Tucson -
Intermediate notes

"Diseconomies Inherent in Water Law – a Calif. case study."

A Calif. case study – ideas for Tucson paper

What is my distinctive contribution? Emphasize that, delete rest.

Kaweah R. needn't be whole study, if have too little. But shd. be able to use it to illustrate many things.

1, Get list of discus. of water law, select ones to emphasize.

a. Non xfrability. Fact of no xfrs is prima facie, & will be supplemented by evidence of need for xfr. Evaluate xfr of MWC shares.

Physical xfr cost nil or low, or negative! impute problems to law.

Xfrability w/o flexibility -- huge monuments but not micro-adjustments.

b. Divergent mps.

c. Frustrated storage? (excessive claims)

d. Excess diversion capac. Have Tom & it.

e. Excess ~~claims~~ length of line. [Tom cd. handle WWCo., cf. area vs. min., etc.] Catalogue absurdities, criss-cross, waste, etc.

f. Scattered settlement – ~~Holley~~ Althouse' stuff.

g. Get data from some I.D. to cf. vs. Kaweah.

h. Reduction of variability by linking Kaweah & neighbors.

~~i. MP of storage on Kaweah~~

i. Protracted litigation -- offer some measure of cost, no. of cases. etc.

2. Note allegations that law works ok, e.g. by Hirshleifer, Harding, Tolley. Refute them from this case.

3. MP of water storage on Kaweah. More gnrly, wd. it be ecl. to store if instl. barriers breached? If cd. store underground (but they can & do, WCD, where their wtr?)

4. Overbuilding, (agreeing w. H M & D & H.). Cycle of overexpansion — evidence on Kaweah?

5. Some obvious absurdities:
~~Lining ditches, but using others for recharge.~~ Firstly, ~~using~~ segregating waters for ownership purpose & thenceforward treating this as a physical reality. Thus southward ditches from St. John's branch; insulated crossings; etc —
? have a list somewhere, perhaps in "Ideas & Outlines".

6. Write a section on how the system ~~rigidofi~~ became inflexible.

7. What needs to be done — & how system inflexibility hampers it.
Need resr., recharge beds, & conjunctive opn (esp. since small resr nec.)
But cannot regulate flow upstream, nor divert for beds, bes rights based on flows past certain points downstream. (But U.S. is going to regulate flows, probly work out, as at Pine Flat, by some computation of what natural flow would be) ("natural" meaning before dam)
But it is one thing to reg. flows for benefit of srs., & another for a jr. to enter the field to capture flood waters.

8. Parties make unreasonable magnified demands. U.S. solves by buying all out.
This encourages such demands, discourages local solutions & local financing.

9. Doctrine limiting expert from --- from what? Pin this down — & criticize.

10. At one time I was awaiting tabulation of Kuh results to make new plans.

11. Costs of variability
a. Hi capacity needed, idle most of time.
b. Probly not ready for big supplies when come, much waste.

12. Some get micro-regularity for weeks, then macro-irregularity. Desirable is to get a little of each.
To measure micro variation in a period, first establish the trend of the period, msre deviations from the trend line. That is where I went astray before. There is still a job to be done of this sort -- consecutive flows data. Decide what info. you want & set up procedure to get it.

13. Sum the % of flow supplied under conditions better & worse than Kuh., &/or ~~[illegible]~~ & diversions.

14. ~~Analyze~~ one ditch in detail?

15. This system is not sensitive to changes in demand, hence only virtue is stability of supply.

16. Stability in summer is important, so finish off those monthly data.

17. Write Holley again? Or did he already answer? I don't think he did, gen. listed.

18. Note close correlation of LCR & C.Vn., try to explain.

19. While waiting for most ec l. adjustment to break thru instl barricades, others adjustments are made, irreversibly. If lag of response to stimulus gets long enough, better not respond at all, need will change. LR, all dead.

20. Discs. due to "free" xptn. Upper parts of LSID (+ho partly offset by full pressure system) Remote areas of TID, in SW, no extra charge for extra length of line, probly.

Among orgns, discs — conveyance loss on way out to Lakeside D.C. ~~farmers orgn~~ e.g. (Not a full loss, bcs helps recharge. But a, system set up when recharge no value, perhaps even injured lands by waterlogging; b, Is a loss to individuals, regarded as such, & presumably wd. ∴ not be enough to overthrow system even if wtr all lost 100%; c, Some ditches lined to stop it, at cost; d, Is uncontrolled recharge, not at the time needed nec'ly ...

e.g. wtr might be going underground at same time as pumping going on, needless round trip; e, Recharge area expanded over extra surface, Δg volume needed to bring up to pump level --- i.e. wasted dead storage — and Δg area over which grnd wtr must be controlled, Δg cost probly.

✓ f, No guarantee of future of this recharge, wtr losers can line ditch at any time

✓ g, No pressure on inner users to use more wtr, nor on outer to use less, hence longer lines than nec.

21. Anomaly that valuable crops are low wtr users. (so obviously acreage of such shd expand, get more wtr)

21a. Citrus has to fight for water, from mp = 0 or ∠0. Play up as big anomaly. LS at least got some wtr. Exeter, Lindmore, TB, & so., got none. (& best lands still get none.)

22. Cycle: slow devmt of citrus, waiting for ponderous CVP, to come lumbering up the valley, meant failure to take advantage of opps. Too slow. Now Fla, Ts., Ariz. expanded, Calif. comes in too late.

23. ~~Merit~~ of Kwh. as e.g. — not affected by cty.-of-origin, by city-vs-country, etc. Pretty straight stuff.

24. The makings of a static, stagnant society, clearly seen in Kwh. rigidity. But dynamic elements don't stop, they move to other mktl. levels, leapfrog etc. --- cf. Hirshleifer, Guggenheim applns, Rural-urban compn, etc.

Adapt or perish. Can't cross imaginary line.

25. Is still questionable if approp. rts. are "propty". Will become so only to degree society wishes, is not inevitable. My view, society should wish to create flexibility, & earn income

Ration by price --- thus a, satisfy welfare crs by compensating losers; b, alloc. eely; c, Reduce demands for wtr d, Build in flexibility.

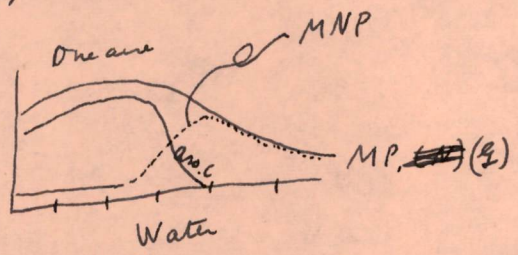
26. Overall P.U. wd. not impose central control. Already have central control. P.U. wd. make flexible.

27. Pumping now, MC may be too low, system of standby charges.

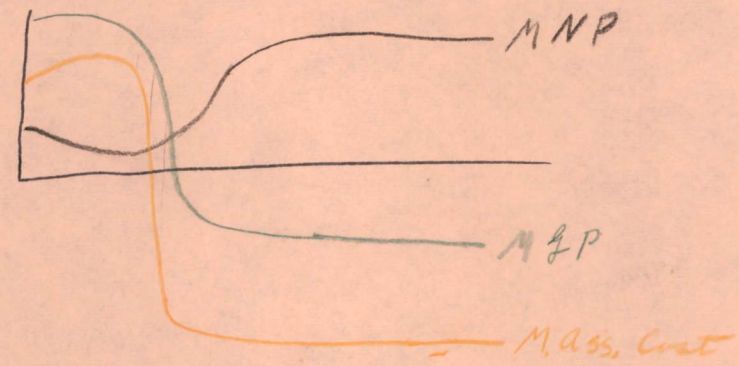
28. Price of wtr as incentive to intensive culture.

Ordinarily one thinks of cheapness of input encouraging intensive use. Cheap wtr encourages much wtr ok, but seems that cheap wtr is subst. for other inputs more than complement promoting more output May actually reduce gross/acre. Is this demonstrable by simple

substn., or must one turn to find aspect?



Above graph is one feasible analysis of situation. But it is more extreme, M&P may be neg., & assoc. costs even more neg. for a range:



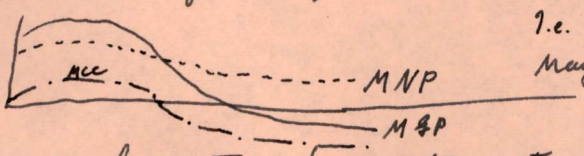
Thus a + mnp can accompany a − mgp, if mgmt assoc. costs are more −.

(Or call them <u>complementary</u> costs, mcc)

Is this the case in Kwh? If it were, annual ground rent wd be higher where use more wtr.

Other explanations are: less risky income (not same as more constant) bes higher net/gross; less mgmt required. Look for evidence, which is it?

Maybe as ff:



i.e. maybe wtr only subs. when very cheap. Maybe even only when price ≦ 0

29. One + achievement of system, has gotten steady reliable supply to citrus areas where needed. Check data on this, tho, has it really? Don't Evans & Watson have very steady flows

30. An e.g. right W-in Kwh area of how it takes extreme pressure to get action, is the area between LSID & Consol. PD 6. Exeter & environs was left out, & entire area between Lemon Cove & Foothill D.C. along same contour, i.e. along Foothill Ditch, & up Yokohl Valley. Lindmore area & south --- all dry for why? For Lakeside Ditch, Goshen Ditch (probly on poor soil) etc.

31. If crop patterns aren't enough, show depths to groundwater. Along Kwh R., shallow wells, cheap pumping, easy recharge. So they should relinquish surface wtr to non ripn lands, when wtr level falls. (but in fact it creates anxiety, they hold tighter than ever)

Note this principle countermands gnrl distribn. principle, but of course latter was never intended to override all other considerations.

Upshot is, shd have ~~a~~ one large channel to move wtr away from river, then branches.

anyway, to make pt.; clinch it, note areas of shallow lifts are keeping wtr from areas of deep lifts. Get out basic info, have Tom systematize.

32. If mp higher in south, Elk Bayou shd get best, not worst supply.

33. If wtr rts are on poor soil, explainers justify hrs needed to overcome salts, etc.; if not on poor soil, ... soil is ~~poor~~ good.
But as long as good soil nearby has no wtr, use on poor soil cannot be justified.

34. Large extra diversion capac. might be a flood control msre. But is it so used? Is there any central control? Check records in flood times --- jobs for Tom.

35. Send copy of paper to Dan Burr etc. for comment.
Maybe go to Tucson via Lindsay & Visalia for last minute gns.

36. "Consolidated" PD Co. is actually fragmented or unconsolidated.

37. Index to imp wtr, (origly, i.e.) is holes in ditch cos. WW Co., very low. Consol. P.D. pretty low.
Curiously, these are upper lands. (but explain: they had more wtr (acre); & good ground wtr)

38. Holes in cos. bring out weakness of MWC. for big wtr. Sell shares, this does not lower everyone equally -- is all or nothing. So some still have too much surface wtr, others have none.
Leaves an overly costly distr. system for wtr. [Also makes a spotty system for power, which follows, as wtr sellers want bigger pumps]
Wtr user who sells is disappointed by neighbors bec surface applin helps recharge. But it is a costly wasteful means of recharge, viewed as such, & probly leads to social approval for wasteful applin of surface wtr, on balance bad.
Why can't seller sell fraction of share, keep rest? Probly bec MWC does not give fraction of "an irrn." ... all or nothing. No - they sell fractions.

39. Probly LSID bought wtr from WWC [& CPD?] not bec imp lower there than Lakeside &c. downstreamers, but bec downstreamers can't sell! Not at an upstream pt. of diversion!
Note TID is a solid block, cf. upstreamers.

40. Contrast excessive diversion capac. vs. inadequate distrib. capac., so is no flexibility in system --- this wd. also refute idea of flood control use of diversion excess.

(38) 41. So former shareholder pumps, wth has mc. Neighbor has ~~mb~~ mc = 0, uses freely.

Former shareholder is completely committed to pumping, withdraws support from surface storage.

Shareholder sells at too low a price, since techn. external economies are not gained by him. Buyer, other hand, probly offers too low a price also same reason. Unless he is big, values & captures external ecs.

42. Orgns. big enough to external ecs. are internal, outbid individuals. Maybe this is good -- puts premium on organizing, overcomes inertia. But higher orgns evolve at fringes, pull wth from center. & conveyance costs. LSID, again, is farther from system, pulled wth from WWC etc. ... as well as preempting it from nearer areas not orgd at all.

This is counteracted by "Delta solidarity." So what you have is hodge-podge of random unec. pressures, balance of forces not going to produce ec. result. But neither is it completely w/o gnrl. pattern .... basic tendency toward fragmented, obsolete devmt in center (or along spine), no devmt in grey zone, high devmt in outer zone. Then comes outside help to fill in empty areas -- the grey zone.

43. Established districts are restrictive. But they will support devmt of new distrs. when nec. to get their fncl & pol. support to force common facilities. E.g. LSID took in hills. Now, L.A. probly will support FRP (tho S.C. citrus interests opposed CVP) bcs need help of allies to get F.R.P. This principle not only offsets restrictive one, but goes two

far the other way, oftimes, floods market.
Floods local land mkt., even if doesn't flood national produce mkt.

44. CVP represented as "rescue project". But to rescue lands so scattered, must recharge ground wtr for all in between --- or make surface wtr available, as for new I.D.'s To "rescue," ∴, is to expand. Thus a large indivisibility, (or discontinuity?).

45. The farther wtr is carried, the greater the indivisibility. CVP, e.g., a colossal one-shot affair, size fixed for long time, attendant wastes.
Short local channels, ec. factors wd. permit more flexibility — but instl. factors deny it.
If Lindmore got Kwh wtr, might build aqueduct in 2 stages. Not that % Δ ↓ initial costs is less, but channel costs are smaller cfd to value of wtr .... ? Work this out. — done, separate page.

Going long way for wtr is one factor makg for jerky devmt, instability. Another one is scattered settlement --- must recharge whole region (as well as provide other services).
a third is competition for wtr prematurely under appro. race.

46. Devote a few words to explain why selected variance/mean as index best to show relation of individual to aggreg. variability.

47. Cf. mp Δl storage on Kwh vs. neighbors, probly show ~~disproportion~~ unequal mp.
None had any storage before U.S. So begin from zero & show which stream shd. have come first.
Note anomaly of no storage so. of Merced, tho needs greater. Due to rigidity, early fragmentation of wtr rts, probly. Tho on Kern is hi concn, so fragmentation is not answer, but security w/o storage.

48. Show benefits of integrating Kwh w.
a, small local streams
b, Kings, Tule, Kern, jointly & severally.

Tom

47 (cont.) To point up results of backward instn., cf. mp of storage on Kwh vs. Tusl, Colo., or other highly devd. stream.
The Merced, or S.J., even better.

49. Gather all ests & indicators of MP wtr on Kwh
Pump lifts
Crop output vs. wtr input -- some apply to area.
Prices for wtr --- xctns in Lakeside area e.g., Corc. bought some.
WW Co. prices, might ask Burr.
Conservation costs --- e.g. LSID sealed pressure system, obviously can't leak much. vs. Lakeside conveyance losses.
Lining of Tulare Ditch.

49 (cont.) MP of wtr

Station experiments on crops

Land prices (tho biased toward hi net/gross)

Amount per acre.

Length of season in which no wtr is let waste. Let us say a D.C. is entitled to 50 s.f. Whenever it takes less, mp = 0, since wtr is free. This might be due to inadequate distrn system, or wtr logged fields, or inadequate mgmt.

50. The way Kaweah system is set up, if upstreamer is wasting wtr, that can be recaptured by someone below him — but not so easy by someone above him! Upstreamer must let so much go by to satisfy downstream rts, even tho they are not being exercised at the moment.

51. Interesting fact: Woodlake & subtended area of WWCo. is outside KDWCD, suggesting no underground connection. Yet LSID was harried for taking WWC. wtr. Maybe that's why LS took WWC wtr instead of CPD?

52. FK canal route gives good idea of contours in area. NB large delta shaped or triangular wedge above FK canal up river. FK contour is the thermal elevation as it passes thru LSID. On left bank of Kuh, maybe n. slopes are ng, (altho n. tip of Foothill D.S. extends into such area.) But if so, rt. bank s. slopes shd be excellent, & better than LS area. Up Canal Crk V., e. of Colvin Mt., much land, s. exposure. Exeter I.D. includes now much n. slope. left bank, -- outside KDWCD.

53. Note great unrequited loss of elevation. Cd. tap entire flow at elev. of Foothill Ditch, intake c. 500', use elevn either to move south, or to gnrte power (an ex. of scale on one large channel).

Elevations:

Lindsay
Tulare 285'
Hanford 251'
Exeter 392'
Corcoran 203'
Porterville 460'
Ducor 536
Visalia 331
Friant intake, c. 500' — & it nicks the 500' contour again near Exeter, east thereof.

Tulare L. bottom, 0 ? (see attached) ✓ so?

3 Rivers gage 620'
McKay Pt. " 450'
Sand Crk " , 490' (3.8 mi e. Orange Cove)

Bull. 49 doesn't even bother giving elevns, matters so little. Folly of supplying Terra Bella from Friant, letting Kwh & Tule & Kern water supply Tulare L. at elev. = 0 !! Check topo maps tho.

54. Kwh. unutilized drop may not be usable for power, wholely. If so, shd. be used for xptn south, releasing some drop elsewhere for power.

Small power plant unec.? Not if tied into big system. It isn't the plants that must be large. Full integration would permit exploitation of many little drops all over.

Ask Blair

55. Terminus is on Kwh.

WSP 1345, 1954, p. 230

Tulare L. gage at mouth of Tule R., 6 mi. sw Corcoran, is at mean sea level!

But Lake rose to high of 197', June 27-28, 1941.

