Thurs

~~River Thermal MWC~~

1. ~~Terra Bella ID~~

~~Citrus Ass.~~

24

~~Price of ID lands for sale~~

~~Cost of w, max citrus can stand.~~

✓ $\Delta \text{output} / \Delta w$ - Thiessy says not aware of any. Are using new w to develop new lands.

Boundaries of haves & have nots, price ~~not~~ contrasts
net output

✓ How scattered groves get w? Why some, not others?

Pump.
Why no storage?

Why w let run down to poorer land?

Saucelito ID

2. ~~Ptrrille~~

~~Grant Allen book 4~~

~~Vandalia ID - with cost~~

~~Take R rip. MWC~~

~~Some MWC - inquire re costliest~~

~~Ptrrill ID~~

over

To Maintain
FRESHNESS

IN TRANSIT—THIS FRUIT HAS BEEN
**PROTECTED WITH BIPHENYL,
2,4-DICHLOROPHENOXYACETATE
AND SODIUM O-PHENYLPHENATE**

NOTE TO RETAILER

Federal Food and Drug Administration requires that all
retailers display this card with this fruit at time of sale.

Etch 295. Some appraisals

145, L51D, Citrus grove, no bldgs or well, \$2100/a, 10a.

145 L51D, " " , house worth \$10[±], 1750/a, 20a

46, L51D, " " , " " 5[±], 1400/a, 20a.

Etch file 1404 ~~DB.~~

Huge list r.e. sales around Exeter etc., 1944-45 etc.

~~File 1406~~

Ivanhoe Factual Rpt. 4-49. Another Jack Radner abortion.

(Ironically, Ivanhoe was able to org. & get wtr. bcs it already had wtr. enough to get started.)

Hardpan, 18" - 30"

p 6 Wutchumna Ditch goes thru it.

p 16 "It is expected that the total livestock nos. in the dist. will decrease w the import-n of ~~the~~ wtr. suppl.-l wtr. This will result from conversion of present pasture lands to intensified fruit & veg. crop prod-n."

Agenda

This contradicts Nordholm? Write him.
Granite found, shallowly. One prominent aquifer, from Kaweah probly. Tight soils make spreading for recharge unworkable.

p 19 1500 afg from Wutch. - Are 91 shares, & 7 Ivanhoe landholders have $5 \frac{41}{60}$, worth 2700 af. But $3\frac{1}{4}$ shares are applied to lands outside ID.

Each share yields ave. 520 afg. Annual ass. ave. \$150/share.

~~2700 af are worth \$40,000? Ambiguous, so skip it.~~
But if does mean that, then wtr worth little.

p 31 ~~Figure 7K wtr with cost for \$6/af~~

Figure pump's gnd wtr @ \$3.25/af

• Van hoe Factual Rpt. 4-49. Jack Rodman

p. iv Ult. net irble acres 9968^a. Distr. system \$1.6m.

Repaid 40 yrs, \$4/a-yr

90% ID underlain by hardpan, 18"-30". Ranked class II.

Overcome hardpan by subsiding & blasting & shallow-rooted crops.

~~Del Puerto, 2~~

Factual Rpt, LSID, 1-50. Jack Rodner. Lousy study.

p 6 Land owned by ID not under average lim.

p 23 Deduct land cost ~~as~~ bfr reach'g repayment capae. Dubious.

& not nec. consistent w what Del Puerto analyst did.

Probbly wth supply antio-n is in l.v., thus get meaningless figure.

John Bendon Summer, 1958

Running 4,250 sf in 7K all time. Good mkt, even this yr.

Nite Rice

Bates lies. See Roger Rice, wtr master, M & L. LBS, Who said biggest output + here was shortest yr.

Aren't spending enough on drainage, & overirr. badly. Don't drain until wtr rises to threaten crops.

Minimizes danger drain pollution from San Luis WD, too small.

Alex Nordholm.

Marvels at A corn.

Prognostications went wrong, overemphasized A dairy. Giamini & all were forecasting it, but Cal. imports dairy products. (Ha!)

Tag. 7-14-58

FK dev, e.g. Lindmore ID, has been slower than foreseen in Factual Rpt. Firms have gone more for quick cash crops, shied from permanent improvements.

Hv. subbed wtr for other inputs, he agrees. \$3.50 may be too low to encourage careful use.

Inc. tax ~~is~~ a major deterrent to breaking up old holdings, Sac. Comals Unit

Value gross output FK service areas has Δ only a little since '51. Probably all a price increase, Tag seems to concede. Rationalizes that this was just a reserve project.

But I doubt. But clearly there is more, cheaper wtr available now than before FK. They can & do use more/acre. Also, new acres have come under irrn, by Nordholm's data.

So tomorrow get Tag's physical data, 1949-57. Per acre. Find no Δ output - so wtr was not the limiting factor.

* Calif. Farm Bureau Monthly, 11-55, p 3, " Cal. loses
68,047 acres of oranges in 10 years."

Bearing acreage, Valencias & Navels.

1955 169,205 a

1945 237,402 a

Figs released by Sunkist Inc. Losses were in SC.

To find ~~my~~ⁿ wt, look in
Cartimant - Delano.

No cap. costs, everything
current

Burr, Summer, 1958

Big yellow blotch didn't get in LS, Lundmore, or Exeter —
now look's better.

LS left IDA when IDA fought their valid — Horton
was McClacken's atty, McCl. paid 0.

Freeze injures trees some, splits bark, takes 2-3 yrs to
recover — e.g. from Fla. freeze now.

also destroy \$250 inv. in crop bfr frost cost —
pest control, wtr, pruning, etc.

✓ 3 dry yrs is enough to kill most ^{orange} trees — saplings less.
Olives live forever.

↓ Sprinkling As yield much, but trees pin's for more wtr.

Ptville Enterprise, 6-9-88

Pioneer Land Co. selling
at \$100/a, wtr free, one
share w eq. 4a.

Terra Bella I.D. McNeill, Howard

Sold raw land, '52, for c. \$200/a. now reselling at higher prices.

<u>Name</u>	<u>1956-57 resale price</u>
Classen	\$500
Wray	400
Mullen	700
Klassen	500
Eckoff	500
Liston	600

Lindsay Str. also had raw land it was selling recently:

<u>yr</u>	<u>acres</u>	<u>Selling p</u>	<u>Ave/acre</u>
1955	718	\$298,-	\$380.
'56	718	301,-	381
'57	433	152,-	352

Above figs reflect all sales by dist., incl. several parcels outside dist. "which wd tend to lower the ave. sales p per acre."

Raw citrus land thus goes for 400 - 700, when it has dist. w. Dist. charges roughly \$12.50/af + \$9/1000 av. val. or c. \$9/a.

TB -

Do own assessing, keep const. for years, just raise rate. Thiessen doesn't.

Sell them extra wtr — B.R. contract permits it. This yr no taken,
so much, let pass by. Sell on paper, F-15 delium it.

Fruit Exchange limits them on shipments. Fuzzy on what
happens when they expand acres.

Bill O'Regan for data on citrus costs.

TB

Highest pt is 400' above canal, 800' above sea.

Once tried zoning system, differential rates, but protests. So now get around it by assessing higher lands higher, which is ok bcs they are worth more - less first hazard, & other factors.

BR gives them 9 yrs put w to use, so try'g to dev. land fast
(Thus approp. doctrine builds fire, encourages lot)

Present dev. very scattered.

May 22, Fairmont Hotel, COC sponsors big mtg on land & w.

Don Burr, Lindsay - Str., in Lindsay.

Straus, of Althouse Straus, head of Vandavia.

Get Cal Rpt Public Health, '58, Cal Domestic W Supply
Stat

Rep W Res 1st An Progress Rpt, '56-7.

T. B. lets new lands in, charges \$200/a, they're glad to get in at that rate. Linds. Str. charges \$250. Isn't as much as back taxes, but what traffic will bear — or less.

Excluded lands in dist. are ranches — mostly good citrus land, but want to stay ranches. Some want in later.

Co. supervisors had something to say about orig. exclusions.

Orig. w from Deer Cr. Have some storage, & wells.

✓ Orig. farms tried many crops, but only citrus cd pay the changes. Figs, vines, don't make it. Paid off 50¢/¢, better than many — citrus paid it all.

Then went n. to canal, got in just in time.

Spending \$3 $\frac{1}{4}$ m for new distr. system, under P.L. ¹³⁰ ~~280~~ (21), which fixes, & lets 'em build own. For new 8,000 a, + replac'g obsolete old stuff.

Use are 3' w.

Distr. fuel rpts are ~~in~~ filed w. Distr. Sec. Comm, 57. To get needed data there.

TB 10, 1957 Rpt.