56. Diversions for pwr devmt on Middle & East Forks Kuh.

57. Diversion for irrn. above 3 Rivers (el. 620'), so irrn. is feasible higher up.

58. Awards in s f, together with ultimate limitation in a f (such lim. not mentioned in Bull 49.) Max. used by max. used in past.
Waster involved

59. Rts expressed in flows at head of ditch. If upstreamer lets wtr go by, recapturable; but not if downstreamer does.

60. Court let seniors get right to > mean flow, due to variability.

61. Court tolerated 40-50% conveyance losses for seniors, cf. LSID low losses

62. WWC scattered so as to serve c. 18.8% area over which dispersed.

63. Blast CVP, import remote wtr at high elevn. (500'). But waste local elevn. & use, almost entirely below 400', down to 200', ave. probly <300'.
Import wtr for hi imp uses; leave local wtr in low mp.
Remember even LS is now on CVP. Most Kwh goes to low uses at low elevations.
Ask Blair — how convert drops to kw? 1 sf dropping 100 ft = how many kw?

64. Emphasize in study: evaluate usefulness of instns. for xfrg wtr, as they worked.

65. Analyze. downstream interests are favored wtr-wasters.

66. Effect of TID v. LSID seems to hv ben to let LS store winter flows for use in summer.

But only by greatest effort cd LS establish this. So other winter flows presumably not securable, had to be wasted.

Only way to find out for sure wd. hv. ben to build & begin using storage!

67. Before presenting measrmts of variability such flows, shd. probly check them for secular trend. In TID v. LSID ct. said was no surplus wtr. so also interesting to see how much diversion have Δd since then.

68. Assemble relevant data on wtr input & crop output to show mp = 0. Cf. nearby areas where wtr is limitd.

From?

69. Causes of excess invmt in ags:

a. Unnec. aggr. flow variance
b. Premature inflated claims & factitious use, preemptive.
c. Overlapping indep. uninted agencies
d. Scattering of customers

Same time, ags. inadequate in some aspects to handle wtr. Certainly inad. perc. beds; & no storage. If money wasted on excess cap. & lawsuits went into storage etc., probly cd. handle locally. Get cost of Terminus.

70. Reduce variability by linking 4 Tulare L.B. streams?

71. Link Kwh & lesser ones -- incl. Tule -- reduce σ variance.

72. Inverse relation, diversions & stream flows?

73. Scattered service area frozen by limits on wtr supply --- & holes filled in by CVP, in part.

74. Navels require winter wtr I think, so dovetail, cut storage needs

75. Flexibility most needed when wtr scarce --- but is then least.

76. Rice in area? Try crop & limited spts.

77. Get some time series on acreage & price of some fruits, get idea of lag of response.

Tom

78. Cost of variable wtr supply: deep rooted crops can take it better. Shallow rooted truck crops require steady reliable supply.

78a. Reliability is not same as steadiness, but really more important.

78b. Most indices of variability designed to reduce influence of extremes, & touted on this ground. In wtr supply, small variations do little damage, big ones are all that really count.

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79. They could form an ID to buy all wtr rts, rationalize system.

E.g. CCID bought M&L; Merced ID bt. Crocker-Huffman; Empire W. Side ID bought Empire Co. rts; Alta ID bought 76 Land & Wtr (?); etc.

But none of these involved physical change. I know of no e.g. of buying wtr rts to remove them. Check Milliman book on this & write for e.g.

80. Today all wtr control involves ground wtr, runs afoul of sfp. law.

Like LS.

81. + mp wtr on Kwh suggested bec diversions vary w. flows, unlike Tuol. Perhaps even irrd. acres vary w. flows ... cty reports might help on that.

Other hand this may simply reflect higher urge to establish history of use.

Lack of storage wd. make Kwh more this way, too? Maybe shows hi mp & ap storage on Kwh?

82. Irrn needs are seasonal. Rigidly fixed diversions indicate artificial limitations or constraints:

a. Fixed wtr rt, fixed by rate of flow

b. Inadequate distrn capac.

c. Winter diversions to ~~support~~ bolster claim ... ~~"claim supporting"~~ ~~"bolstering"~~ ~~diversions~~

~~"claim puffing" diversions~~

"Claim-stretching" diversions.

"Preclusive"

83. MP storage lower in south bec more demand in winter?

84. Sr. fied wtr deviate residual by Ag % variability

85. Superposition of anachronistic instns, (w. privileges for obsolete ones). Kings R, MWCos. remain on inad. delivery system -- rotation --- when Pima Flat allows going to demand system. Under no pressure.

86. Emphasize divisive consequences of wtr law, creating artificial class distinctions, ~~& thwarting~~ factions, unable to unite to max. joint benefits.

87. Area shd. be peculiarly susceptible to flood hes. low banks, cf. vs. Tucl. etc. Hence hi value of flood control.

88. Lakeside DC is a wedge driven into Kings R. servi area. Core ID ditches go right thru it, & one, Core. 10 "highline" canal goes east of it. So it def. wants Kings R. wtr. Is practically an island in fact, in Kings R. area. Could all be served from lower Kings. (Whole area cd. be from upper Kings — Alta ID serves up c. 5-00')

89. BAE study, soils, .. p. 44, p. 71, e.g. ... now, crops maybe not best suited? Or, cd. interpret otherway, have not proven limiting factor. Desert has proceeded where they had wtr. See attached.

90. BAE T. 4 p. 10 shows % of land irrd. by classes. Shows maldistn. of wtr within each area (including Kirk). I.e. much good soil not irrd, but much poor soil is.

is some grave qu whether
crops now best suited to soils.
E.g. LSID, with 25% citrus in
whole area, has hi % class 2C
soil. by BAE p. 44, "not suited to
tree fruits" due to hardpan.
Developed due to superior inst.
But folly to freeze pattern.
Probly isn't best climate, either.
Lindmore, subarea 22-12, ~~is~~
has most of its 2C land in
orchards (p. 71

91. Re integrating Kwh & neighbors, Kings & SJ have good storage sites, need a distrn system to spread out Kwh & Tule in flood ~~ops~~ times, while Kings & SJ are completely stored.

92. Wider ~~Larger~~ implications ... approp. rt. not a freak, but like residence requirement etc. Ripn. rt. like specs. rts to own w/o using. Interplay of 2 ~~counter dominants~~ countervailing forces, "altervailing", now one & now the other on top, explains much. Dynamic alternating countervalance. Reciprocating antitheses. Alternating counterdominance, or countervalence (sp?)

93. Needed: means to dispose of instl. garbage. Now, obsolescence ~~leads~~ hallows.

94. Big projects are rarely forced on their own merits alone. Too risky. Lenders demand collateral, already proven.

Sr. wtr holders have the collateral. Where wtr is limitational. It is not the wtr that is collateral but the entire tax base built up due to wtr supply.

Those who hv. the collateral however have least incentive to join in project. They wd. pay more taxes, lend their credit to opn., but others reap main benefits.

Thus local enterprise is emasculated, disabled.

Link this with divisiveness, & devaluation of residuals by fixed diversions of wtr.

95. There is resistence to saddling land w. inescapable taxes. Hence many like MWC. indiv. can sell share, end payments.
But result is riddled service areas.

96. By controlling wtr supply can get by w. much less wtr. (attached) Rotation system wastes wtr. Storage w/o ~~out~~ Ad ditch capac. to permit demand system wastes wtr & storage.

97. Where wtr is limitational, extremely steep dim. rets.
Hence extreme contrasts between those who have a little too much & a little too little.

Wtr. is limitational bec is more irrigble land than wtr available to irrte. it. But only in an ultimate sense, & there is nonesuch, bec wtr can be imported. So it is only one of many constraints.

98. Kwh. is e.g. of how hi wtr scarcity worsens ec. of wtr as claimants cling tighter. Kwh. less flexible than neighboring areas of hi abundance.

99. Wtr wasters claim need to flush soil. But too much passage of wtr thru soil results in leaching. Exactly one argument for preferring irrgd. produce is, grown on soils formed in semi arid areas, little leaching.

100. Hirshl. etc. favor ~~govt. controls, but~~ strengthening rip. rts. Bcut Eng. has strong govt controls of wtr now, result of clinging to rip. rts.

Briefly emphasize productive possibilities of controlled wtr supply. —
wtr crops when need it, critical moments. And stimulate them or shape or "set" them by drought when needed.

Then emphasize how possibilities lost by crude systems wtr low or delivery

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101. Meager results of $ wtr shown by Taggart's figures.

Showg:

a. At low price, reach stage where wtr is more a subst. for other input than a complement.

b. Very slow response to new opps.

c. Low mgn of wtr?

Check the figures, anyway, first.

102. a gap in focusses of studies. Some limit selves to what is possible today or tomorrow. Others, extreme, look off to millenium; or go into ofts. ec. systems.

I shoot for practical idealism. Not accept all the waste of status quo, but also keep feet on ground of what is possible, if not tomorrow then the day after.

103. No return flow on Kwh., no pollution or salinity problem.

104. Find summary of $ ditches, needless crossings, etc., on Kwh.

105. Lined ditches vs. spreading grounds. And N.B. ditches were unlined during era of ample hi gndwtr. Were only lined fairly recently, when gnd wtr went down. Indeed, hes it went down, ... an eg. of tighter grasping when ~~things~~ get wtr gets scarce.

106. aspect of alternating counter dominance, "alternating ascendancy of antitheses"

When grnd wtr gets low, even many of those w. wtr want fringes & interstices to get wtr too, to keep up grnd level & [want them orgd. to help, ~~support~~ [vote for & share costs of] monumental xfr projects, pol-ly & fncly. So expansive forces gain ascendancy.

E.g. LTRID tolerated orgn of Pixley w. mixed feelings. Helped grnd wtr, but competed for FK wtr. (i.e. reaching restriction ~~th~~ ascendancy again.)

107. alloc.n of FK wtr by willingness to sign, priority. Some areas left out ... Esp. probly areas in large hldgs. Which include some of most promising lands. Maybe this is a reason why wide thermal lands s. of T.B. never orgd for FK wtr.

108. Where fms are small & grnd wtr deep, system of surface deliveries preferable. Still might use grnd recr., but not a well to each fm.

This limits argument pro grnd wtr, every fm direct tap to wtr. Ers. of scale in tapp'g grnd recr. Oft cited, indeed, as cause of large fms.

Dead loss, in recharge, the deeper the table the greater the loss. Is no pwr gained by wtr filtering down.

109. Imminence of desalinization means put wtr at hi elevations. Also, antic. that problem of saline wtr ~~can't~~ will get better, not worse, so needn't antic. heavy flushing needs ... i.e., desalt the SJR before the ocean.

Tucson.

110. For TID & LSID hv. wtr/acre from Bull 21.

Cf. vs. Bull 49.

also seek Lost & spilled from Bull 21.

~~Cal. State~~ data I got in ~~Sacto. per Bull Th.~~

(108) 111. Grnd wtr is to be had on "demand" basis not bes of inherent technology alone, but bes is excess "peaking" or capacity. ... in well, & pump, & power co. plant & lines, in standby charges.

Might be cheaper hv. excess capac. in surface system. Or in a few big wells opd. by ID, as in Modesto.

Bias vs. ID shown by firms saddling selves w. costly pvt. pumps, eagerly, but refusing to vote for ID to do same

112. MW Cos. etc. have huge excess capac., but is not peaking capac. are on rotation systems. Excess is not in such way as can ever all be used at once.

113. List TID crops from Bull 21; & Taggart

Tom Also get crops of whole area from BAE!!

Get crops of Ivanhoe, Stone Corral, Yettem-Seville, Orange Cove, Hills Valley, Exeter, Lindmore, Porterville, Vandalia, Terra Bella. from BR.

114. Cost of lifting wtr from 715 to T13. Gives idea a, Of value of wtr, b, Of mc of serving larger area c. Ducor & south. c. Value lost by letting Kwh elevn. waste.

115. If primary bens > primary costs (in this case o.c. of wtr)
then 2dry .·. probly > 2dry costs.

Also, is big 2dry ben. in bringg wtr up so can earn livg in more pleasant residential area.

116. Sent for Shultis & Booker, C&ES File 12.13, Irrn Pwr Info.

117. Low mgmt pwr rates, so local wtr cos. can't Δ wtr rates bec firms wd. all pump.
So recharge orgns buyg FK wtr must pay by land taxes.

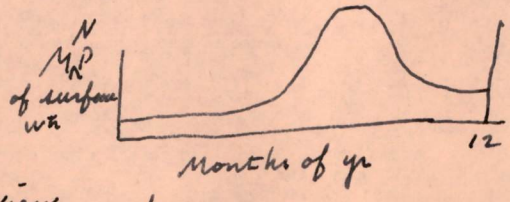
Leg!! 118. Value of decreased pump lift. See CVP studies 8-9, p. 45 ff., value it at $1.6m, annually, vs. direct bens = $5m.

119. Value of wtr in SSJV ··· BR est. $7.30/af, CVP study 8-9, ff. p. 45.
Then come to $3. net of xmsn cost.

120. There is something to be said for letting favored few have very reliable supply in this, there is a great gain in doing away w. supplemental wells entirely. as I believe e.g. at LS 10, & probly also Foothill Ditch & maybe Lemon Cove, Hamilton, & Mankes-Rice. It wd. be productive use of wtr to do that. Then, by Δg variability of remaining supply, Δ incentive for storage, & mp of storage? Prepare to answer this argument.

121. Map shows "St. Johns D.C.", R24E T18S, not in Bull 49 records.

120. (resumed).



From this view, makes sense to distribute variability unevenly.

120 (cont.) The favored ones shd be in areas of deep lifts, & is some tendency that way.

But this wd. only apply (if at all) to handful of srs. to whom can give rts so good they needn't have suppl. wells. Beyond that -- & that is not very far, for river dries up completely from time to time — a sharing is best.

122. Are benchlands in citrus kes wtr is so dear? Or v.v., as at first seems more plausible.

To answer, check hist. of Exeter, Ivanhoe, Lindmore, since wtr became cheap. Rushing into citrus?

123. ID may include under. land to bolster wtr claim. Has TID done this?

124. BR has contract w. LS ID, TBID, etc. These contracts must give them lien on more wtr than they need, since LS & TB at least are selling membership now to peripheral lands.

125. Flexible wtr system wd require consol. land settlement, best first. Otherwise mgmt areas get drained dry when better areas come in, later.

So failure to settle land settlement problem is a big reason for clinging to rigid wtr rt system.

126. Cycle. BR imports not justified by Δ output. But by Δ l.v.

Is a, Little Δ output

b, Little real demand for ctn & some other items expanded.

But is big demand from land buyers. This helps expansion forces gain ascendancy ... specs. push hard, & restrictors are quieted.

If dry & ird land both double in price, that Δs absolute diff., in fact almost doubles it bcs dry land not worth much anyway. Thereby Δs pol. pressure to reclaim more land, hence to get Pine Flat, San Luis, Terminus, Isabella, Success, FRP, etc. Even in Santa V., Δs absolute excess of ird. over dry value, boosts land devmt works.

All there get half started, have hi cap. reqs. → Δ i.v., → -Δ l.v.

Hi land prices grease the wheels in many ways. Δs pol. pressure on State & local govt. for pvt ... wtr & roads. Makes local people more willing to bond selves. Makes big landholders more willing to make concessions to others to get results. Creates racing psychology as development elsewhere threaten to preempt wtr.

127. Salt balance argument is n.g. vs. flexibility Bcs. suppose we bring in more lands than can sustain, need to retrench. Vested wtr rts do not let us.

Argument vs. "spreading thin" is based on assumption of irreversibility. And under present law the argument has some merit. This is another strike vs. the law.

Tucson,

128. In 1935, TID v. LS, case decided on ~~basis~~ grounds of whether plaintiffs put wtr to beneficial use before 1916 (when case opened). p. 504

129. Trial ct. instructed to fix quantity for trips. But cannot fix future needs. Any amt deemed reasonable at the future time! p. 525

130. How can TID justify serving some & not others, if expand & contract acres?

131. Get ltr off to Dean Burr.
Send for Orange Cove ID Factual Rpt.
" " ?
LS
Teapot Dome WD " "

132. Elevn valuable not just for xptn, but quick xptn.
Low gradients mean a, Slow motion
b, Need wider, costlier canal
c, Canal more vulnerable to subsidence etc.

To have demand system, need speed in distn system.
(Are speed of flow & volume of same perfect substs?) (Not 100%.
Advantage of speed is if ags. empty to begin, can begin irrtg sooner. Time it takes to irrte, however, depends on sf capac. only.

Also, when finish irrtg, if have canal of large X-section, low veloc, much wtr remains in canal when finished. Also are higher channel losses at low vel.
So for frequent starting & stopping, need hi vel. low x-section system.

Tucson,

133. LS got 1.76'/a for yrs, got along.

134. Jerkiness in system. Bs (attached)

135. Even those w. sr. wtr need supplemental pumps, w. few exceptions. So steadiness does them little good, while hurting others? Or does it by same token do others little harm?

136. TID v. LSID, imposed system where tolerate hi claims in winter & spring by those who can't use 'em. Thus frustrating storage.

So lower use w. priority prevails over jr. higher use w. respect to time as well as place. Several ditches take & apply April-May wtr, when value low but can hold them from storer.

137. Can "import" wtr to time & place of need by chang'g time, (storage) or place (conveyance.) Law biases toward conveyance, bes wasted winter flows are not available to compn of others so much.

138. E.g. of ~~contraycloud~~ perverse Δ diversion, WWC, (attached)

139. Keep lines short, can afford the excess capac. you need for flexibility.

Long lines, remote importing, excess peaking capac. becomes costly, must use facility fully all time, it dominates you.

More anomalies:

Big jumps.

E.g. V&K Ketchum Ditch diversion is 60 sf, first 60 sf reaching head, until river flow exceeds 200 sf, when diversion terminates. (p. 137, Bull 49A). Thus throws 60 sf down river suddenly.

Simul, Jennings goes down from 39 to 34 sf, when St. J's at Ketchum reaches 200 sf. (p. 170)

A remarkable contra-cyclical diversion:

WWCo, '48-49, the driest year from '38-39 — '54-55, increased its diversion to 33,346 af, near its all time hi of 34,126.

LSID & TID also increased takings.

Tucson,

139 (cont'd)

If wtr is limit, & cost is small % to tc, then shd build surplus capac. to ecze on other inputs. Demand wd. be inelastic.

But this isn't done by small D.C.s. Bcs they're not getting hi gross, I judge, so wtr cost wd. be hi % to tc.

140. You must keep wtr table fairly low at higher lands to avoid waterlogging lands below them? (Maybe if lands below are pumping, solves problem).