Wtr sales \$141, —

Taxes &
redemptions 42, —

Int. on bonds 9, —

Cash rentals 13, 1-

Op'g " 10, 2-

Oil royalties 8, 0-

—
—
—

Total 239, —

TB '57

Op'g costs

Per af

Ad	\$10,1—	96¢
----	---------	-----

~~W~~
Pumping

Salaries	7,1—	
----------	------	--

Wtr purchase	27,160	2.57
--------------	--------	------

Pwr	61,943	5.87
-----	--------	------

—
—
—

Total	97,281	9.21
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<u>Wtr distn.</u>	6,709	.64
-------------------	-------	-----

Mntnce

Salaries	3391	
----------	------	--

Xp'tn	2156	
-------	------	--

Pipe lines	2550	
------------	------	--

Pumps	2264	
-------	------	--

Wells	1068	
-------	------	--

Meters	1622	
--------	------	--

Bldgs	1668	
-------	------	--

Roads	3389	
-------	------	--

—
—
—

Total	23,513	2.22
-------	--------	------

TB Crops Irrigd, '51,

Crop	Acres	Wtr used
Navel	1285	
Val	784	
Tang	3	
Lemon	124	
Olive	260	
Plums	49	
Ctn	254	
S Beets	154	
Almonds	6	
Veg	14	
Corn	30	
Melan	5	
Peaches	4	
Persimmon	5.5	
Seed alf	28	
Grain	1041	
Feed		
Feed		
Total	4358	

+ 104 a leased outside dist.

TB, '51 rpt.

Op. cost / af del. to fm. Losses practically nil.

	'51	'56	'55	'54	'53	'52
Pwr	5.87	5.26	5.30	4.29	3.98	3.75
Lab & c. costs	7.16	7.39	6.47	7.35	7.02	6.89
Mntnce Reserve	.13	.13	.12	.12	.11	.11
Total	13.16	12.78	11.89	11.76	11.11	10.75

No. of service 298		
Irrig.	298	269
Dom.	363	345
TB dom	153	148
Total	814	762

TB '51, af

Wta delinuis

Op'g
Revs
Earned

Mo.	Irrig	Dom	Other Dom	Op'g Revs Earned				Pen- alties	Σ
				Irrig	Dom	Other Dom			
1	318								
2	—								
3	—								
4	442								
5	1501								
6	687								
7	1983								
8	2050								
9	1430								
10	1181								
11	338								
12	32								
1957 Σ	9956	465	136	10,558	\$124,-	14,-	6,-	1,-	\$146,-
'56	10,064			10,705				1327	144,-
55	10,196			10,889				956	144,-
54	9466			10,172				473	125,-
53	9469			10,116	114,-	14,-	5,8-	487	134,-

(City agent, Visalia) 1350 N. Main,

Grant Allen Realty Co., Porterville. 5-14-58

Lonnie Swearingen)

Best citrus land undeveloped - no wtr.

Canal came just in time to save. Wtr had bn dropping, many going broke.

Water came, 1'd yield from 200 boxes oranges/acre up to 600,
fairly typical. Use 2-3 ata, ave yr, but yrs differ. On sandy
land, will take 4'.

Big problem now, overirrigg, now w is cheap. - where it is.

Col use twice as much - dev. new land.

Orig. dev., Lindsay - Strathmore area, flat. Now obsolete, but
chose that area bcs nearer in, old days. Has w. Hill tops better -
warmer. And is other flat land just as good as Linds. Strath.,
so. of Ptrville. But will dev. hills first. Good soil, "warm land."

Pioneer ditch, one of first. From Tule R. But no storage,
no w. when needed.

Enormous floods '58, no reservoirs.

Citrus & olives stay a live long time w/o w. But can drown them
& some do.

Alf. hay, price varies, no support. One yr, \$20/ton;
next yr, \$12. Goes to LA mkt, competes w. Imperial, which is

better quality ber so hot, cut & cure same day.

Roughly cys citrus can stand up to \$50/a for w.

They don't waste good warm foothill land on cotton & alf. (No why waste with?)

Levelling etc. only \$150-200/acre.

Pump's w up to citrus not major cost or problem — one grower,

✓ 15 hp pump does all, e.g. (But it wd. be major cost were with a major input, i.e. were demand elastic)

Strong vs pvt. pwn cos.

Grant Allen Citrus book, 1

3. 23 a citrus, 1st Ave nr Lindsay, \$93,000 \$4,043/a

6. 38 a " 100,000. Corner SE of Rts 244 & 192 \$2,631/a

2. 32 a Valencia, }
14 a Lemons } McWm ranch. \$110,000 Near Duccor. ~~\$956/a~~
69 a bare } Price wd. be acctd for by grower alone, 46 a @ \$4,000 => \$180,000

Sold

115 (Bare ground didn't seem to count for much. No w? None mentioned)

9. 20 a navels. \$42,000. Grossed \$8,000 ^{or \$400/a} last yr. \$2,100/a, price

13. 2 a oranges, Jessup ranch near Orosi, \$19,950. \$9,975/a
Must be a home.