141. Althouse, p. 13, like Weir, remarks on 1,000s of acres ruined by hi wtr table.

142. Althouse, p. 12. Lands 500'-600' ave. better soil than 7K-500'. Lands above 7K enjoy longer frost-free pd.

143. Deer Crk, White R & "So. Basin", huge underground resrs."

144. 7K wtr must find new lands once recharge achieved -- another cyclical over-expansion factor.

145. J. Adams confirms, TID does vary acreage ea. yr. accord'g to wtr. This suggests hi mp wtr but hold: it is acres getg surface wtr that vary. Maybe land is planted & cropped anyway. Contribn of TID wtr is just to obviate use of lift & grind wtr 40' or so.

146. By adding minor assoc. streams to Kwh system, get signif. Δ:

$$\frac{517 - 436}{436} = 18.6\%$$ Althouse p. 33, 1890-1940.

Give needed stability by integrtg w. Kwh

147. Althouse msred Kwh outflows, pp. 42-43, check vs. Bull 49 resids. (v. notes p. 5-6). Ave. 84,000 afy. of which 84,000 from St. Johns. How treat Lakeside D. in King Cty?
But msred outflows from Tulare Cty.

148. 1940-50, TID expanded, added land w. of Packwood C.C., & interties see maps. I suppose due to getting CVP wtr.

149. Index to low value wtr, TID, they don't msre it, but charge per ave irrgd. — J. Adams Bull 29.

150. Blair B. suggests irrg grndwtr record, lower Kwh, see if rose in big yrs, or did wtr get away?

151. Waste esp. bad from St. Johns, shown by Althouse. Even after southward diversions.

St. Johns begins to waste ~~at~~ when Kwh runs ~~300,000~~ 70,000 afy.
Kwh Branch at 300,000. Huge diff. — yet maintain McKay pt. div.

Althouse, p. 42

152. Deer Crk & White R. areas, better soil than Orange Cove ID, (q.v.) more of it. Just lacks wtr. Better soil than Lemon Cove, Woodlake, Exeter, Cmwd Crk area .... everything but wtr. Althouse, p. 96, T26

Althouse is very strong & detailed, & makes powerful case that mp wtr on benchlands, 500-600' & even 600-700' far exceeds present uses, & in great volume.

Has map showing scattered devmt there now.

153. Somewhere way back when I got idea sr. approp. got a certain quantity before jr. got anything. But I don't know of anywhere that works like this.

But LS did get some limits imposed in af, & LS's was effectively so kind also.

154. Variability is imptnt; bes only c. ½ canal-served area has suppl. pumps. Bull 49-B p. 11.

155. There are c. 1,000 acres of citrus & decid. orchards near 3 Rivers, extend'g a few miles up each fork (so citrus can grow hi up. 3 Rivers is above 620') At 725' in fact, from Bull, 3 Map. And if you go up each fork a few miles you rise above 800'

156. When prorate wtr in TID, probly cut down each individual same prop. Otherwise how decide whom to favor? This means using entire distr. system to serve fraction of TID. -- a minor waste perhaps.

Tucson

LS & ~~Tucson~~ excluded by HH's def?

157. In "service area". Bell 49 ~~puts~~ says c. ½ lands in service agencies get wtr ~~each~~ ann. yr. (i.e. these ones have fairly reliable supply. Probly it is they who have no suppl. pumps) (No, it is c. ½ of those served in ann. yr who have no pumps) The ben. of improving system then wd be to obviate pump'g.

158. Overlapping, why? Probly to Δ reliability of supply, &/or length of season. Reps a waste. But p. 12 shows most overlapping is in what HH calls the "Net irrd" area, meaning gets canal wtr in "normal" yr.

Comen of wtr

159. Cf. Δ diversion capacity vs. max. diversion of each ditch.
" " " " simul aggreg. diversion, which is really all the capac. nec. ... & wd. be doubt if even that can be handled in other bottlenecks.

Capac. is for peaking. So rather than σ, max. flow or entitlement is ~~also~~ cause ferc'g excess capac.

Excess capac.

So ≠ cf. Σ individ. peaks vs. peak of Σ.

160. Many ditches take from s. bank Kwh, so why not TID?
Ham. Ditch, Consol. PD, Deep Crk., Crocker Cut, TIC Ditch, Packwood Crk
Oakes Ditch, (now Kwh Br. becomes Mill Crk.), Evans, Watson, Persian.
J. Adams says TID engr. 1st proposed, to divert from S. Bank Kwh (This c. 1889, when engd.) The plan "aroused opposition" (p. 245), but doesn't say by whom. TID then took from n. bank, not of Kwh Br. as aforesaid, but of St Johns!
Bell 2 wd. tell more about this

Tucson,

Althouse, pp. 61 & 69. Also cites Cal Bull 3

161. ~~###~~. ests. 21 % Kwh wtr is reused. (over)

aggreg. duty possible

~~###~~ Kwh mean an runoff = 404,000 a/y (1903-50)

From this serve:

a. "Gross areas served by orgd opg agencies," — Net of overlaps. — 174,500 acres

b. 58% of above, canal-served "in a season of normal run-off": "Net areas" (net of what? Net of Overlaps ?) "Total net irrd area." — 100,500 acres

b + d is Σ area served. But deduct ½ d as being served by overdraft. Or get actual overdraft est. Otherwise, also deduct ½ c as overdraft-served, leaving c. 100,000 acres getting service, from 553,000 a/y (over)

c. c. 50% of (b) has suppl. pumped wells — 50,000 a.

d. Other "net irrd areas not served by canal diversion", pumped wells only. (Incl. Exeter & Lindmore IDs .... but not Ivanhoe? Or was Ivanhoe orgd in 1956? Yes--1948) — 54,500 a.

e. "Sum of gross service areas" Gross of overlaps. — 221,514 a.

For overdraft see BAC p. 113

Overdraft, 1921-35, Kwh area, 1.3 maf, or 81,000 a/y. (Source: 539, p. 126)

f. "Sum of net areas irrd by each agency" Gross of overlaps — 144,200

g. Kwh Delta WCD (orgd 1927) — {259,360 a. Tulare Cty; 83,000 a. Kings Cty} Σ = 342,360

162. It may be not ### sr.s. who are ### wastg wtr so much as jrs. jrs. have rts to flood wtrs, on poor lands. To store flood wtrs in big yrs for export south wd. have to acquire wtr from jrs. ... & riparians who wd. claim damage, a big stumbling block

If $\frac{1}{4}$ wtr applied is recaptured by pumps, then $\frac{1}{4}$ of that, etc.

$r = \frac{1}{4}$, $\Sigma = \frac{1}{1-r} = \frac{1}{\frac{3}{4}} = 4/3$. ---- i.e. you add $\frac{1}{3}$

(Wtr captured by return flow wd. ult. be lost. Say used 3 times -

$$\Sigma = \frac{1-r^3}{1-r} = \frac{1-\frac{1}{64}}{\frac{3}{4}} = \frac{4}{3} \times \frac{63}{64}$$ --- i.e. you add that

$\frac{1}{3}$ mostly in the first 2 or 3 reuses. So return flow is almost as good as deep percolation.

$$1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} \cdots + \frac{1}{4^n}$$

So if 27% is reused, then can add a % to mean annual flow.

(cd. also reuse more, & note high multiplier gain by doing so)

$$\frac{1}{1-.27} = \frac{1}{.73} = 1.370, \text{ add } 37\%.$$

$1.370 \times 404{,}000$ afy $= 553.000$ afy.

If take some care & Δ reuse to 35%, $\frac{1}{1-.35} = \frac{1}{.65} = 1.54$

$1.54 \times 404{,}000$ afy $= 622.000$

Enough to irrte. 200,000 acres pretty well.

Tucson, 35

~~163~~ 162 (cont.)

But there appear to be large changes in areas receiving surface wtr from yr to yr, & changes take place <u>within</u> orgns, & probly <u>within</u> individ fms. So if you cut a man's wtr down he reduces acres, (may also reduce wtr/acre, no evidence).

Pt doesn't follow tho that all are cut alg. System cuts off some altogether before cuts others at all.

163. Bull 3 proposes dam in narrow canyon 2-3 miles below 3 Rivers in Sect. 33, T 17 S R 28 E. Pf dead storage all used to create elevn, this dam crest was c. 925'

Gnd wtr. depth

164. Bull 3 Map 1 shows gnd wtr very shallow in NW Tulare Cty, but no pumping there. E.g. between Uphill Ditch & Goshen D.C.

Pf fms do not pump where wtr shallow & land dry, shows low mp wtr, probly poor soil. So Uphill & Goshen, too, & surrounding DCs, probly low mp wtr. Probly only reason they didn't sell, were below McKay Pt., couldn't change diversion pt. (Also, much of that nw land is in Alta ID --- but not all. Near Traver, maybe Traver soil, ng. Soil map shows big blob alkali following up St. John's R. along Cross Crk, 10' & they didn't pump. But S. of Buena, lifting over 200'.

✓

Scatter

165. Bull 3 Map 1, scattered pumping, <u>very</u>

Tucson,

166. There ~~is~~ was also no pumping s.e. of Consol. PD --- again suggesting CPD only uses wtr bec cheap.

167. Whole area s. from Outside Crk is like suburb w. individ ~~pumps~~ wells & septic tanks, now incorpd. into "city" (CVP). CVP enhances wtr supply over whole area. Does not Δ output much, immedly — but Δs land supply vastly ... i.e. Δs what was really in demand. But watch out!

168. Give one e.g. of problems in changing pt. of diversion. Suppose WWC wants to shift from intake above McKay to one below it. How recapture the ½ that goes to swell Kwh. Br? Get all Kwh diverters to agree --- but is no benefit in it for them, probly hv. to pay for assent. Any holdout might holdout for what he thinks is entire value to WWC. So might retain 50-50, but stop flow in a cross-ditch to compensate. But X-channels reach Kwh Br. below intakes of Consol & 7 mi's DCos. And on WWC's intake, they wd not be entitled to ~~on~~ divert the Δd flow, which is based on flow at that pt., regardless of what affects the flow.

169. Spring flood flows, everyone gets some wtr, even jrs. But jrs. do not get full season irrn. What they get is wtr that shd be stored for use on fewer lands, later.

Thus the river is over subscribed, too many lands have a claim on it, with result storage impossible; & grnd wtr falls.

app. law defect ✓ This is result of letting diverters in early days claim more than they used. Result --- Σ claims too large

169 (cont.)

MP of canal wtr not very hi to those who only get it in spring. Wtr shd. be stored for Aug. on ± the land. They had let more land than cd. be sustained come in on basis of ground wtr. ~~Then~~ mining.

✓ Then the system lacked any means of retracting, in ec. way. Had to cry for help, outside subsidy.

Perhaps if outside subsidy hadn't come, ~~it~~ wd. hv. rationalized local system. Jts. in distress wd. hv. sold out to a Distr. rep'g smaller area, to build local storage.

So CVP has let this wasteful system perpetuate itself. So the

✓ fault is not entirely with wtr law. Our system of public works for pvt. profit deserves some credit. But State law also to blame -- it was the combo. State law made it hard for people to solve their own problem. & Fed law made it easy to beg for help.

CVP hides fact there was a disaster ... the waste involved in subsidy. Had this occurred to pvt. firms it wd. hv. been clearly recognized as a disaster. Coming out of U.S. taxes, not seen as such.

Kwh. is like Tuol. in that peak flows waste. But is unlike in the means of waste. On Tuol. waste flows to Ocean. On Kwh. is spread on lands that get little good from it bcs lack steady supply.

Are also some on Kwh who get too much $. Probly Consol PD & Imp. D. & WWC. Some who shd use grnd wtr, Goshen, some w. poor soil, Goshen.

Tucson

They did form an orgn & give some tax pwr, 1927. KDWCD. But over two wide an area, bcs settlement so scattered, & wtr rts so scattered. Focussed on grnd storage (& probly fighting LS), neglected surface storage.

Thus Stan. had advantage of a late start. On Kwh., crude use of peak flows, & vested interests therein, precluded higher use via storage.

170. Low heads. Whoever is jr. at the moment takes full variability, on both branches.

171. Problem of rotation among members of D.C. Say it takes 5 days to go around. Is gt. uncertainty, so to offset probly rotate too fast, & maybe give ea. furr ½ the head one man can handle, thus wasting labor.

172. Correct earlier point. There are rights expressed in af!
Appln 1233, 1919, Mod-Turl. on Tual, 325,000 afy!
Probly wherever several diverters, hmmm. put rts in sf.

173. BAE p. 9, soil types, shows east benches have better soils than valley bottom.

174. BAE p. 10 et circa probly shows wide variety crops on ea. soil class; & same crops grown on diff. soils.

Tucson,

175. Surface storage preferable to grnd. storage for LS &c. higher ups, bec grnd wtr storage at low elevs, requires repumping.

176. How hi can citrus grow? Martin Stahl claims to recall seeing it c. 2,000', up Kuh on way to Sherman Redwoods.

177. The sustainable irrigable acreage w/o storage has little relation to mean annual flow of 400,000 afy. Extreme hi flows can't be saved. So 300,000 is more like it. But summer flows are limiting factors. They are very small. So big problem is storage, & worst feature of system is precluding storage, by spreading out flood wtrs., division aspects, etc.

Put emphasis on these dynamic factors, in paper.

178. If Lakeside D. has sold shares to Tulare Lake & interests, spreads out area even further.

179. Althouse p. 27 shows what they grow. Crop acres.

T 17S

R 23E (Traver) Mostly dry, even tho in Alta ID !! Dry misc., 17,000 a.

R 24 Dry misc., 17,000. Includes Uphill D.C.. Such little irrn as there is in field crops, grain, & alf.

R 25 Vines, 2900; Ctn, [redacted] 1400; alf, 900; dry total, 16,000

R 26 Citrus 3900; Vines 3600; dry, 14,000

R 27 Citrus 1900; dry total 9,000

180. I wdn't say ctn. cdn't compete for wtr in free mkt (for wtr, i.e.). They pump very deep for ctn wtr, w. side. But alf. --- only as part of ctn complex.

But ctn is expanded bec growers are racing to estab. both wtr histories & ctn. histories. System stimulates perverse behavior. And probly wdn't pump so deep w/o this added spur. W-siders may well be establishing histories in anticip. of FRP wtr. So is no clean test of imp of wtr for ctn. This is one weakness of system

In T20s R26E (Lindmore) (1940)

Ctn	2000
alf	700
Citrus	3900
Decid	400
Olives	1500
Vines	2400
Dry	11,000

Here, all the major uses paid for deep grnd wtr, deep enough so most land not irrd. But inside the twsp very steep gradient of depth to grndwtr, range from 15' in nw to 100' in east. (1920)

No proof.

181. Wtr. law must be judged not only for how it acts in vacuum, but how it ties into Fed & State systems, reacts to them.

Premium is on getting out on a limb, creating crisis to warrant rescue. Individuals create histories of use, groups create crises requiring rescue. Then the group becomes potent pressure group.

180 (resumed)

Bull 3 map. 1 shows in T 20 s R 26 e the pumping was on east ½, where life greatest! NW corner is in Conval PD, but large area not served. Presumably poor soils.

181. (resumed)

Also judge w/ law by how interacts w. ctn allotments. Growers wd. try to est. ctn hists in any event, can't blame that on w/ law. Best to est. them they sprout ctn fields all over in excess during times of non-quota, demand w/ service.

(Once you begin quota system, hard to shake it, bes whenever lifted, growers race to est. histories in event of another)

In estab'g ctn hist they also est. w/ hist. & fixed w/ st. which attaches to lands after ctn program withdrawn (if ever).

Weak.

180 (resumed)

Sum up why w. side lifts do not prove hi MC w/ for ctn, Kwh area.

a. What are w. side lifts, really? And costs ... maybe per foot cost falls w. lift.

b. Better soil, 2½ - 3 bales

c. Estab'g histories on cheap land, a gamble, no way of check'g if sale of ctn pays for it.

Tucson,

180 (cont.)

Sum up wtr compn:

Top: Orchards, foothills to s.

Middle: Ctn-alf, TID

Low: nw junk. These lands cd. very well give up their occasional wtr supply for storage to use south.

182. Alkali – evidence of past overirrigatg

183. Compn? No. Here is one natural oppy, & one set of people to take advantage of it by community action. If they do not make most of their opps, no outside group can move in & bid them away.

Needed – means of makg outside compn. felt.

Suggestions: a. State appraisal & taxation of wtr rts; damsites.

b. Free mkt for wtr

184. System builds ff. verteds vs. storage

a. Srs w. steady flows

b. Jrs. w. partial supplies & pumps (maybe) who wd have to give up all wtr.

c. P.G.&E.

185. If Kwk had rationalized, probly wdn't hv. paid to bring in CVP wtr to sustain or expand the dried-out lower uses. [CVP wtr doesn't even pay for itself to sell for higher uses]

If CVP had come, wd come lower down, cheaper.

186. Big job. Establish cycle.

Hypothesis: CVP so big, expanding acreage too much.
so slow, other areas got there first, making it even bigger.
Thus cycles are a diser. of scale, due to slowness.

Needed: Data on expansion of orchards, vines, etc. Bearing & non-bearing
" " prices.

187. Thiery of TB said used new wtr to dev. new lands, not to Δ supply to old.

Showig a, MP drops steeply. Quantity not nec; reliability is.
b. TB, when wtr short, retrenched rationally by retiring lands, a course not open to Kwk system.
c. TB had so little wtr were in ~~gone~~ stage of Δg returns to wtr, [got out of it by retiring acres]. Thus they were genuinely pinched.

188. At hi l.v.,' 1958, Holley says bare land worth $1,000/acre if can get wtr mgnl landholders will join IDs w. BR contracts to get l.v. Δ (figuring thus rather than on value of wtr)

Thus expand wtr service area by false guide The demand for wtr is based on l.v. Δs rather than mp of wtr.

188 (cont.)

Thus Δ l.v. not only a false guide for me in estg mp w.t.s. But many perhaps most long term decisions --- & that means all the big ones ... are in effect made on that basis. I.e. landholders become willing to join IDs; to hv. their IDs sign contracts. to invest pol. effort & hv. their congressmen deplete their limited bargaining power; to contribute to campaigns; to ~~assume~~ bond themselves; to begin ~~dcom~~ actual land use to nail down use rts; to compromise w. neighbors & complementor-competitors (thus spreading even further); etc. etc.