16. 40 a $\frac{1}{2}$ navels $\frac{1}{2}$ vals, top locn & cond-n. Canal w., red soil, warm site.

Gross c. \$40,000, '55-56.

Price \$168,000. w/o crop.

\$4,200/a

20. 4000/acre, oranges, 80 a w hse. Lindmore 10, \$4/yr cos +

\$5.50 /af.

Rough impression: land w/o wtr, \$100/acre.

land w w 600/acre.

But depends who supplies it & for how much.

But if I.D.s now have w to waste, they are getting it nearly free, so Δ shd fairly well rep. results of w.

? if people are lining up for w, shd be boundary betw. have & have not, & price contrast.

33. Ritchie grove. 50a. oranges, 6 mi se Puckle. Adobe soil, 2 hrs, 2 & 3 below.
Vandalia I.D. 156 cost of irrig. \$1819.38

Gross inc. ave. \$54,000

Taxes 862

Price \$225,000 = \$4,500/a.

~~Qn.~~ Do improved groves move more than others? Why no bare land figs?

34. 30a navel under irrig. 5 mi se Puckle
Adobe soil. Pump plants on 10a., 30a. on Miami well co. inc.
Cost of irrig \$824/yr. for wa + \$430 for pump (?)
2 below hrs. $\left\{ \begin{array}{l} = \$27/a \\ = \$14/a \end{array} \right.$
Ave. ann 15,600 fld boxes.
Taxes \$159.

39. Peaches.

City taxes run \$3/a
Lundman ID txs 2/a

Return to book 4 for raw land.

Opinions differ widely re worth of raw land. Terra Bella ID foreclosed on much of its land in depression, is just gett'g around to unload'g. Is sell'g dry, but w promise of w. Price not yet det-d.

Inquire.

Reilly, in Grant Allen's offic, says raw dry land wd go for c. \$80/a. But complicated by antici-ns of w. So I say to find worth of w cannot work from l.v., but op'g revs & costs — grazing vs citrus

Citrus built up now by Angelinos who've sold out & must buy again in one yr for tax sav'g. Again, l.v. poor index to e.c. value of w.

Grant Allen, Book 4 Bare land.

1. 400 a. under, e. of 99 in Tulare, area of ctn & alf.

"Plenty of w is available."

\$110/a.

Fenced. Sandy loam.

Pumped wells, evidently.

far below the \$1,000 mentioned by Holley.

8. 20 a rough ground w LSID w. \$600 - \$500/a.

10. 440 a, Seq. N.F.

\$65,000

\$148/a

12. 160 a grazing, near Glenville. Carries 30 head. Deer, quail
40 a cleared, in oats.

14. 120 a on Welcome Ave E of Hwy 65.

60 a dry pasture. Lessor pays \$3.50/a, he has his own w.

Lessor pays Lindmore w tax

\$2,000 a yr, lease. \$17 per acre per year x 20 = \$340

17. 81 a in Springville, \$16,000 \$184/a.

28. Near Lindsay, 2d & Adams, 23 a. tillable LSID wtr. Pipeline
& boosters in, faucets every 5' on hill, can irrig. whole piece.
\$650/a.

Mr. Cruse, Vandavia ID. 1st rd. of State hwy. going n.

Grant Allen Book 4

Thru Don Pedro Realty, 608 McHenry, Modesto.

1 mi n of Wafed, 83a, c. 70 a. bottom on Dry crk w right flow wall
up, + Wafed 17. Walnuts 1 yr old. Small house & ~~farm~~ Grade B
farm.

Irrig taxes \$420; Cty: land 343, bldgs \$70.

$$\$75,000 \div 83a = \$904$$

$$\div 70a = \$1,071.$$

Implication: raw land in Stanislaus Cty. w. good wtr is worth much
more than in Ptrville area.

Reedley to Orosi. 5-14-58.

Vines, decid. fruit. On sloping hillside, citrus; also on top & other side of shoulder. Then another level plain, vines & decid - & a very few citrus on flat.

Ditches full of W - probly Alta ID

Just s of Orosi, dry canal.

Cutler. Calgro Winery.

Gettem - probly Armenian. Brooming ditch. Then suddenly no W - Seville, dry, cattle. ^{This area is in ~~Woodlake I.D.~~ Stone Canal I.D.!} This in a way characterizes valley - real arid wild west ec. & lush irrig ag. mixed.

Arid patch short. Large hill on n. Scattered citrus on flat. F-K canal, citrus on flat above & below. ^{area above canal not in any I.D. or W.C.} Over low barren hill to Cottonwood Cr, shallow, sandy, full.

Very small % eligible area is in citrus in this so-called citrus belt.

Somdye puts 8 wind machines in tomatoes

✓ Coward Cr to Woodlake, thick Citrus. Not in any I.D., but some in WWC

Woodlake - a scatteration

s. of Woodlake, 2 big, brimming rivers. (Kameah & St John #)

Diversified hort. - & 7-15

Jm. w 198, note hillside of abandoned citrus grove to s.e.
Lack of w? area genly seems nigh 100% irrigd, on flat.

S from Exeter, very thick citrus & vine, thickest yet.
Stops abruptly after 3-5 mi or so, thins out & is no citrus.

Look'g e., is citrus on lowest f-hill slopes. Some thriving, some
dying.

Turn e. toward Lindsay, again thick citrus, continuing
thru Strathmore & beyond. As before, when it clears out on
flat, can be seen up side hills.

Porterville: biggest, cleanest town since Fresno.

Ptville to Terra Bella.

Tule R. full. Why let w go down, when is more valuable up hi?

Probbly prior rts.

Also 2-3 smaller streams, same story. Dry land up hi needs it.

Citrus - olives disappear, until just before Terra Bella. Must be ID.

Also visit Citrus Assoc. there.

5. from TB, dries out fast. But citrus scattered for miles on flat. Also, a solid belt of it where hills go up.

Here is place to find out what w is worth!

Why do some grow it, others not? — other land is grain or grass.

How get w?

How much pay to dev. it?

Duca is O. TB is junky & very small.

5 from Duca. scattered citrus + things to none. Foot hills recede in distance. Colossal area of potential dev. Rolling in parts — just what fruit needs.

Turn w. to Delano. Soon reencounter irrig from pumps. scattered — vines, dry grains.

FK canal after several mi of this.

Why not run canal thru artific. lakes, swimming holes?

Unwatered area between Ecton
& Lindsay, that Burr pointed
out from hillside, is easy to
serve, better land than others, level,
etc. — good e.g. of area
w/o wtr, but downstream
Kauweah people hang on.

Also s from Strathmore. Both
areas, sidehills have groves, flat
lacks.

P+VL

Jay G. Brown, rip its on Tule, old timer.

Tule R. ss. its are upstream.

Certain days in May, tho, L. Tule gets it. see John ^{Gauger} ~~Gauger~~
w. Pioneer Ditch.

Ina Anthony, too.

Ernie Northrup. (Wm Rogers will call)

Wm. Alexander. Eng for L. Tule ID. BRR trained. Visualizes

Tule R. ID. Success Dam, trade for F&K wtr, keep on gravity basis.

Reps Tul City Flood Control Ass., lobbying in Wn.

Trip to Porterville etc., May 14-15, 1958

As interesting as the agric. differences are the towns. Nice towns are Lindsay, Porterville, Modesto, Turlock, Visalia (I think, tho I (& Exeter) didn't press it). A nice, compact, clean town is a real and rare treasure. Many other towns are dispersed and/or dirty, and could hardly be called established. Terra Bella, Ducor, Strathmore, Hanford, Bakersfield, Five Points, Helm, Tranquillity, San Joaquin, Mendota.

On West Side, Mexicans-negroes much more in evidence. Shacks, scattered.

Around Hanford, there is lots and lots and lots of water. Of course this is a wet year, but no such abundance of brimming ditches is evident in foothills. From Hanford I bore nw on county roads. Crossed many brimming ditches. Then Kings R., very full, then Kings River again, as it turns northward, near Riverdale. It was in flood, not over its banks but into very wide flood by-pass under a short causeway. All this water spilling north into Fresno Slough and to waste. This despite Pine Flat -- so I guess there is not enough storage on Kings R. yet.

So in a way the northern mt counties have legit gripe. South has not yet fully developed its own water resources, and by no stretch of imagination allocated them rationally; nor have they put to use the F-K waters they have, in areas of greatest value, e.g. Terra Bella. Yet they are reaching out for more, more, more. All this talk of water shortages is based on grabbing future supplies in antic. of future needs. Probly most ridiculous extreme of this is Satnislus Cty, but all are guilty -- including northerners.

Lonnie Swearingen mentioned that in this year's floods, Highway 99 acted as dam, penned up waters to east, was great flooding.

So next trip, investigate Hanford. Water wasted there could develop terraces, or west side, either. Crops there are hays and grains largely -- get figures. Other towns in the area: Armona, Lemoore, Grangeville, Hardwick, Guernsey, Strafford.