I may hv. tended, also, to overest. Δ in the ff way. I accept wet value as real, but discount dry value as largely spec. in antic. of wet value! But the wet value may be spec., too.

Put it thus: contracting IDs are land promotion schemes. They undertake certain expenses to nail down w.t.s. Not nec.ly to sell land, just to enhance value --- for it is enhanced in eyes of present owners too. They are not just sharpies. But they reckon on Δ e.v.

189. Traver area badly alkali, --- F. Adams re Alta ID. From Althouse & Wein we know alkali attributable to overirrn. Traver area gets it from Alta ID, also probly from St. J's irrtn ... from both sides

Bull 3 gndwtr map shows depth under 10' these, i.e. land pretty well ruined by underground flooding from above.

Interesting you can sue upstreamers for taking wtr away, but not for dumping it on you.

Wd. be wrong tho to ~~pem~~ deny this area wtr permanently. May become ok, w. lower gndwtr level. F. Adams '29 mentions beginning to reclaim.

190. Kwh is like cities, too much spreading of grwy.

By focussing on smaller area cd. give security, needed for hi value orchard crops.

Thus reduce voting base, pol. support. Need what welfare ests call compensators ... " " ?

It is a good e.g. of scattered settlement frozen by reaching limits of wtr supply; & supply Δ precluded by scattered rights.

191. As to preclusion of storage by claims to undersed wtr, there are 2 aspects:

a. Winter wtr. Supply moderate, demand nil.

b. Spring flood wtr. Demand moderate, supply large

(a), winter wtr is tied up by wtr given in yr-round sf.

(b) flood wtr . . . . " " " to too many lands

192. The only "specialized fruit farms" n. of Kwh. are around Ivanhoe (Clawson p. 47)(1940). But this area receives no surface wtr. (Further, I recall it withdrawn from KDWCD bcs they cdn't do anything for Ivanhoe)

p. 45, the only dense cluster of fms of any kind is around Ivanhoe. (Maybe small fms sold WWC stock to improve land?)

193. W. of Visalia, follow Rte 198 to Kings Cty line, & is a denser settlement in sections n. of hiway, i.e. precisely in the sections between Persian Modoc service areas. (But contrast obtains clear west to cty. line, may be due to hiway. Probly many part time fms, urban influence)

Tucson,

194. 1949, Ivanhoe, figure pumping grndwtr costs $3.25/af.

Ivanhoe Factual Rpt p. 31

195. Irrationalism in cycle.

FK service area, firms first went for quick cash crops, when i.v. low, c. '52-56. Now, i.v. hi, they ~~grow~~ are putting in citrus. (evidence?)

196. Analyze Taggart's physical output data. Was there any Δ output/acre, & in aggreg?

aggreg. may be more meaningful bcs as acres Δ, quality of land changes, new lands take time to get orgd, etc.

Big vacuum of orange supply by LA subdivision. Unusual oppy to expand. Experienced firms available, everything. Goofed completely.

Moral: when give wtr cheap, is very slow response. People value what they have to pay for. Here, of all places, conditions seemed favorable. But weren't.

197. BR sells all wtr in FK.

Why not? I.e. what is so surprising about that, when demand is artificially boosted up by several factors.

a. Priced way below cost

b. Buyers are buying future security & Δ i.v., more than current m&i wtr. As shown by no Δ output as shown by perm. contracts agencies taking less than entitlements, as long as allowed to.

c. Future rts must be estab. by present use -- both for BR, & for Calif. wtr law (See Reg. Howard note)

d. Is a temporary recharge demand.

198. Low MP wt clearly shown by those not buying from FK. FK has had available extra Cl. I wt. Ditch Cos. w/o adequate summer wt cd. have bought. James ID etc. did. But not Gochen, Modoc, etc etc. Only TID of all downstream bought any wt. And that mostly Cl. II.

199. Most that KDWCD wd pay for FK wt is $2.50/af says H Holley. He regards that as a lot.

200. Only one lined canal in system ... Lemon Cove. (it is next to river) TID threatened to, but KDWCD paid them for seep'g wt. FK wt (thus evade 160 law). — H Holley p. 3

188 (resumed)

In Kwh area, demand for land as such, as an invmt. Augmented by LA expansion & urgency of suburban sellers to cover tax positions by buying replacements.

Thus ripples spread out from urban expansion as I once wrote to Vern Ruttan

BR contract'g worked nicely for specs. They didn't really have to take much wt for 6 + 15 = 21 yrs.

201. Elast. of demand for wt will be greater where there are many compl. costs. So is a priori, prima facie presumption higher MP wt bringing in citrus than ctn. In citrus, is $250 invmt in crop before harv.

202. Citrus needs steady wtr bes 3 dry yrs kills most mature trees; less to kill saplings.

Olives can stand dry yrs, like forever. - Don Burr

Grant Allen makes no such distinction, says both citrus & olives can stay alive w/o wtr. Drowning them is bigger problem. But Burr probly more careful about details.

203. LS only place where anyone mentions + mp wtr per acre? That figures, bes on TB they contracted acreage, in LS cut everyone down.

But check Taggart — did LS yields rise after 1952?

Yes -- & so did many others! Have Tom check over. Grant Allen mentions phenomenal increases around Ptville.

204. Holley said raw land went for $1,000/a, '58.

McNeill & Burr show ~~same~~ lower figures, '56-57 or so.

Does this mean lower raw land prices in citrus belt? Cf. Grant Allen figures, perhaps write people. Mayke Holley misspoke. Check Hill Leeds Jewett on TB --- p. 68 they confirm in gen'l, but note LS prices higher than TB (the statement on this is a bit vague)

Also note, '55, rising trend of prices, "contrary to expectations." Prices of land w. wtr service, i.e., & for "reinstatement of wtr rts."

So they were pessimists c. 1950 evidently. This jibes w. H. Holley — didn't think wtr was worth much until it came. (Many no doubt attribute too much of Δ l.v. in time of Δd l.v. purly to p.w. of the period -- post hoc ergo ...

N.B. w. LS & TB, wtr contract as a land sales scheme is very direct: IDs actually sold land

#205 TBID deactivating its Deer Crk well field. "In the future they will natly be kept in reserve & not be used except in emergencies or for legal reasons." p. 38

Thus local wtr is wasted.

#206 Citrus probly find same motive as w. ctn to expand acres to nail down quotas. Write Grace Larsen on this.

#207 1958 much wtr. TB cdn't sell excess. (LS had hard time, too)

#208. Underscore value of altitude. TB ID, only lands on hi eastern slopes are good for citrus, or best. Leeds Hill & Jewett etc. on soils. Grant Allen confirms, but says flat land also ok, LS is flat. Hills better bec warmer.

#209. TBID, when mgmt, only citrus cd. pay hi charges. Figs, vines, cdn't make it. McNeill

Grant Allen adds, don't waste good citrus land on ctn or alf.

210. Summary, impressions of raw land prices, 1958. Grant Allen et al.

Tulare ID, near Tulare, ctn & alf, $110/a.

LSID, $500/a & up

Lindmore $300/a

Wtfd ID $800/a or so.

211. just so. of Kwh R is abandoned orange grove on hillside. Now in Exeter ID. Just below Foothill O. I'd say. Area dessicated while lesser uses thrive. But flat below is all irrd, maybe northern exposure was problem? Write & ask someone.

212. S. from TB, citrus groves scattered for miles on flat; & on hills to east, a solid belt. in TBID. To Ducor & even a little beyond.

213. In any land devmt, not nec. best land first. Much depends on individ. holder. Can only hope over time, mobile resources move to better lands.

But wtr law freezes pattern by freez'g wtr.

Good lands w/o wtr do not nec. belong to more deserv'g people. Contrary, often their vices faults are what kept them from getting wtr early. But is no consolation now.

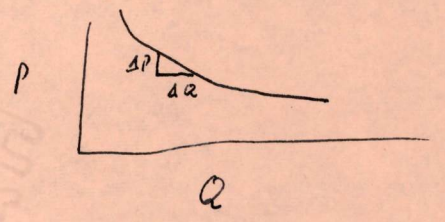
214. Where wtr is limitational, ~~you~~ can make given wtr complement lots more labor & capTl. by grow'g intensive crops, using little or no more wtr/acre, but lots more men &c. inputs.

By spread'g out to irrte. more land, are us'g land as sub. for labor & cap.; w. fixed wtr supply.

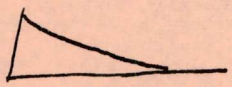
214. Elast. of demand for wtr is low where are many complements. In gnrl this means intensive land use; but w. important exception that some cap. & labor are wtr subs.

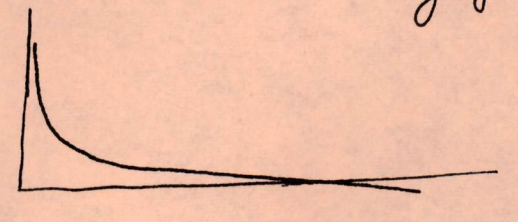
But these subs cannot sub. for all wtr. They are stretchers of supply, not same as simple subs. As supply gets very tight, they actually sustain demand, in one stage, where otherwise it might cut off completely.

As p of wtr rises, users will ease on it. Spread it over more land. Once they do so, demand then becomes less elastic.



$$\epsilon = \frac{\% \Delta Q}{\% \Delta P}$$

Most demand curves get **less elastic** as they go s.e.: 

Wtr probly looks more so: 

But this is Σ all demands. Need demand curves for each crop.

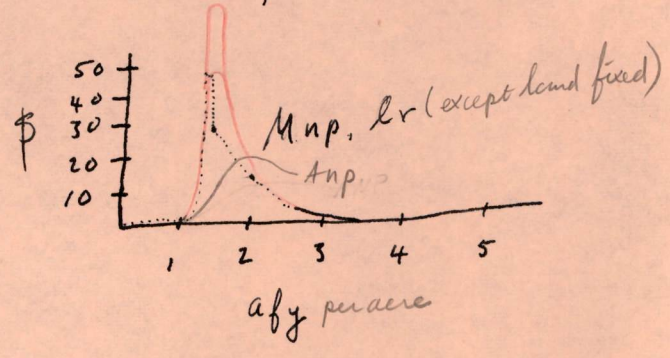
i.e. elasticity does not rise to m.w., bec wtr is limitational

to mgnl rate of substn. betwn wtr & money --- not same as ε — changes rapidly.

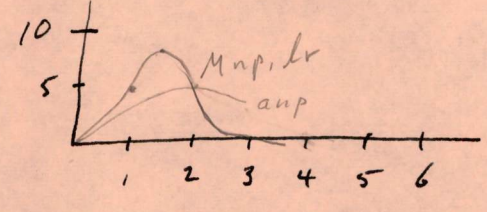
I want to show citrus can pay more for wtr, bec demand gradient steeper

Put it thus: if wtr cost is 1% of gross, can raise to 2% much easier than barley can raise from 10% to 20%. Compl. costs seem to detract from resid. But consider: ea. compl. cost Δs gross output by more than cost, enhances resid. for wtr!

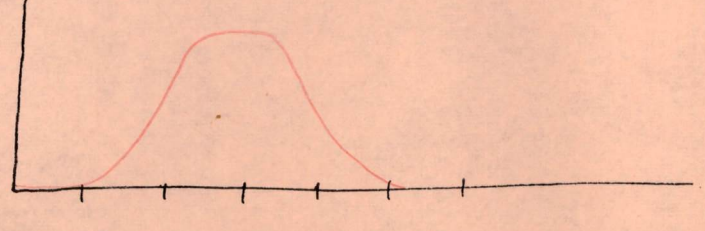
Citrus, on loam soil



Barley



Citrus on sandy soil



When citrus growers threatened w. loss of wtr, they have gone to great cost to get wtr — i.e. they have evinced willingness & ability to pay hi price. Barley growers haven't.

But this not entirely convincg. It was established citrus growers who did this, at LS. Have holders of underd. citrus land ever done it? In peert, bcs LS was only partly devd. And individual pumpers heave gone very deep for wtr.

214½. Inelastic wtr demand by citrus growers means a, Not deterred by hi pria, but b, conversely, not encouraged by low price. Is a minor cost. Yet TB growers cdn't pay for it .... but they might have in more prosperous times, they were mgnl in several respects. Also, adequate wtr n.a. to them at any price save something that wd. have been a major cost.

Not surprising that cheap wtr did not boom citrus fast. Wtr too small a cost to be major limitg factor. But w. low-gross crops, natchly cheap wtr did boom them.

215. Curious bias in 160 a. law. Wtr goes to areas of hi unit l.v. whose opt. acreage is small. E.g. citrus belt. Thus a landholder w. 160 a. top thermal citrus loam, @ $1,000, has invmt = $160,000 in land, gets wtr. But wtr denied to excess land of barley grower, @ $100, i.e. his invmt over $16,000.

In terms of total assets, disparity even greater, bcs citrus has $4,000 per acre improvements, barley almost none.

But on balance it is good that law is so written, despite absurdities in terms of its own rationale. Supplies wtr more to small fruit farms, to farms who improve their land. It wd be better if they charged for wtr, of course.

Tucson,

215 (cont.)

Law also makes sense in a way. acreage lim. is roughly ∝ to amt of subsidized wtr received. a lim. based on land value or r.e. value wd not.

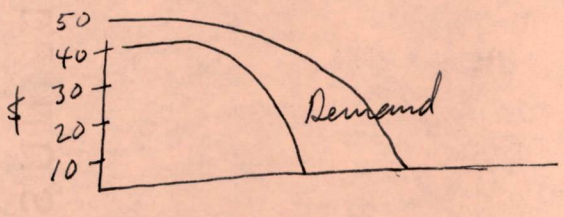
In areas where wtr will Δ l.v. very much, i.e. fruit areas, holdings are likely to be smaller. Thus law funnels wtr to areas where worth more.

So, in very crude way, has some ec. propensities

also, is means of recognizing extended benefits from cheap settlement.

214 (resumed)

Now draw demand curve from citrus for wtr



Demand is extremely elastic at hi price, but extremely inelastic at low price. Bes only at hi price is wtr limitational

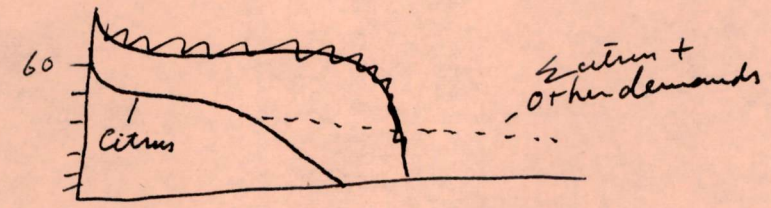
[This is a general truth, incidentally, & is why mkt system works. Mnpy only pays when demand inelastic; demand only inelastic when price low.]

We have ben taught to draw demand curves wrong all our lives!! They are surely concave to s.w.? No, bes at very low prices, big volume users enter the field. a demand from citrus growers is not a good demand.

214 (cont.)

are a few unusually perfect subs, cd. pay more than most.

So demand looks to:



So don't err by characterizing citrus demand as elastic or inelastic.

Is both, depending on price.

BR. brought price way down, thru both range of elast. & inelastic demand, from $50 to $3.50 Arc-elast. over the range .....

% $-\Delta P$, i.e. $\frac{-\Delta P}{\frac{P_0 + P_1}{2}} = \frac{-46.50}{26.75} = c. -200\%$

• $\frac{\Delta Q}{\frac{Q_0 + Q_1}{2}}$ to match 200%, ΔQ must be double the midpoint, or several times Q_0.

So demand pretty inelastic in that sense. But from P_0 & Q_0 ? -- % $-\Delta P$ = c. 90%

% ΔQ of 100% enough to make "elastic" demand.

And that we probly have.

But demand response over time, lags, is ~~easier~~ complex.

215. Cf. historical response to wtr, Kings Cty vs. Tulare, or vs. some Tulare Crop that is very responsive to wtr.

Thus show higher rep w/ upstream.

216. ~~[illegible]~~ 7K wtr looks so cheap to LS they over order, for insurance. Then if WWC right yields well (? guess it is not completely nullified, then) they try to sell the excess. (Recall they even use 7K canal to carry their WWC wtr. sometimes)

Write Bum. ?

This shows hi rep w/ to LS.

217. Write Grant Allen re alleged law requiring consumers of Cl. II wtr to hv. big pump. pay hi standby charge. Such arbitrary rules may distort pump ers.

218. Distortion inside LS & TB .... = charges, but unequal service costs.

219. LS erges on wtr by full pressure system; Lindmore by using 30-40 ditch tenders.

220. State Index rpts acreages of MWCs. Cf. vs Bull 79. E.g WWC 30,000 a.

Leg. 221. Feasibility of State Ownership, re 7K IDs.

222. TB proved feasibility of lands letting wtr go to conc. land supply. Not ideal, bcs ended w. scattered system. But better than Kwh.

223. "Matching funds", expresses how U.S. invmt induces pvt. invmt. etc.

Tucson

224. P.L. 163, cheap loans to TB etc. to build their own distr. system.

(A U.S. "asset" that probly will turn sour)

225. Good exposition.

One wd. presume, from plaints of wtr need, & limitational wtr, that as wtr got scarce, were forced into cheaper crops; & coming of wtr wd. permit movg to dear crops. I.e., if wtr were the limitational resource, then watch those crops requiring much wtr wd. be the scarce ones, the dear ones.

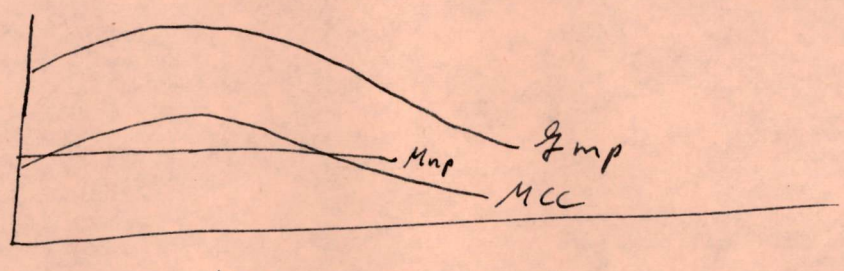
But in fact, dear crops require little wtr/acre. Problem not to get more wtr to the area; but get area's wtr to scarce lands where best crops can be grown; & get owners to dev. them.

226. Alf. holds in reserve wtr for ctn. Alf. cdn't pay for it.

227. Land never subs for wtr, always requires it — add land, must add wtr. Characteristic of land — highly comply to other inputs.

Even when subs for them, as e.g. for cap. in skyscraper, is more comply. ?+- only competes w. cap. by complementg it.

228.

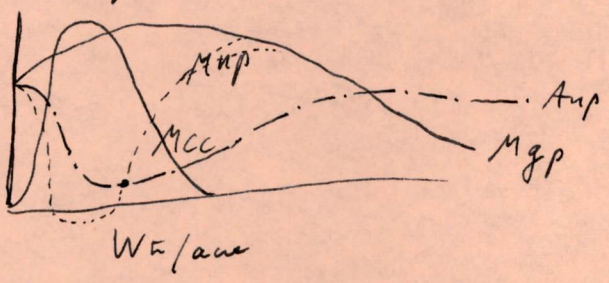


Wtr per acre

Maybe use above in expn.

228 (cont.)

W. hi compl. costs, they do not Δ w. wtr after a point. This makes mnp wtr very hi after a bit, almost = mgp !!!!



In fact you reduce compl. costs, mcc are neg, at one stage, as costliest conservation practices are abandoned.

So this clinches: mnp higher where mgp higher, by nearly full amt, & maybe even more!

E.g. if can Δ citrus output 10%, same trees etc .... [you do Δ hvst costs, so mcc don't fall to zero, but reduced wtr conserv costs may offset this or more than offset it]. --- by Δ wtr, is all mnp of wtr. !! Even in long run view!? No, new groves cdn't enter unless wtr price below Anp. Old groves cd. pay well above this to keep going.

Major moral: orchards can't pay anything for inadequate supply; pay well for full supply; pay enormously to survive.

229. FK did not make wtr available to citrus areas where previously it had ben prohibitively expensive. But just to areas that already had wtr.

Cheaper citrus wtr cd. be expected to A output from old groves that were thirsty. But not to bring in many new ones, since in areas where made available, wtr cost not limiting.

But other areas, cheap wtr long crops, wtr limitg, got big Ad demand.

Thus TB, 1953-58, hardly Ad wtr bought. Old groves already had plenty; expansion was slow. (hi wtr toll, low land tax)

230. Delano - Earlimart, gross/ac from ctn, ptoes, & grapes, almost approaches citrus gross/ac. Early ptoes probly the reason, they are a hi grosser.

231. Mc Corkle ... get his viewpts.

Leg.

232. E. slope Colvin Mt., citrus orchard, "huge". So why not Yokohl V.?

Tucson.

233. More land prices, G. Allen.

a). 4 mi. n. Lindsay
2 mi from Exeter.
"almost" frost free.
$800/a. ~~[illegible]~~ bare land.

b) Yokohl V. Surrounded by citrus groves. 3 good wells. Now in perm. pasture.
138 a. plus house, barn, cattle ---- $200,000.
That's over $1,000/a.

c) Nr. Lindsay, $600/a bare

d) So. of Porville, citrus district, bare, $550/a.

e). On Deer Crk., n. of TB, suited for grapes, $350/a

f). 247 a., (190 in oranges, 10 olives). $2,000/a. Includes old house.
Life wtr from table of 147'
Never frost. -- hillside
1 mile from Woodlake.

g). On Tule R. nr. Woodville. $711/a
591 a for $420,000. Includes 212 a. ctn allotment; 260 a. shares rip. wtr assn.
Mineral rts mentioned --- ½ ± withheld.

h) "Close to town". "Plenty wtr". Nursery or citrus recommended. $550/a for 5 a, bare. Unusually low down.

i.) $2,625/a for ~~[illegible]~~ 20 a w. 2-yr old citrus grove, canal wtr.
Can bare land really be enhanced so rapidly? Sounds as the value of citrus trees, or cost of production, is not so much in the land's waiting as in Co.

234. LS charges for wtr:
$10/af + $6.30/a tax. Use 2½ af, so pay $31.30/yr. for wtr & service.
To get bare land into LS, pay $250/a. Showing this charge has by no means exhausted ec. value (the one) of wtr. The land must be bare bcs in that area is no other way to get wtr but LS.

234. Lower Kwh - Tule Delta, heavier soils of lower value predominate. Alkali damage common. BLE area Proposal p. 7

235. "no favorable resv. sites are available" op cit p. 10 If so, Kwh shd be joined w. Kings; & conjunctive opn.

236. Deer Crk mean annual 19,000 af. op cit p. 10 Why isn't this enough for T13? Downstream rights? Tipton & Pixley are down there.

237. Irrtrs cannot claim they are recharging. Recharge took place thru stream channels before irrn. (was alkali then also natural? Cd be — why not? -- in some areas). Op cit p. 13

238. Suggest ff. as max. ec. pump lifts. op cit p. 23

Citrus & olives	175'
Other	75'

Cite Bull 34, max. bearable wtr costs per acre:

Alf	$8
Ctn	7.50
Rice	7.50
Grapes	7.50
oranges	30.00

239. For 60 acres, 1941: op cit p. 26

Pump, deep well turbine, w. motor: $900

Well & casing 650

$1550 ÷ 60a = $26/a

240. Quality:

Much wtr tended to hurt soil, so soil is poorer on Kings-Kwh deltas. ~~Better~~ Better in Tule, Deer Crk, Poso Crk deltas.

But wtr got attached early where soils poorer.

241. W/o imports wd. hv. moved toward local =m, not so much by acres going out, but by using less wtr/a.? Well, many poor soil areas wd. go out.

242 Ask Blair — feasible divert Kern R. wtr to Tule or Poso Crk, White R. or Kwh? High up, i.e.

243. Terminus Dam is between Lemon Cove & 3 Rivers. 20 mi upstream from Visalia. 150,000 af res.

Est. 5 yrs to build. 1958-63.

"Fed. first cost" of project est. $24m

($24m ÷ 174,000 a. in surface service area = $138/a

$24m ÷ c. 400,000 a in Kwh. delta. $60/a

$24m ÷ 150,000 af cap. = $160/af capac.

cf. Pine Flat, 1m af, $41m, much cheaper storage: $41/af capac.

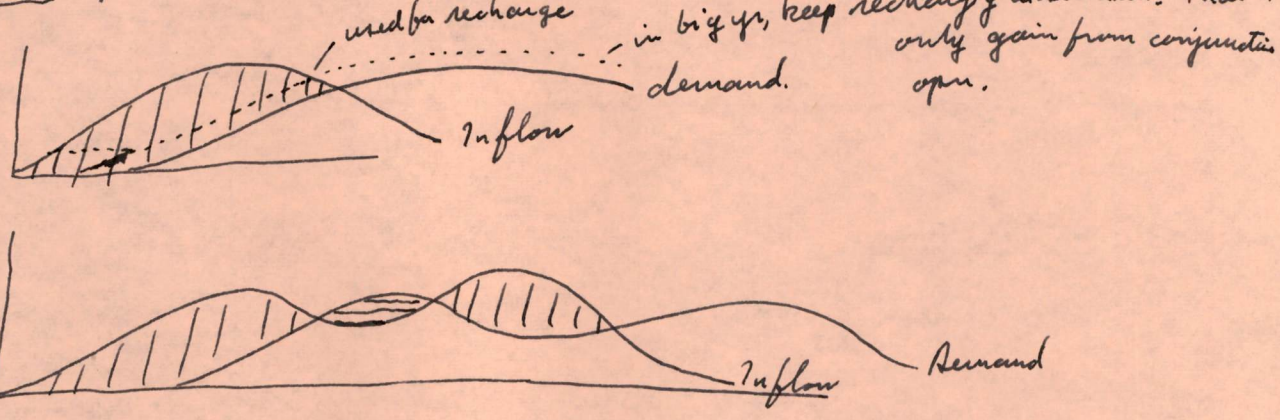
Success is more comparable to Terminus. — Army Eng. 1-59, p. 78 etc.

244. Quote on how L S litign discouraged Lindmore et al from trying Kwh. Bull 21-I, recn of a 1B9 file.

245. Since Kwh. storage was ~~prohibitively~~ very expensive, need was strongly for integrn w. Kings & Kern; & full use of underground, by outsiders too. I.e. the lands underlain by good aquifers were not those on which ~~underground storage was good, & vv~~. up of wtr hi, & T(I) v. L S precluded use of this storage by those who needed it.

Kwh. storage alone might have known. if most of devd wtr had moved south

246. Amt of wtr a resr. can save is limd to capac. of resr, unless there are two peaks in excess supply during yr.



In II, get double use of resr

If river is highly variable from day to day, wd. get some of this. Likewise if demand cd. be built up in early spring, say for planting. Also, by conjunctive opn, but maybe I have overest. that, ... anyway, it requires resr. big enough to have some carryover in flood yrs. Is means of converting a one-yr. carryover into a secular carryover. is all.

Tucson,

246 (cont.)

Aulaki's reservoir contents graphs however show no double peaking anywhere.

245 (resumed)

If Kuh had joined w. Kings to dev. & force Pine Flat, helped both Kuh & Kings.

Govt morals:

a. Good land, good wtr, & good storage not joined by Nature. Man can join them. Wtr law obstructs

b. Local ints. wd hv. gone much further were it not for antic. Fed. subsidy.

247. Appr. claims "too much, too soon".

Planning is too little & too late.

248. Synchronize.

Size of project for remote import makes tough.

Have done well in a sense --- put big project in middle of smallones.

But cannot use to dev. new land — too much risk, probly.

New land devmt has to be tied to old. Hence bias, probly don't dev. best lands, but those mingled among or next to old.

Is some good. a. Promotes compactness; b, size of project brings in lands that can't force their own reclm bcs unpopulated, etc.

Danger tho — bring in too much.

Also stir up 11 routes. In this case compn is not just regional,

but complicated by 160 a. law. Excess landholders wanted project of their own.

249. Cycle: cf. FK deliveries vs. Kwh-Tule flows. % Δ * > 200%?

And regulated, too.

Then, hvg developed the mgmt wtrs, the better ones are now being devl'd ... Terminus, Success. Isabella, P.F. and more mgmt ones — FRP.

% Δ wtr supply very hi.

Bringing in outside wtr is partly what lets you dev. local wtr. Frantic grasping is relaxed, so can proceed to exercise it.

250. Two stages of Kwh problem

a. Before FK

b. after

251. What wtr is immobilized w/o being used?

all flows less ≤ diversions

252. analogy

A society under our laws reacts to scarcity like drowning man — by panic. Grasps frantically for whatever can reach. Thereby ties up resources, precludes economy.

253. analogy.

Longest day of yr is June 21. But air, wtr, earth senses heat rest, is lag. Hottest days follow. But keep eye on sun, forecast.

254. Cycle.
As gnd wtr rises, more will pump. % of recirc will rise.
Δg effective supply. also Δ speed of recirculation — now it takes over a yr for wtr to get down, & then is too deep to use much.

255. Cycle
New wtr, first use as sub. for other inputs. But slowly take opps to dev. new lands. Use less wtr/a. So?

256. Bldg big pw gets support bcs Δ l.v. help recips., but don't hurt others, bcs no new production comes on for a long time. So expansive forces predominate.
Insofar as do compete, compn first becomes acute in field pcn appreciate — compn for developmental capital. Compn is diffused, so can't oppose particular projects much.
Opposition comes re actually bringing lands into production.

257. As long as govt provides something free, people will claim it w/o using it. True of wtr; & of aqueducts fnced by outside govt.

258. Δ l.v. overtaxes ee's capacity to hold assets. To land buyer, is an invmt, diverts from other invmt. To seller, is income, spends on consumption. So it really does absorb cap., unfunctified.

259. Overexpansion:
a. To get pol. weight, bring in too wide an area.
b. To get enough wtr for area, go far, to big supplies. This also reduces opptn., & makes easier to placate w. cheap pwr (Shasta) or flood control (Oroville)
c. To make long haul ee l., build bigger, plan bring in new lands to share costs.

Tucson

260. Q. mp storage on Kwh. vs. others.

261. Hutchins, MWC, p. 208:
MWC was means to separate rip. rt from rip. land when subdivided.
Q. like of Chaffey.

262. On what grnds was LS denied "export"? It is in Kwh watershed... Lewis Crk going into Elk Bayou? Maybe lies outside grnd wtr basin. Or maybe Lewis Crk not counted bec doesn't contrib to main stem.

Harding, p. 61

263. When beckly'g parcel sold, rip. rt. can be xfrd by deed. So who is to know who has rt?

264. Approps are strig not just vs. each other, but to establish adverse use vs. any ripn.

265. Impossible to get a prejudgement. Anyone stor'g on Kwh, or diverts'g wd have to undertake heavy expense before he knew his rts.

266. A cost to society is revenue to individual — claim stretching diversions.

267. Re wtr as limg factor: Areas of "shortage" have no higher % unirrd irrble land than wetter areas. So? Check this.

414. Before alleging cyclical overexpansion in '20s, must explain why Census showed irrd. acres falling, 1920-30. Probly a stat. fallacy. '29 was dry yr, etc.

415. Use Horn thus Visalia H.U. subareas A-D.
1. Write for full def. of irrn effic. How treat recharging & pumping.
2. Cf. LS vs TID, Corcoran ID (which buys from Lakeside)

Pumped wtr by pvts not counted as diverted, yet taken into acct. in computg effic. somehow? I think.

3. Get eff. of "Visalia" unit as whole. Note how much lower it is than LS. -- even tho larger unit means "outflows" are recaptured. But it is high: .90.

416. Bull 2, p.157, shows what uses are competing in Kern area, 1955. "Visalia" unit.

alf.	41 t a	
Pasture	32	
orchard	26	
Citrus	28	= 85
Vine	31	
Truck	4	
Ctn	53	
Hay & grain	21	

In neighboring Fresno-Hanford unit, vines cover 1/3 net irrd. acres. Why stop so suddenly here? Loosed-up wtr service?

Vines pick up again in s. Tulare Cty, so Cty. has 80,000 a. vines (p.159)

417. Bull 2, p.174. "Visalia" unit.

Applied wtr	–	523,000 afy
Precip.	–	214,000 afy (on used lands only)
Total cons. use	–	533,000 afy.

417½ But whatever Horn means by effic. is too limited. "Cons. use" by barley is not to be equated w. citrus.

So cf. value of output per af, TID vs. LSID. Concede drawbacks, but makes striking exhibit. Also, are moving into era of unemployment (but also cap. shortage)

418. Is no reason why law cd. not evolve into requirement of ee. use, moved by money.

Early approps were excessive. Concepts of "beneficial use" changed, tightened. No one can "waste". No reason why concept of "waste" cd. not evolve to mean up < max. possible, & the means of adm. be a rent charged by state. Only obstacle is minds of men. Is less radical than forfeiture.

Thus I wd move to mkt, but via different route than Milliman et al.

419. Stan. Cty. etc. cd't gripe too hard about using State funds to help Tulare Cty. from north -- bes. in reply Tulare wd. have gone for their wtr.

420. Vs. Kuch. distr.n:

Needs vary seasonally, but rts are const. sf, nearly yr-round.

421. In area of small fms, need to spread overhead over more output. Sl wtr lets you do so. So hr rep wtr higher in LS on this acct, as well as short. Just like adding more land

422. Land in large hldgs, owners largely interested in cap. gains. Small hldgs, production. Another reason for allocating wtr to small. also another reason for expecting cycle. Large must subdivide — is only way they can get return.

423. Get this info:

Value of raw land w. wtr in T.I.D.

424. Tule R is in Stan.-SJ wtr supervision rpts.

425. Leg. CVP Problem 7, Wantrup signed, recommended order of constr.

426. Cycle of '20s, SJ, Stan., & Merced Ctys boomed, Tulare etc. changed little, partly bec. awaiting CVP, even then. Pumps went in, true, but perhaps more to salvage & probly improve lands already irrd than to bring on new land.

427. Too scattered, 3 ways:

a, Wtr rts too scattered, too many claimants, half in stage of Sg returns.

b. Pumpers too scattered, requires unrge large aquifers

c. Distr. systems scattered.

428. Suppose some had 100% steady supply, others had all the σ. But was no counter-motion. Cdn't Σσ then = σΣ? Try to boil all down to counter-motion.

429. – When bring in more land, are fructifyg precip wtr. that falls on it. Pro spreading thinner.

430. – Bull 2, p. 179

SJV waist gets lower wtr effic. ratings than Lake V. !!
Undercover folly of imputing Lake wtr.

431. – Bull 2 p. 179.

all Tulare area h.u.s get good wtr eff. ratings. Put this up to shoot at, fallacy in such aggregates.

But Tulare Lake h.u. gets .70, vs. .90 for Vitalia & Hanford. Interesting ∴ Tulare L. is buyg wtr from both Vis. & Han.!

432. – Bull 2, pp. 183-84

Tucson

433. Inflexibility not only cumulates, but As aggreg. demand by ending claims for future.

434. Wa law digests too neat. One law for perig wts, one for underground streams. Often 2 mingle, as in Kwh. What law applies? TID v. L&I0 decision is best precedent.

435. Agenda – State filings on Kwh? Look for list. State Acq.n Rpt., no mention of such filings. CVB mentions Kwh intn wd. require wopn from present holders. to Failure of State to adjudicate – problem on Kwh? evidently State never tried, to file on Kwh.

436. If anyone filed newly on Kwh., wd have a long wait to get ruling. WRB way behind. Cannot really get a prejudgement – & if you cd., wd. probably be "no".

437. Fla. has not waited for Calif. or CVP, thus ruining hopes of cities. 1945, even; 1958, Fla leads in output 3-1 & more. Even as mkts moved west. Cal. missed the boat.

438. Bull 2, p. 176. Est. upstream Kwh needs 26,000 afy "ultimately". Rips can assert any time. Small problem on Kwh. Greater on Kern – 350,000 afy. And Tule: 48,000 afy

439. Rip. rts cd. not be bought by an overall I.D., for use on non-rip. lands. Many Kwh rts. are rip., due to delta cone fanning out of natural stream. Requires unanimity to get any change.