If you gather up complements from 10 acres and put them to work on one, by shifting water to intensive areas; ~~and~~ you get ten times as much gross output per acre-foot (assuming same water/acre); and same land input, assuming two lands have same dry-farming potential -- well, 1/10 the land input. Anyway, there is a gain -- and expressing it cogently is vital to my work.

Also, extended benefits from closer settlement, very real when cf. east side and west side towns. Garden cities, civilization, community life, vs shacks, isolation, hot rods, ignorance, liquor.

And insects. Although here I am torn. Driving thru east side, Exeter to 99 and perhaps beyond, not a bug on the windshield. West of 99, it is black with them. Results of poison plus good drainage and cultivation. Latter is good, But as to former I wonder, which is the healthier environment, and whether maybe we can't improve on poison for pest control. If we do, tho, the ideas, the impetus, the financing, will come from east side civilization.

Kings Cty is small, and pretty well represents lower Kings R. area -- also some west side. But if can get cty-unit data, cf output and water applied, there, might be handy unit.

Modesto - Turlock are good in that they put to use all their land; but bad in that they grabbed more water than their land needs, and in latter sense they have not been at all diligent in putting water to use. Meikle speaks of taking in more land some day, but that not the answer, probly, as the land that needs the water is far south.

Bill Alexander's office is in Woodville -- that must be hq of L Tule ID.

Areas with their own shallow wells are in strong position, because they can use Class II water. Thus again lowlands getting too much water, e.g. L Tule.

Uplands should get w because when they apply it it soaks into ground and runs downhill anyway. Lowlands should get no surface water, except spills and overflows.

✓ Don Burr says storage on Kaweah would do them little good, they couldn't get any more water -- presumably someone else has it claimed, lowlanders. It would help only by giving him firm knowledge of what he could take from Wutchumna Ditch, so would know what to order from F-K. But that is so cheap he over-orders anyway, to be sure, then can sell it down the line, or up.

✓ Mentions some deal where F-K moves some of their water for them, takes it on at Wutchmna I think and carries it to them for 10¢/af, big bargain for ID, and costing US nothing.

Something about if they have to spill from Millerton, first water spilled is loss to Lindsay-Strathmore ID, or someone else Burr was speaking of -- I didn't get this straight.

2 Grant Allen mentioned power cos. got law passed that to take class II water you have to have pumps big enough to have big standby charge -- so no wonder farmers prefer to pump!

Anomaly: PGE has developed Kern R., but SCal Ed devel. SJoaquin!

✓ Don Burr mentions Lindsay-Strathmore ID has all pressure system, uniform pressure thruout, even below canal. So cost is same to serve all, even uplanders. Same charges to all, also same assessments. Had to make them same, early days, to hold ID together. Now, makes no diff.

Advantage of closed uniform pressure system, saves attendance, opg cost. They op with two ditch tenders, cf Lindmore, uses 30-40, open system.

(Whether the costs are incurred via closed pressure system, or many ditch-tenders, here is measure of economy of water.)

Visalia looks like good town; Beautiful new county bldg. But, like Hanford, it may be a lower river water waster -- in this case Kaweah R? Yes -- and w/o benefit of any ID, so far as I see. Adams shows none either, 1929. An area of many independent ditches, I guess, MWC probably. State Index shows some huge ones in Visalia and Tulare, both -- Wutchumna, 30,000 acres, is biggest. Odd that the Wuthhumna, which goes north from Kaweah R., should serve LSID and Visalia, both south.

trip to ptrville, p3

As to water quality, it is unec for Terra Bella etc to be drinking canal water part of year. Should use 100% canal wtr for irrigation, reserve local wtr for drinking.

Feasibility of State Ownership, 3-52, shows picture of Lindmore lateral, it is closed pipe. So what did Burr mean Lindmore system is different? Non-pressure, perhaps.

What are standpipes for?

ECCID grows fruit and vines, so why not other west siders? Inquire in Tracy, re Westside, Banta-Carbona, etc.

Thiessey, at Terra Bella, knew of no citrus that was actually suffering from lack of water before canal came. Canal came to develop new lands. (and raise water table no doubt). McNeill remarked, by contrast, canal came "Just in time" -- well, no, what he said was they got into canal just in time. And having developed a scattered, splattered system, it is clear they needed more water to consolidate it, thus lower costs. There is a comprehensible motive.

How did they develop a scattered system to begin? Spec of course, but why not develop it later? Local sources proved less than anticipated I think he said. Master plan, p. 1, corroborates. They overestimated their supply and underestimated their needs.

An interesting wrinkle in TB was that in depression some landholders, instead of relinquishing their lands, let their water rights go, to the ID.-- c. 1/6 land in dist did this. How possible?

There may be a lot to this "matching funds" idea. TB was too tight to undertake bringing in more water, but now F-K has done so, they are ready to shell out a good deal to distribute it, etc.

McNeill says they don't want a "gold-plated" BR dist system, were glad for new PL 163 or whatever that lends them cheap m to build their own. Ask Burr re this -- he seems proud of his "gold-plated" system. Did BR have a hand in it?

Unfinished business: get increased output per increase of water, on given lands.

In general can get this thru contrasting different kinds of agric. And that gives you long run mp, which is what you want anyway. Short run mp is always very high, can count on that, for lands already developed, but that is of little relevance for planning.

Amount of water no more important than certainty of it. It is that certainty that permits large complementary investments

Trip to Porterville, 4

Building up large complementary investments makes mp of water very high, by variable proportions. But when we apply mnp analysis, these detract from mp, too. But in general one can assume that each complement before the marginal one adds more to gross output than its cost. Hence increases residual imputable to water. Therefore more intensive land use means higher mnp for water.

This is really a question of which land to use first -- by deciding where to send the water you are deciding that. So send it where there is most ec rent. That is one way to look at it. But what I want is a direct way, showing more ec rent for water.

✓ Ultimately the neatest way to proceed is with water the independent vble, and show its gross mp, its mcc, the diff is its mnp. But to show the presumption that this is higher on lands susceptible of more intensive development, use the residual approach. Otherwise, mere fact that mnp is higher doesn't preclude possibility that mcc are equally higher, so mnp not higher. But fact that lands are susceptible to more intensive developments establishes presumption that the diff, the mnp, is greater. Because you add the complements only because you make some rent on each one.

Possibility remains that complements' mp curves are steeper on less intensive lands, or methods.

TB's underdevelopment expressed not only in its having only 4358 of its 15,000 or so acres irrigated in 1957; but of those, 1041 were grain, 254 cotton; only 2069 in citrus.

TB has scarcely increased its water deliveries since 1953 -- yet McNeill says they are proceeding ok. No wonder Holsinger etc are going to check into their diligence!

7 TB opg costs alone are c. \$21/af! Includes mntnce, but no capital charges. Yet they charge just \$12.50/af for water, plus \$9/acre tax, or \$3/af, so how meet opg costs?

Discrepancy: Grant Allen said canal water came just in time to save the area. Thiessey tho says they weren't so bad off, are using new water to expand. But probably Grant Allen had in mind other areas than TB -- private pumpers, perhaps. Or perhaps Thiessey would agree that their wells were falling, trouble was impending.

But here is real discrepancy: Allen says typical to increase yield from 200 boxes/acre up to ~~300~~ 600 when water came. Thiessey denies any such effect in TB. Ask Burr, McNeill.

Grant Allen may not be too reliable a source -- several questionable statements. 1, He first says hillsides are best, or hilltops, because warmer; later says prefers area to west of highway 65 -- maybe because he has something more to sell there?

2, States a little more water increases orange output from 200 up to 600 boxes/acre, but others don't confirm this as typical. The 600 seems too high -- Burr mentioned 300 as more average (but maybe Burr's LSID groves are older, produce less)

Stretch from 99 over to Reedley, solid raisins, wasthru Consolidated ID, until cross Kings R, just before Reedley.

Hanford west to Riverdale, I must have passed thru Lucerne, Lemoore, Laguna, and Riverdale IDs -- as of 1929 at least. Then just accross river going west is Crescent ID, then nothing.

James and Tranquillity IDs may not be much, but they are better than west side with no IDs at all, I suspect. Helm, San Joaquin, and Tranquillity are all inside IDs (tho excluded, in case of San Joaquin, and perhaps others). Outside the IDs are no towns at all -- just Five Points, which is hardly a town.

It was either the Merced or Madera area, I think, where I saw many young orchards going in, a generally frontierish aspect. Next trip look closer.

Madera area still largely undeveloped, tho -- also Chowchilla. They may be economizing on the water they take, but they aren't taking much I suspect.

Here is basis for strong criticism of BR, and subsidy policy it represents. Slow development. Its integrated use of water is well conceived, but it has not grappled well enough with land development problem.

Reedley to Orosi, I must have been almost entirely in Alta, cutting thru side of Orange Cove ID, which used to be Foothill ID, just n of Orosi.