440. If I.D. sought to buy from approps., wd. have trouble buying from so many. Cd. assemble options I suppose, leaving MWDs working until ready to take over. Cd. it condemn? Ask Fred.
Cd a MWC sell by majority vote? Or require unanimity? Consult Hutchins.

441. "Channel losses" include altitude – here more imptnt than quantity, since in recharge

442. "Custom of the locality" rules, so far as judges concerned. Thus progress not required in early settled areas.
Anomaly of low standards wh comm in areas of shortage, bes early settled. By cfson, W. Stan. ID is very ec. of wtr, tho much nearer sources. Bes of strmc. Gravity flows, no concept of mc is applied.
Where natural wtr is the scarce item, no concept of rent applied. Likewise ✓ natural elevation. Only power is priced & economized on.

443. Inflated claims natch., bes no cost.
Even vendibility wdn't stop this – unless State sold.

444. Is cheap to ~~enter~~ file an applcn, get a priority. Is costly to use wtr. & break down early claims. Hi cost even to know what claims are.
Knh largely pre-1913. (but all in City offices in Visalia probly)

445. Insurance principle prescribes pooling risks. System violates.

446. Const. rate of flow, wtrs.
Strs. have summer wtr, no need to store winter wtr, but veto own others' doing so.

447. Cities not contributing to devmt of wtr.

448. Rts. based on current flow, regardless of antic.ns. Yet w. big snowpack, current spring needs will differ than if small one.

449. Huge Lakeside channel losses are in area where wtr not needed.

450. Direc.: if tried to reg. flow to generate power, all irrtrs cd. squeak. Will Terminus quote pwr? Friant does, & is some conflict w. irrn, & probly no ecd. adjustment.

451. BR ~~—~~ expected rapid adjustments to Slwtr, underestd. lag. Bendon, Taggart.

452. Nordholm, p. 45-46, uses l.v. to ~~support~~ justify CVP.

453. One share PD stock worth $80,000, 1955 -- Ch. Kaupke.

454. No shifting of diversion pts on Kings, either — only of MWC shares.

455. BR lets wtr shift some, but won't let users sell to eachother. Says who, Bendon? Bunn tries to sell his surpluses.

456. Inside Turlock I.D., great flexibility wtr alloc-n, altho law requires a taxes. Res all have surplus. Contrast Kwh.
Here is anomaly I seek. It is not that Turlock cozies more on wtr gusty, but re flexibility is much better, altho Kwh needs it.

457. Inside I.D., all must be treated about same. So natch. those w. more favored positions resist forming I.D.s.

458. Wtr rich instinctively shy from arrangements leading toward possible direct forms of thin wtr use w. others. Thus on Kings, BR only wanted to export flood flows. But this cd lead to connection, & later pressure to export low mp wtrs, when crisis struck in south, e.g.

459. BR wd. store flood wtrs. Areas now depend'g on them wd. ∴ be in large holdings, less risk. Fear to lose "their" wtr, oppose BR.

460. Citrus takes lots of wtr in ~~Sept~~, Oct., Nov. — thus reducing storage problem. O.C. Factual, p. 20, ~~for D & FB~~.
TB similar, Leeds etc. p. 36

461. Some changes are possible, shown on Kings, can store, change rates of flow. work out ok. I.e. system is flexible enough to accept free gifts, & even pay a little.

462. Kings R. ~~FB~~ agreement, KRWA & PGE, FPC required give irr. priority.
So irr. > pwr, also probly on Kwh.

463. Can move diversion pt. downstream w/o protest, says Cl. Smith, but not up. (thus slow ratcheting downstream)

464. Orange Cove got same treatment as LS, only worse.

465. Flood Control Act of 1936 first ~~authorized C.E. to build~~ made flood control costs non reimbursable. Taylor, 46 Cal. LR 166
1944 Act authorized specific levees on Kings, Kwh, Tule, Kern. -p. 167

466. Moral: cheap wtr does not "stimulate ec. devmt." (a "good" concept to use & get on my side). Probly less demand inelastic, so dear wtr is a hi fixed cost
KCLC, in N. Kern WSD area, good e.g.

467. KDWCD does ~~most~~ much of its recharging down near city line, by catching "opnl spills" from TID & c. 1 & by checking end of Lakeside Ditch. i.e. they get 2d choice, pickup leftovers, in wrong places.

Have no wtr of their own. Store surpluses for cos. Dewey Cameron LS, which needed it, ed't use grnd storage, altho there was plenty of storage space.

468. Individual ripns. remain ~~on~~ in Kern Delta, w. poorly defined rts. — Dewey Cameron. They are going to contract for storage in Term.

467. Probly KDWCD ops largely in west end bes:
In n., table is hi enough
In Tmrs & CPD, is plenty ditch loss
In n.e, they do use Elkhorn Crk.
By rights they wd. recharge w. their own wtr rt., a steady flow = perc. capac, in n.e, bcs aquifers run s.w. Direc. is bcs they must take wastes from downstream rts.

468. As long as pumpg is so cheap, is not wise to bring up grnd wtr very hi, pumpers will waste. There is fallacy in importing costly wtr for ground recharge, w/o pump tax.
Even now, Tulare City Advisor Jensen says pumpers pour 5' on vines.

469. '58 price crest for oranges, due to slow devmt. Spurred big preparations — but too late.
'58, Perville restaurant serving 7 ka. frozen orange juice. So Cal. oranges cd. also go east.

470. There is horticulture s.s.e. from Visalia, in TIC. area. With underground tile system, 15' wt level! But stops abruptly. At Tulare-Lindsay latitude. Why? Ground wt available in TID. [Soil ok — maybe too good? Maybe doing nothing awaiting free wt supply from U.S.?] Maybe barren land is that just recently added to TID.

471. Price of wt in TIC. One share, $450 or less. Annual value = c. $22.50

One share = ave. 10 afy, says H. Holley.

So in this area 10 afy is worth < $35/yr, or < 50¢/af.

assuming correct info, & granting this is unsteady flow.

But check figures. HH says ave. 18,556 afy, 1929-55; does Bull 49 confirm?

472. Needed: more use of ground storage. Xfr from cos. to WCD; & put price on pumping.

Rt of MWC etc. block even this.

473. BR is further perpetuating orig. diversion pts -- serving TID from intake off Watch. Ditch. Factual, pp. 6-7

474. TID alkaline due to earlier hi wt.

475. 1935-43, TID wt level rose 40', heavy rains & w/o much help from perc. beds etc.

Warning: don't let groundwt come too hi, or risk coming to surface again.

476. All users avoid recharging hi, lose wt to neighbors. Factual, pp. 27-28 So can't count on TID to recharge much more, can you? Origly was lower, but no longer. BR subsidy price partly offsets this.

477. Leg Re taxation of wtr rts. Alpaugh ID. v. Kern Cty. 113 Cal. App. 2d 286 Alpaugh claimed wtr rt was an improvement to land.

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478. Leg. Spring V. W.C. vs Cty. of Alameda, 88 Cal. App. 157, 168, holds invalid assessments made anywhere but at pt. of diversion.

Otherwise every cty. on a stream cd. tax every wtr rt.

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479. MWC w. rip. rts holds them only as a ~~trustee~~; title is never divested from landholders. ~~Anaheim Union Wa Co. et al v. Fuller et al, 150 Cal 327, 88 Pac. 978 (1907).~~ Copeland et al., v. Fairview Land & W Co. et al., 165 Cal 89, 131 Pac. 119 (1913). [Correlative rts to groundwater and also follow this rule, no doubt, being like rip. rts generally]

"The relation of a shareholder to the company's functions is different from that in an ordinary corporation; the shareholder's interest is not confined to the right to participate in the profits of the business and distribution of the assets, but is a vested property right; consequently a valid sale of the assets of the corporation, to which a stockholder had not consented, could not deprive him of the right to continued ~~water~~ service of water for land to which his shares of stock had been made appurtenant by action of the corporation." ~~(33). (33) is~~ Bent v. Second Extension Water Company et al., 51 Cal. App. 648, 197 Pac. 657 (1921). " Quote from p.213 of Hutchins, Wells, MUTUAL IRRIGATION COMPANIES IN CALIFORNIA & UTAH, F.C.A. Cooperative Division Bull. 8, Octo. 1936.

If shareholders stop paying assessments they lose right to have water delivered by company, but retain water rights. But a 1929 amendment lets mwc sell shares on which assessments are delinquent, & deliver water to purchaser on other lands, within the proper service area.

Changing pt. of diversion, place of use, and owner, all together, poses tough legal problems, even for individuals.

479. (cont.) So the MWC doesn't hold w'ts, same as trustee for indivds; But indivds can't sell them freely w/o us'g cos. works. [May go farther like Lemare, circumscribe area of sale.] All parties can protest nearly any change.

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480. 1928 amdmt was supposed to weaken rips, but in part strengthened them. Bes. the Water Comm Act said 10 yrs of non-use & rip. r'ts return to public. 1935 this was held unconst — bars of 1928 amdmt, which protected future uses of rips. Selected Problems ... p. 399

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481. Could an indiv. withdraw his w'ts from mutual & sell? Or cd. mutual buy stock & sell r'ts it reps? Unscrambling an omelet. R'ts have been adjudicated for MW cos., not for indivds, wd. open up Pandora's box. Inside co., possibly not all shareholders are on = basis.

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482. Excess claim protect all from a challenge of nonuse. Bes. if w'ts not used, wd. simply go to head of schedule, & belong to some other excess claimant.

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483. "... all contracts or purported contracts of the district which are beyond the scope of the power given by statute are void." — Allen v. Hussey, 101 Cal. app. (2d) 457, 472 (1950). So is much doubt of ability of ID to declare a valid title, or even a quitclaim.

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484. W'ts held by ID are surely exempt from local prop'ty taxes. But if x/fr to city, or various other agencies, might be taxed. Esp. a remote city. Or a power co. This wd. inhibit sale, same to other ID.

485. If creditor foreclosed on w'ts of MWC, "there are no clear-cut decisions" what he might do w. w'ts. Hutchins, ~~MWCos~~ MCos. in Cal & U, p. 131. Thus is qu. whether can xfr freely, by implication, never settled.

If foreclosee takes MWC, he takes on obligation to continue w'ts service - p. 81. This breathes of non-xfrability.

p. 90, Mentions possibility foreclosure might divert w'ts away from non-pay'g community. But is no precedent, & not clear if cd. be done. He shrinks from it. "The Ordinary remedies of creditors of corps do not apply altogether to Mutual Cos, due to the beneficial interest which the w't-u'g stockholders of these cos. have in the w'ts & physical props. nec. to ~~supply~~ provide their lands w. w'ts."

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486. Fred: I.O. w't is "dedicated to a public use." Does that make it non-xfrable?

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481. p. 90 "extremely unlikely" purchaser at foreclosure sale wd be upheld in diverting w'ts to other lands, promptly.

p. 90 Pending removal of present uncertainties, creditor should have unanimous or nearly unanimous consent of stockholders to mortgage, that helps protect him.

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488. Hutchins, Selected Problems ... p. 381. Xfr'g w't w/o proper formalities constitutes abandonment by seller. So buyer gets only priority dating from his beginning use. (This wd. inhibit xfrs ~~some~~)

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489. Many MWCos. have no clear record of title to their w'ts, cannot mortgage or convey them. As long as they continue use, no problem. But if they tried to sell, challenges wd. result, they wd. stir up hornets.

490. " . . .in practice, I have found that project planners are still faced with the same evils, namely, the 'padding' and 'pyramiding' of water rights. This practice has, in many areas, resulted in the adjudidation of water rights in excess of the available water supply, although the actual use of water may fall far short of the supply."

"I am sure that Federal project planners will not recommend projects for authorization and Congress will not appropriate money for construction unless a project water supply is assured."

--- E.O. Larson, Regional Director, Region 4, U.S.B.R., in WWN 9-53.

Thus it is the nearer projects cannot be authorized, forced to turn to remote sources where by no stretch of the imagination can water be termed surplus.

Leg. 38 Cal. LR 761-81, Bibliography w.r. law problems.

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491. "Appurtenant to land" is a one way street. Landholder can sell, but w.r. supplier cannot retract. That is why landholders clamor to for it.

M&L even mnged to "sell" r.i.p.r.t, at least sell an estoppel -- but other rips. were placated w. subst. w.r., & Rank v. Krug etc. still pending.

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492. City-of-origin only applies to filings by Dept of Fnce under State w.r. plan, w.h.r. rarely block other x.f.rs. Sec. 10505

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493. A State is not bound by contract w. its own subdivisions. Trenton vs. N.J., 262 US 182. So how can Calif. contract w. MWDSC, etc.?

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494. State filings on Kuch & Tule now tie up surplus w.r.s even more. On Am.R., in D 893, WRB criticize these, seriously hamper dev. potential.

495. You can split a wtr rt. quantitatively, but not temporally? I.e. sell yr. surplus winter wtr while retaining summer. I think not, but check.

WRB still gives permits in simple sf, & you need only use that max. part time. appl. 234 was given w. varying rate by WRB, 6-2-59, on SJ. But this does not let indiv. do it, nec by.

496. 1927, Kings R. still inld. CVP. Jopson & Giannelli plate 2.

497. State filings in Tulare Lake Area. Jopson & G., ~~Table~~ Table 1.
1-30-27, — Kings, Kern

~~1949~~
1952 Stanislaus, Tule, Kaweah (last 2 perhaps 1949, notes ambig.)
Were several requests on other streams to release from priority, even on Kings & Kern. But none on Kwh - Tule. There must have been something to file on!!

498. Need premature wtr for bgng. so won't have to pay desperation price later.

499. WWN, 3-15-49, 9DA founded 1910. One major achievement was constl. amdmt. ltg I.D.s. buy stock in MWC.
Moral: I.D.s can only do what statutes authorize, & in this case what const. had to authorize. Pretty sticky.

500. Are there good resr. sites up Kwh arrogated for single-purpose pwr?

501. Contracting I.D.s get free options on future wtr, from BR. On basis of their projected crop requirements. But looks to me now as tho they are not devlg those crops & needs as fast as advertized. BR admits to being disappted. how does this work?

Another evidence of miscalc. — export from LTRID.

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502. Engle: philosopher of don't settle allocations, solve all problems by devlg new wtr. pp. 139 ff., CVP, Cal, Jt. hrgs, Cal-U.S., 1951. Silverthorne, Kent, do., Las Vegas, 12-59.

503. Sect. 275 instructs Div. WR in Dept PW to take all judicial, admin etc. actions to enjoin waste. But Holsinger never went to ct. - pp 166-67, CVP Cal, Jt hrgs Cal-U.S. 1951.

So Sect. 275 etc. inadequate. Chas Lee also never went to ct.

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504. If you threaten people w. diligence, they will not release wtr, but expand service areas. Lessons of 57; & MWDSC; Tyrolyte ~~Edwards~~ (plans to expand) So this is not adequate policy.

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505. Fallacy of Δ l.v. as mine. Backward landholders just want that. Based on the possibility of someday selling to someone who will earn income. So Δ l.v. is not mine of actual Δ income.

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506 Surely, those insisting on fixed rts are the static, backward elements. The production firms merely want wtr supply for use. Those insistg on perpl. rts are those wantg to ~~sa~~ maintain l.v.

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507. Local people often prefer poor wtr supply free to good one at price. Solution: State change price.

508. 4-58, Ike vetoed $1.56 rivers & harbors measure, bcs contained 28 project at $350m he disapproved. Did same in '56.

Terminus & Success among those vetoed. But 6-10-58 Success & Tule still among those ~~in~~ in House Approps Commee approved funds.

509. Milliken L. Service area

Est. requirements of long term contractors, 1958: 1,450,000 afy

Approved long term mktg program 2,150,000 afy

Surplus still looking for mkt: 700,000 afy

Of this, 600,000 afy is spring mtn before June 15
100,000 " summer " after " "

— Statement of Policy for Wtr Service, CVP, 1958

So there is this great surplus, still. Based on selling entire mean flow SJR.

510. 1948, 49, 50 — very dry yrs. Thus helped BR make long term contracts. This plus priority system. Demand expressed in those contracts thus magnified. As shown by slow progress of many in working up to amounts contracted for.

511. Not only will BR recharge make ground wtr free, but to stop pumpg, most IDs contemplate delivering wtr free after a while — Reg. Howard.

512. LS takes ½ its entitlement, but irrtes $\frac{11,155}{15,201}$ a. — Burr. Suggestg entitlement exceeds needs. [But remember they are selling land] (They used to contain 21,000 a. or so, had to retrench after TID v. LS]

513. Tulare Factual gives values of t.e. TID, 1949. p. 36

Max $600/a, Decid. fruit, Cl. I land

Min. 75/a, Irrigd pasture, Cl. IV land. (Tm. deliery requirement = 5', p. 21. + xmsn losses, quite a contrast)

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514. BR will supply 141,000 cl II, + 30,000 cl I. Kwh supplies 111,000, + part of 102,000 which BR figures from TID will pump. $\Sigma = 282{,}000 + k \times 102{,}000$ all for 68,000 acres. That is over 4 afa + underground inflow. Too much. p. 32, Factual

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515. Hit this pt. – doubtful if cheap wtr supply is promoting ag., in any useful sense. Demand inelastic. Limitational. Hence hi price is a hi fixed cost, a stimulant to ec. use not just of wtr, but land. Insofar as demand is elastic, it is wtr, as such., less output/a.

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516. Cycle: Is also now the Small Project Program, BR lends up to $5m. Several in Cal – will dev. new land. Excess landholders can get wtr at higher price.

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517. ~~I-25-49~~, Ltr. of 1-25-49 from J A Krug to OCID lets excess landowners pump underground wtr where Project wtr mingles w. other wtr. WWN 2-15-49.

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518. 1-25-49 (Krug ltr also ects 10,000 afy will seep from FR canal to O.C. strata; (but if it doesn't, will let them ~~get~~ buy more). O.C. Factual said same. If this is typical loss, FR must lose materially this way.

519. Inflated sr. rts mean river must be quite hi before jr. gets anything. Sr. must take his full quota or risk losing it. The loss of quantity to jrs. is much less imptnt than loss of stability.

Take CPD. Area = 9780 a. (net irrd). Mean annual diversion, 1920-55, = 66,000 afy. $\frac{\sigma}{\bar{x}}$: .33, one of lower ones. ~~Aug July : April~~

$\frac{\text{July}}{\text{April}}$ diversions, 1920-55, $= \frac{5051}{11,646} =$.

Cf. same for TID, $= \frac{598}{7155} =$

[Qn.: is variability of consecutive flows a legit. mire after all?]

[Question: Why didn't LS tap off CPD as it did off WWC?]

So CPD has steady supply thruout season & yr to yr. ~~Apply~~ Divert nearly data.

To supply this lavish use, jr. approps suffer much reduced reliability.

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520. "Domesticated phreatophytes"

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521. Excessive claims by jrs. merely block future devmt.

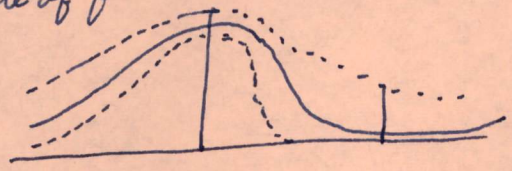
" " " srs. impose needless risk on jrs. Push their srts up into a range of flows that are more variable, less predictable, etc. also shorter season, maybe most imptnt of all. Damage in several dimensions.

522. Noted re summaries of monthly & daily variability. (before Kim made LS correction)

1. April, $\frac{\sigma}{\bar{x}}$ for Σ diversions > $\frac{\sigma}{\bar{x}}$ for flow of river: .46 vs .39.

2. July, as mean flow gets much lower, variability rises, so flow is practically worth less.

3. The April flow is considerably steadier than the annual flow — .39 vs .49. So annual variability must come in other months. Suggests variability expresses itself more in length of season than rate of flow near max.



4. ~~Return flows from upper lands are less important.~~ Res in August, Σ diversion is steadier than Kwh R!, ~~Either that or computer~~ (Res includes LS pumping.

~~error.~~

5. Bulk of Aug. wtr went to very few. LS got $\frac{1}{2}$, & very low σ (but ~~did~~ we included ~~any~~ pumped wtr ~~!~~). CPD got $\frac{1}{4}$, but $\frac{\sigma}{\bar{x}} = .91$ Foothill & WWC got most of rest.

6. LS appears to get ~~$\frac{1}{2}$~~ Aug. wtr. But this is pumped from well-field. WWC direct diversions are very low. So do this again? This also makes Σ diversion in Aug. seem steadier than Kwh, while otherwise wdn't be.

If we recompute LS, wd. then find that $\Sigma\sigma$ exceeds $\sigma\Sigma$, etc. in August, far more than in hi months.

Tucson.

7. I have substantially understated my case by including LS pumping. Even in July, LS takes $\frac{2701}{19,193}$ = ___ % of wtr, is important steadying influence.

So recompute LS, both annual & for all the dates.

8. Aug. 23, diversions are much more variable than for Aug, one by one. But Kwh is steadier! So is Σ diversions! – maybe due to LS error.

Likewise, July 11-20 shows greater contrast than July.

So work some of these daily figures out. Also July 11-20, bcs it is a period long enough to afford material inconvenience.

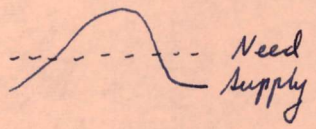
9. LS will be much more variable, and get smaller $\bar{x}$, when we record zero years as zero. Yet that is what really happened. & should be so recorded, & evaluated. Also will Δ $\frac{\sigma}{\bar{x}}$. It is true that system changed, but that is part of the problem.

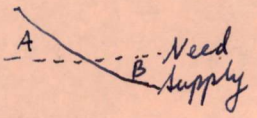
Also, if we record fictitious flows for LS, then are overstating Σ diversions.

Tucson

523. Not only did CPD divert 7 afa, but most of it in a few months, bcs not spread evenly. So must have applied even more by pumping in Aug, or something.

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524. Say during June yr. supply goes so: 

or, more likely, so: 

. You cling to hi wtr rt so can get

A, saturate soil, to meet B.

But now if supply exceeds need whole month, you keep it all anyway, bcs must have that right always to enjoy it ever.

Thus reduce supply of jr. needlessly. To get that extra insurance

Surely, in short yrs you want that extra, to pour it on in early June. In long yrs you have it too, tho, & in average yrs. So you keep from jr. in ~~most~~ ~~yrs~~ all yrs what you need in only a few yrs.

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525. TID v. LS a ct. stalemate. Settled out of ct. Taught litigants stay out of ct. in future. Corollary — don't rock boat.

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526. Re map of storage, note that altho costs $ per af, value per af also $s, in Kwh area at least, bcs as storage $s, get enough to carry you into later & later summer; & finally dispense w. pumps.

Value of late summer wtr much higher than average cost per af used. ~~Spring~~ May wtr comes easy, lowers ave. cost. Value of storage is to supply Aug. wtr.

In cfg canals vs. storage costs, canal costs per af might be lower, yet storage be preferable bcs supplies wtr when needed.

526. (cont.) Thus cf. Terminus vs. 7K. Terminus yields 100,000 af Aug wtr @ $25/af

7K, 4,000 sf = 8,000 af/day = 240,000 af/mo. Aug. wtr + c. 1.9m af ppty wtr. Canal still looks pretty good

---

Say LSID costs came to $30/af. But Aug. wtr was pumped from Rancho, was ∴ higher than mean. Lewis Crk wtr was free. As to fixed costs, they were a) Incurred largely to get the Aug. wtr
b) If regarded as 7 (time), Aug. gets same share as May, w. many fewer af to spread over.

So if Kwh wtr had gone where most productive, storage cd be valued at $60/af or so, paying for Terminus easily!

Tucson

521. Why did CVP planners ignore Althouse' strong recommendation to serve lands ~~w~~ w. ~~600~~ 600' highline? pp 91-98

a, Difficulty of working w/ exchangers (Althouse didn't recommend them)

b, To quiet fears & opposition from Southern Cal. re citrus expansion. Surely, FK avoids areas of citrus potential. Recall Angel discusses S.C. opposition based on this.

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528. Anomaly: spend vast sums to dev. w/ so people can continue treating it as a free good!

529. Tucson
Part of the extra ~~channel losses~~ variability in dry mos. & yrs may be due to channel losses. Careful not to erroneously impute this to water law.

—

530. In cycle, ground wtr storage is potentially a wonderful buffer, when increments from imports must be large.
But scattered settlement & quantity needed for recharge so much that import capac. for that purpose, when recharge accomplished, makes surplus import capacity.

—

531. Tulare Cty. suffered by accepting outside aid. Her part of price was to deny wtr to her better lands, w. citrus potential. Res s.c. support needed.
Now, w. FRP, s.c. needed San J. Valley support. so w. side citrus belt will get wtr.

—

532. Citrus has hi amenity value, consider that.

Tucson

533. Cal fgn r.e. values bucked nat. trend, Jan - June 1960, and rose 5%.

Why? Probly bes enhanced expectations of irrn wtr, many areas.

Now midwest r.e. values down $50/acre, July - Dec., says Doanes.

Leaving Calif. l.v. out of line, very. Building FRP ~~[illegible]~~ to created lands not needed.

534. Revisw Althouse notes, pp. 10 ff.

535. Consult Bull. 3, cited by Althouse, on use of wtr in different units of Kwh

536. Bull 3 seems to bring out that pumpers use less wtr/a than surface diverters. Check Bull 3 on this

Surface diverters have to use more bes they cannot control timing. Pumpers can get by w. much less bes have better control - & despite their ability, if wish, to use more ... & they must use more in August etc.

537. If use very large pumps & spread all around, lose virtue of pumping which is control of timing. That is probly why di Giorgio used so much wtr/a; likewise west sides. Like large farms of yore & cellphone today, their "efficiency" is by mining resources.

A price on wtr extracted wd. affect pumps. You wd. want to reduce amt of wtr used. So wd A control of wtr by more, smaller pumps.

Note this effect is different from deeper wtr, which encourages fewer, larger pumps.

If tried to more wtr extraction by power use, & tax them, wd distort, bes wd. incite to get more wtr/kwh, use larger pumps, (waste wtr)

So if wtr is what you want ecged, more it directly — meter the wtr at each pump. (or meter the pwr after determining wtr/kwh, but that is treacherous, ratio will change).

538. Under TID, empty ground rec below 20' in 1950 was c. _____ af.
TID recharg'g _____ afy. Shd fill in _____ yrs.

539. 1921-35, overdraft in whole Kuh area, = 1.3m af. 715 shd replace this in a very few yrs.

540. Another discr. in Kuh area is upper Cmwd Ck. Much wtr wastes to Kings Cty. Area excellent thermal. Gets 7,000 afy (p. 69, Alt.) for 16,883 irrble acres, 3660 irrd.

541. Cliché: wtr limg factor. Scatter shows not so. Human response. If humans responded wtr might become limg factor. But they don't, & remain a narrower limit.

542. Vs. xfrability — in Calif., wtr rec becomes personal prpty. If in channel, is r.e. like the channel. Fudickar v. E. Riverside ID, 41 Pac 1024, (1895)
If "in use for irrn", not personal prpty — Fawkes v. Reynolds, ~~211~~ 211 Pac. 449, 1922

543. Citrus districts signed up first w. BR — confirming hi rep wtr there.
LS signed in 19__; TID in 19__.
Stone Corral
Ivanhoe
Lindmore
Exeter

544. Re Munic. Bankruptcy Act, Why can't bondholders take over works & wtr rts of distr., before foreclosing on lands of individuals? Search intrls on MBA, Bekins case, etc. But w/o going further, here is clear indication I.D. cannot easily convey prpty. Creditors can't foreclose on it.

545. Is always possible judicial review of propty sales (as well as other acts) by I.D. Trustees may breach trust, is suspicion of selling to friends etc. Allen v. Hussey, 225 Pac. 2d 614, 1950; 101 C.A. 2d 451, 1951.

"An i.d. owns no lands in a proprietary sense, & its propty is owned by the state & is held only for govt purposes."

546. TID v. Collins, 154 Cal 440, 1908.

Act of 1887, ID holds its lands in trust, they are exempt from execution, even tho no longer used for distr. purposes

541. In genl, once an orgn begins serving wtr to individuals, neither can sell it. Is "dedicated" to serve certain lands, impressed w a public trust, etc.

548. If anyone exported pumped percg wtr w/o injunction he wd gain a prescriptive rt. Hence wd be enjoined immedly by overlyg owners. Even if a present surplus.

No one cd sell the wtr for export; nor cd all jointly. So must enjoin.

549. Why did Modesto etc. not go same route as southern sisters & develop ground wtr instead of surface storage?

a. Poorer ground resrs.

b. Better sites, pay for selves by hydrel. (same Pine Flat, maybe, or was that too big?)

c. Greater threat of losing wtr by export – to Bay Cities or to south.

d. More unified orgn of benefited lands. Kings & Kern fragmented. Southern streams' hi channels, many little diversions & separate interests.

e. Scattered southern service areas, pumping began in between.

But SJ & Kings were threatened w. export south, & had hydrel potential.

Can trace SJ clearly to wtr-rts impasse.

Kings & Kwh, too - easy diversion, too many divided interests.

Kern, one major interest, but no incentive bec was owner not ID.

So what does Kwh lesson of divided interests teach us? Larger analogy is entire C.V. Wtr law blocks merger of pvt interests, limits them to archaic petty dsmts, disables pvt & local agencies from moving in ecl directions, thus brings in State, & logrolling.

Ideas & impressions from Dick Smallwood's work on crop outputs & wtr inputs.

What can I do w. the stuff?

1. Alf. in FK area has not responded to Δ wtr. Acres have expanded vastly in Tag. rpts, 1951-58, but output/a constant. Maybe they brought in poorer land, but very constant 6.7 tons/acre suggests remarkable uniformity

LTRID is striking: no Δ output/a, vastly Δd wtr/a.

TID I have no data for, worked up. Nor LS.

But Lindmore got big responses to peaches, ctn. So did Tulare.

2. Few I.D.s Δd their ird acres much? ~~Many~~ Main responses must ∴ have been in output/acre. Whoa! Some have Δd acres greatly.

Most obvious response of this kind has been subbing one crop for another.

alf. has replaced what?

3. How use in Tucson paper?

a. Show good response to Δ wtr in Stone Corral, Ivanhoe, Exeter, LS, Lindmore, TB areas. (Contrast performance of Cty as a whole). Showing need for more wtr, in areas that can't get it. But how can these data show response to Δ wtr?

✓ Pre-wtr data are lacking. Must go back to Cog Rpts, whatever they are worth.

b. Show poor response of alf. in TID (& cty), a typical downstream crop. also ctn, if so.

a. Show response to wtr by assuming as raise wtr level, pumpers apply more. Do I have annual wtr levels? I don't think so. ~~Would~~ Wd. just have to assume steady annual rise.

c. Using acreage figures alone, show lag of adjustment to opps of new wtr supply.

We lack good output data but have good acreage data.
So record Tulare Cty acres of crops that might expand & contract w. variable wtr supply, see if correlate w. Kwh R.

What crops? Alf? Can it stand dry yrs? If so wd. be good in variable areas.

Cheapest wtr for w. side is floods caught in Tulare L.
Pump to w. side & spread. Or dig settling basins & trench in from Lake, minimize life.

BR customers along DM canal, many get < 3'. That is total from BR & other sources, 1956. Crops are Barley, alf, rice, ctn, beans, melons, tomatoes.

Spec. element: want to hold wtr in reserve for day when ctn limitations breached.

If LS was not basically stopped from using Rancho de Kaweah storage, why then did she stop after 1951? No one is using it now. So in effect this was stopped. Its use was tolerated for a few yrs in a compromise. But not basically permitted.

St Johns losses, &c., continue in summer, when entire flow cd be used now.

Principle of not being able to use grnd storage of one area for benefit of another has wide implications. C.W.P. needs such on wide scale. SSJV, poor in recr. sites, needs it esp.

But Hollinger says law won't allow it ... can't drawdown the storage. p. 376, JAWWA, 47(4) (April, 1955) pp. 374-88

Only legal method now for drawing down recr wd. be an appropriation. But appropn contemplates constant rpty and ... law doesn't conceive of irregular needs, i.e. of storage

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Grnd wtr, a "surplus" may be approp'd. for export. But what is "surplus"? Drawg from a recr, how much drawdown is ok?

Burr v. MacLeay Rancho, 154 Cal 428-39, 1908.
Mentions overlying owner can prevent ripening of adverse use by invok'g aid of a ct. of equity. p. 429. [So was there a kind of declaratory injunction before 1935?)

Summer wtr shd go where ditch losses low. But goes to CPD, WWC, V&K Cos., all hi losses.

Concn of summer wtr wd. be ok if to permit concn of wtr consn facilities But goes to wastrels.

Recheck TID v. LSID, (or write Burr). Did ct. forbid export even tho LS recharged it? I don't know if it was mentioned. But wd. follow. L majo defect of law is not letting them use this storage. By law they cd only acquire approp. rt., which wd be adverse

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Since it costs $5 to lift one af 100', & of this pwr ≅ $2, it follows that one af falling 100' is probly worth c. $1.00, if used to generate power. If drop can be used to avoid pumping, is worth more.

When gradient gradual, pwr gen'n infeasible. Use elevn then to gain latitude & lower xpln cost.

On Kwh, use all to gain latitude, below say 600' or 700'. Needn't go into whole Valley to point to relative surplus in Kings from which lower lands shd supply selves. — & Kings able to tap SJ, etc.

Entire Kwh shd go south. Regulate by own storage some, plus pump Kings wtr up into Kwh – south aqueduct in summer.

~~Irrigation is fairly new~~

Irrigation is fairly new in Am. history. There have been only 2 major depressions since irrn. started. In each of them, irrn. had overexpended and took a bad beating. ∴, now, future of irrn. looks bleak.

Say so, & use as argument vs. monuments.

Surly, even Kwh area is way ahead on wtr. So gmly wet yrs are low output — show's wtr is more imptnt limg factor than wtr, overall. (But on margins of wtr supply, wtr is limiting)

Correlate gross outputs, not per acre but ~~gmly~~ per Tulare Cty (bcs of changing acreage), with flows of Kwh & Tule R. Adjust for ctn restriction program; or use barley; or sum up somehow.

Maybe cf. Kings Cty & Kings R.

On Tuol., etc., TDs take more wtr in drier yrs, show's surplus of wtr. On Kwh, no one, not even WWC & CPD, are in that strong a spot. They take more wtr in wet yrs.

Citrus grows from Round Mt WD to Ray Gulch WD, ~~80 miles~~

$\sqrt{80^2 + 24^2} = \sqrt{6400 + 576} = \sqrt{6976} = 10\sqrt{69.76} = 10 \times 8.35 = 83.5$

= 84 miles. ~~Maybe 100,000 a. or so.~~ If 6 mi. broad, is 504 mi^2

= 323,000 acres.

Output/a is relevant bcs it gives an idea how costly it is to apply the wtr.

This area that appears in Althouse as "dry farmed" may actually be subsid by his wtr table.

1956, FK canal delivered nearly 900,000 af. + 50,000 for temp. users. That is over twice the annual flow of Kwh R; nearly twice annual flow of Kwh - Tule combined --- & these are primary sources for service area.

Is vain to protest this is ~~just~~ partly compensating for overdraft. This implies expansion based on this wtr will stop when reach =m. In fact, can go ahead to a new overdraft -- is nothing to stop it.

But % Δ is greater bec FK wtr comes in summer. Aug. wt is 171,000 af in 1956. Of typical Aug. flow of 3,500 - 5,000 for Kwh. 1952 max. was 22,000.

1956 Temp. service included TLBWSD &c. excess owners. BR will have tough problem, w. surplus wtr, enforcg limitations

Tulare Cty shd not only have taken over citrus from LA, but equally prunes from Sta. Clara.?

Plums are hvstd in June-July. Hence fine for wtr w/o storage. But no doubt cheaper in result. Trouble is they aren't. Plums yield gross $400-550/a, 1950-55
Prunes yield gross 300-400, same period. Maybe higher net?
Prunes are hvstd in Sept. So stored wtr wd permit shift from plums to prunes.