Adams shows Yettem in Alta. CVP map shows Yettem just w of Stone Corral district, not in anything. But isn't there a Yettem-Seville something? Yes, CSD. What is story? Did it secede?

Taggart's figures show that LSID has 25% of all citrus under FK. Lindmore has another 25%. Others are Exeter, Ivanhoe, Orange Cove, and TB. LSID has higher % of its area in citrus, 6,000 acres.

So in putting value on water, remember likely speed of development is big thing. And rescuring established capital is important, in view of likelihood that new lands won't develop fast.

Check into Delano-Earlimart ID. Its gross is outstandingly high, from cotton, potatoes, and grapes. Almost approaches citrus gross, per acre. May be outstandingly good land. Maybe good economics.

Tag doesn't list Shafter-Wasco -- why not?

D-M districts average lower per acre gross. Two highest are Del Puerto and Hospital, \$504 and \$437/acre.

Madera is pretty low. What jacks it up are raisins and early potatoes. Raisins ~~getz/erz/nigh~~ are most money-getting crop they have; early potatoes most/acre, by far -- over \$1,000. That probly is why Delano-Earlimart grosses so high.

From Rizzi and Rock, there are :

ORANGE ACREAGE, CALIF.

Tulare Cty	34,266
Fresno	3,401
Kern	<u>1,247</u>

SJ Valley 38,914

State total 197,261 or .2% state area, less than in cities.

So a little expansion around Porterville would be a big item. LSID has 3% total State acreage. SJ Valley has 19%.

Problem is letting water run downhill when shouldn't.

✓ Looking west from Ctnwd Crk - Woodlake road, is low hill covered with huge citrus orchard. That is Colvin Mt. -- its w slope is in Ivanhoe, but part I saw not.

✓ Going so from Exeter, EID is heavily developed, but comes a sudden break, is probly on leaving ID, and looking e to slopes are still citrus, and those slopes are in EID. Then one shortly enters Lindmore, but that is not so fully developed.

Between Strathmore and Porterville, again, is no development of citrus. Not in any ID. Why not?

Tule R., like Kaweah-St.Johns, is spilling downhill, no storage. Wouldn't local storage be cheaper than FK? FK is grand idea, but south isn't ready for it yet, hasn't developed its own resources, nor is willing to let them be integrated into thing. Hasn't solved problem of putting land to use in existing systems.

TB may be e.g. of danger that a pattern of scattered settlement will be come frozen when water runs out -- good object lesson, case study.

Towns at river bottoms: Hanford - Kings
Visalia - Kaweah
Tulare - Tule
Bakersfld - Kern

To get land into LSID they pay \$250/acre ~~for~~, for privilege of
 buying wtr at \$10-~~20~~/af & paying land tax, c. ^{6.30} ~~\$10~~/acre. Use $2\frac{1}{2}$ af.

So value per acre ^{per yr} ~~\$10~~ ^{\$31.30} to 10 + 5% x \$250 = ^{\$44} ~~c. \$30~~, ~~or \$25/af~~
~~Get exact fig.~~ Or c. $\frac{44}{2.5} = \$18$ per af.

BR. Ptrville ID. Tech. Studies in Support of Factual Rpt.

Ch. IV, Wtr Supply. Prepared by David S. Summers & Floyd ?

Bluhm. Fresno Opns Office. E. F. Sullivan, Opns

Supervision. 10-54.

p1 Ave an. nat. supply, incl. rain, = 16,100 af, '21-49.

From direct diversion of Tule R. or pumping.

Crop irr req. 39,000 af. Need 21,000 supplement.

(Fallacy of much thinking is, you either continue at current standards, or go out of prod-n. Is room for vast adjustment bfr do that. Very few acres hv actually gone out. Perhaps w/o imports, wd reach eq. via not reduig acres, but usig less wtr/a.

Such acreage as has gone out, can't name single cause. Silly to point to one cost, attribute all troubles to that. taxes more often get this treatment. Esp when land price = \$1,000/a.)

21,000 suppl. to be 15,700 d1 & 11,500 ave d2, max 24,000.

150 wtr level down to low of 64' - Ad dev. & below ave. runoff.

153, up to 43', ave. - range 8' to 100'. Recovery along river is rapid, up to '21 already.

✓ Ptrole wth supply, 2

28 representative wells.

86' lift, 159' depth.

20 hp mtr

627 gpm yield

\$3.80 wth cost/at

\$.044 per af-f

(Need data on how variable lift affects pump costs, to evaluate
qnd storage)

p14 No comprehensive adjudication use of surface wth has bn made.

This is probly more detail than I need. But from factual
rpts get local sources, all IDs. But these do give pump costs.