Other crops w. early hvst are Cherries, May-Jun
Apricots, June-July
Nectarines " "

Yet this factor has not been paramount evidently in determining crops of this area. Grape hvst is Aug-Nov.

Valencia	May (in Tulare Cty. June-Oct. in south)
Peaches	Aug
Figs	Sept.
almonds	Sept.
Walnuts	Oct
Olives	Oct-Nov.

Clings hvst later & gives more than freestones, so stored wtr wd allow that shift, more eel.

Navels: Late Nov. Dec., Jan, & early Feb. (in Tulare Cty)
Jan-April in south.

So Tulare Cty has the Xmas navel mkt to itself.

Kuch area had short run flexibility in this sense, that acreage of field crops expanded & contracted w. wtr supply.

Thus imp of wtr to field crop areas expressed self in more acres; to perm. crop areas in more yield / acre.— if in stage of + returns.

1924, Cty Peach yields up; field crop acres down.

LS helped conserve wtr by pump'g out Rancho del. res., Ld channel seepage.

If entire channel gravel area thus pumped out, improve recharge muchly.

CVP took too long is criticism. But wdn't wtr law reform take longer? Maybe, but once you create flexibility, benefits are to speed up all later projects. It is much cheaper. Its effects are much wider spread in space & time.

Mr Corkle & Dean explain Valencia decline bec it origly thrived due to a seasonal advantage — shipped May - Oct, while Fla. shipments low. Fla. season corresponds to navels. Frozen concentrate destroyed this seasonal advantage, thus stopped new Valencia plantings. Gave advantage to navels. p. 31

But this hardly seems adequate explanation. For fresh winter oranges from Fla. are also expanding - p. 34 - and hurting navels.

Fla. has no artificial wtr shortage, & no Cal. Fruit Growers' Xchange. That may be more the answer.

— Citrus, 10-yr downtrend — — long lag, room for big bad cycle. All orchards, same. And all Cal. orchards have ben there same. Now again?

Combo of needing wtr supply, & long dev. pd. of orchards, has made Cal. hort. susceptible to marked cycles. Perhaps worse than elsewhere. Mo. e.g. has not had such extreme troubles, that I know. Cap. has bn retreating from Calif. hort. since 1930 or so, until just recently. Bearing acreages e.g. of walnuts expanded in early '30s bcs of plantings in '20s.

Elsm is also important for ~~tomatoes~~. Tulare Cty. grows early June tomatoes. (so again, summer wtr not vital, altho wd. be nice to have 2 crops)

Why no storage in SSJV? Bcs warmer climate, earlier harvest, less need for summer wtr than in Stanislaus Cty.

Compn from SJV plum area, Clovis-Portenville, is for early-maturing varieties. These command better prices. But SJ not going in for late maturing plums. Maybe w. more late wtr they wd.

Surely, tho, value of late wtr in this area is sharply reduced by fact you can grow early yielding plums. Which are better anyway. And after yield, can't use trees or land much again until next yr.

So is problem of better allocation of whole season's wtr. Maybe if ed. alloc. June wtr ideally, ed. handle huge acreage specializing in early fruits, need no storage! Just adapt crops to wtr supply.

Late wtr needed for grapes. Also, full seasonal employment. So late wtr wd. be hi productivity, to permit crops to use seasonal surplus labor.

How can $\frac{\sigma}{\bar{x}} > 1$? It is not easy! Make those coefficients fall off rapidly.

$$\sigma = \sqrt{\frac{\Sigma(d^2)}{n}}$$

$x_1 = 0$

$x_2 = 10$

$\bar{x} = 5$

$$\sigma = \sqrt{\frac{25+25}{2}} = \sqrt{\frac{2\times 25}{2}} = 5$$

$x_i = 0, 5, 10, 25$

$\bar{x} = 10$

$d_i = 10, 5, 0, 15$

$$\sigma = \sqrt{\frac{100+25+225}{4}} = \frac{1}{2}\sqrt{350} = 5\sqrt{3.5} < 10$$

$x_i = 0, 0, 0, 0, 100$

$\bar{x} = 20$

$d_i = 20, 20, 20, 20, 80$

$$\sigma = \sqrt{\frac{4\times 400 + 6400}{5}} = \left(\frac{4\times 400 + 16\times 400}{5}\right)^{\frac{1}{2}} = \left(\frac{20\times 400}{5}\right)^{\frac{1}{2}} = (1600)^{\frac{1}{2}}$$

$$= 40$$

$$\frac{\sigma}{\bar{x}} = 2$$

Freestones, Tulare Cty also has early-maturing types that demand premium. But how early? Early August? Peaches do require July wtr at least.

Thus this crop shd show much more sensitivity to wtr supply than plums and, better July wtr wd. allow more peaches. Doubtless needed to take up midsummer work slack.

Ctn hvst season probly much less critical than fruits. An advantage. Other hand, why grow ctn on land that can hit early fruit mkt?

~~If~~ There is no subst. for storage on Kwh & c. river itself, by importing wtr. As long as there is ~~it~~ irregular wtr, land must be set aside to receive it. If import full wtr supply, recreate flood problem in Lake Basin — there being no outlet.

So local storage was inevitable all along, & shd have been used first.

All cost: Shasta wtr does not get a completely free ride down Sacto R. Loses elev which might be used somehow, e.g. to water w. side Sacto V.; and gets dipped into all along route.

Alf. is good crop for irregular wtr supply, bec gives many cuttings, like a lawn, & can go dormant when wtr stops.

If so, shd vary w. wtr supply

Can even out supply of one mo. by imposing variation on others.
[9/ have a little storage] Probly some seasons are better able to absorb
irregularity.

Tucson

268. No change pt of diversion or use if injure anyone. However great the benefits. ~~Any~~ Any injured party has legal right to stop any change.

Law does not say his claim is limited to the amt of the injury. He has an absolute veto power. You can contract w. him not to ~~per~~ assert his claim. But his bargaining power is not limited to damages he can prove; but by what traffic will bear. (Chap. ~~Burns~~ 7) Chap 10, Wat Code, esp. ¶ 1706.

Thus any one injured party can exact tribute = entire antic. gain any project.

Difficult situation. Two or more injured parties, impossible.

Law as usual is ~~a~~ vague, leaves much to court battles w. uncertain outcomes. Bad for everyone, & precludes changes.

269. If Army Engrs are build'g on Kwh they probly filed on Kwh. Or are they just storing, as at Pine Flat? Did they file on Kings?

270. Overlying rts are sup. Reconciled by reasonable use. Cannot export from grnd wtr basin, but a surplus can be approp., not by statute but court decision. Is probly basis of TID v. LSID.

Distr. is, hi wtr is largely outside basin, i.e. KDWCD.

Can approp. from known underflow stream ... complicated case no doubt. So many conflict'g issues, is probly why fought so long & indecisively.

Percolating wtrs, surplus above "reasonable requirements of overly'g lands" subject to approp for distant use. "So that is why LS cd. seek to show downstream uses "unreasonable".

271. Raymond Basin Case, alloc. by base pd. use. Precedent for claim-staking uses. applies. approp.-type principle to ground wtr.

Pere'g wtrs. Katz v. Walk., correlative rts, is for ~~underground~~ pere. wtrs.

~~Hutchins~~ (~~W. Hutchins to contrary?~~)

272. Cumulative effect of a little non-xferability, or stickiness in xfer.
If let go, hard to get back. So cling, even tho don't need now.
Make stickier.

273. 2dry beneficiaries can also claim injury, probly, from wtr xfers.
also appropriation of return flows, if any. (Can approp. return flows of foreign wtr)

274. Channel losses not counted in "beneficial use". I.e. enormous losses countenanced. Kuh is good e.g.

275. G. Thomas, p. 143, describes fractional division work'g well, drg yrs.

270 (resumed)
TID v. LSID shows how unec. the "reasonable use" idea is, what disces results in.
Underflow may be approp'd; & percg wtrs exported. In either case wd. have to prove surplus.
But why did LS stop export'g WWC wtr? Bes can't change place of use if prone injury.
Also probly as part of compromise reached out of ct.

276. If can approp. "surplus" perc.g wtrs, what happens if later shortage develops? Presumably the fn. approp. is now correlative. Or no — he's better than correlative, his rt. of use is a fixed amt.
Hence the rip. (& hence overlyg) landowner's recourse to declaratory injunction, to forestall adverse prescription — a rt. enunciated in TID v. LSID.
Interesting that the idea of future or "ultimate" needs as something you can reserve today is a recent devmt. We have evolved from rip's claim to absolute property to spec's rationale of "future need".

211. What is the Crockett - Gamboggy right? Must be approp. of surplus ~~pco~~ perc.g wtrs, return flows. A vested rt. It is not a correlative rt., as that can be used only on overlying lands.

Thus LTR10 is admitting it has a surplus!

278. Exporting wtr from a "watershed" other than that in which diversion is made is ok only if existing rts not impaired by export.

This wd apply to LS export of WWC wtr. Deprive downstream of return flows.

Thus the wtrshed & ~~if~~ aquifer requirement, either or both, definitely preclude rational ec. use of such wtr.

219. Downstream ripns cannot store wtr as ripns. Wd. hv. to approp. But then wd. conflict w. other ripns, be jr., etc. His appropn. wd. violate his rip. rt.

He cd. waive his own rip. rt. vs himself. But any one ripn cd. challenge storage. But his appn limd to non-partic. Can't block storage of most ripns?

No, but lose priority etc. Ripns. cannot store their rip. wtr. Have no right. Must file as approps, on unused wtr!!!

Thus a rip. rt. in an irregular flow can never be regularized, in presence of intervening claims.

Conceivably all ripns. cd. get together & abandon their rts, thus leaving unappd unclaimed wtr in stream. But risky & easily vetoed.

280. St. approp also hard time to store. He has rt. to divert given flow not to store given quantity. Wd. require a new appln. You can change places of use & diversion if lucky. But hard to change diversion rt. to storage rt.

Storage rts usually given in quantities, bec physically feasible. But translating flow rt. to storage rt. cd. be ambiguous & fraught w. litigation.

279. (resumed) Regular flood wtr is part of a rip. rt. - Gin Chow. To the extent that rip. owner "can" (not "does") put them to "beneficial use." - Chowch. Furs v. Martin.

Thus only extraordinary floods might be stored by appropriater.

But Pbg v. Vall. changed, perhaps, not clear. Hutchins p. 65

Gerlach case, must compensate rip. for loss of unreasonable use. p55, 15, 67.

281. Several provisions wtr law discrim. vs xfrs among watersheds

Sec. 11463 no exchanges unless watershed of exchange no net loss

approp. no export if injury.

Percg wtrs " "

Watershed & Cty of origin.

Etc.

Result: only monumental xfrs possible. Then no damage locally as wtr cheapens, so then local xfrs possible.

282. An I.D. cd. garner all rip. rts., bec can condemn them for public use?

Bert wd. a new I.D. be so construed? Madera cdn't get M&L, e.g.

LS didn't prevail. Etc.

283. Several good things happened, 1917.
a. LVT mandatory for IDs.
b. appr. rt. unused 3 yrs reverts to public (Sec. 124 H. Hutchins p. 293)
c. T. Adams describes some wtr problem cleared up under pressure of war.

284. 1948, Fed. Ct. Claims ruled hldg reserve supply was beneficial.
Law evolves, zigzags. Is great doubt. To protect self by all possible means, is mood created.

285. Pump'g grnd wtr often depletes surface flows by less than amt pumped. Trelease p. 311 (Duke U LR).
One knows that L S used all it pumped. Is dubious if others used what they didn't pump.

286. Appr. rt. may be xfrd, place of use & diversion, if no injury. Even a portion
But law is silent on sale. Implication is, is ok to sell, whole or part.
But if you sell, are admitting you have a surplus, may endanger.
On salability, see W. Hutchins, Selected Problems in the Laws of Wtr Rts, 1942 E.g. note 11. and maybe c. p. 38. p. 378 ff.
also check Hirshleifer etc.
Trelease, p. 314 ---- orighy, approps on public domain "regarded as freely salable." Still so, some States. Hutchins, supra, tells which.
Then some wd. claim extra, & sell it. So some states forbade change of wtr from land for which orighy approp.

287. Hutchins, p. 125.
Rip. rt. is perpetually inseparably annexed to land as part & parcel of it.
But approp. rt. "is separable & alienable from the land to which it orighy became appurtenant." p. 125

281 (cont.)

"An approp. wtr rt. is subject to conveyance like other property." p. 126

Is real propty, conveyance must be in writing. p. 121

But is odd that Milliman et al. oppose Gin Chow & think can make wtr xferable by strengthening non-xferable rip. rts! Check their book on this.

288. Appurtenance is not lost by conveyance to a MWC. But appurtenance is much weakened. Burden of proof shifts to him who seeks to prove the appurtenance.

To judge from fact xfers of shares are common, but of appr. liens unheard of, this difference must be important.

Is no mention of how an ID might convey part of its wtr rts.

289. ~~Pri~~ Ditch capac. does not create right; but sets upper limit. since c. 1919

Lack of capac. definitely destroys rt., however. p. 134

290. Courts go for "physical solutions" whereby interloper pays for wtr conservation by sr. c. p. 357

Thus is clearly no equality as among approps.

No between rips & approps, but is more so here.

Only among rips.

291. Eagerness of many to make wtr rts prt. prop. is to turn allocations to mkt. Commendable. I point out can do both.

292. In a half-sense you can get a prejudgement. When apply for permit. But all WaRtBd can give is it's ok. It doesn't know what all is in cty. records, approp & rip. Is still risk of later suit.

293. a Major evil of TID v. LS was ascendancy given to surface wts over use of grnd wtr storage.

By pump'g, LS imposed a slight cost on surface approps: lowering level of river, impede their diversions w. old intakes.

Export then was not only issue. Suppose someone inside Kern Delta did same, as LS. Wd. inconvenience surface users slightly.

Pump'g from channel wd. Δ its acceptance of wtr, hence create storage Shd be encouraged. But have had to maintain surface flows.

294. MP supplemental wtr very hi. Fructifies other wtr.

But much of this is artificial

a. Orchards already installed, sr mp > lr mp

b. Wtr spread too thin, forcg imports. If local wtrs consold, imports look much poorer.

Thus mp imports looks much higher than it is.

295. Recharging is a productive use of wtr. Since you reduce lifts 10' by recharging one foot. A strong argument for vesting underground in pref. to surface. i.e. for keeping it fairly full.

But w. scattered settlement, need 3 times as much wtr tied up this way. Is little benefit in thus enlarg'g vest. --- levels fall slowly, from overdrafts.

L95 (cont.)

But FK shd mainly serve late summer wtr. Thus use SJ storage to regulate Kwh.

Going south, both cd. use same canal! Kwh in spring, SJ later! Thus cd take Kwh south w/o extra canal capac.

As long as they're cfg wtr anyway, shd certainly use it to even out service. But are they? Yes — FK flows heaviest in June-Sept. So Kwh is using SJ storage.

Note this underlines desirability of having used P.T. storage instead. Res. canal is used only part of yr, so shorter better. Also steeper, cheaper. Also desireability of conjunctn opn w. ground recharge, get smaller eq; use all yr.

But FK not delivrg to many Kwh service areas that need regulating — none but TID & LSID. None to KDWCD, e.g., not in BR records anyway. (KDWCD just buys some BR wtr from TID that pers. thru its canal.)

296. If MWC began w. rip. rts., cd it sell shares off ripn land? Probly no.

297. Wtr rts in flow rates = peak needs.

So if flows above peak needs in other seasons cannot be stored, except by those w. best wtr rts.

But they are the very ones w. least incentive to store, since their summer needs are cared for.

298. Wd. it not be more ec. to put more storage on Kings R or SJ instead of bldg Terminus? Put Kwh. floods in FK, & underground. This is ~~not~~ the ec. that flexibility wd. allow.

299. Excess conveyance costs ~~thrice~~ 5 times illustrated
a. approp., reasonable use, conveyance losses not considered
b. Inside ID, same rates for all
c. Fixed diversion pts, long canals
d. Scattered service areas
e. FK canal, remote import.
Society treats as negligible. Yet is major cost!

300. R.P. Teele, USDA Dept Bul 1257, 1924.
p. 2 Irrd area will greatly expand. Res is overcum. Good quote

301. Not just LS, but all along foothills, areas of hi mp wtr are not areas of good underground storage.
Why has KDWCD not devd. storage, rechargebeds? Res. not able to store for citrus belt -- including Orange Cove ID, Lindmore, etc.
Ideal, wd. use delta storage for foothills. Foothills cd pay for it.

302. TID was very scattered origly, only lately consolidated.

303. Value of elevn. Vandalia too hi above FK, 350' says Dawson, for service. (But probly cd get from Tule R.) By map, tho, it is no higher than TB. Just nearer Tule R.

304. Kwh delta is much better aquifer than further south. Coarser-grained. Fans from San J-n to Kwh are good storage. Wm. Gardner testimony, p. 417, Hrgs S. 912.
But Ks.R aquifers are saturated. Kwh is legally tied up. Hence this fine storage not available.

305. Di Giorgio has a 1700' well! p. 414.

306. Kuh &c. fans are coarser at apex

307. Tulare Lake interests need w.t. only in some yrs. But to get it must buy annual r.t. Res. cannot use storage
a. Underground in fans
b. BR

308. Stone Corral 10 orgd by small farms. Then as spec. values devd, big investors gobbled up. — Vernon Wynne S 322, pp 1188-89

309. Intermittent irrn. is n.g. bec land once irrd. produces poorer dry crops for several yrs. S 322, p. 112, Sen. Exten

310. It is costly to level & otherwise improve land for use.
If land is cheap, not worth while.
If .. .. costly, is worth while. You want to earn a return on big invmt. in land.
Hence cycle. Hi price, you begin developg, & output.
"Cheap" land in sense of low sales price brought on by hi taxes is not what I mean by cheap, above. But cheap in sense of low annual carrying costs. Hi annual taxes also encourage devmt & improvement, even tho they lower price.

Tucson.

311. When wtr users hv. sp.-round wtr rts, & U.S. provides storage, it can only store their wtr — for them. But KCLC filed on wtr denied by Isabella — 5912 hrgs p. 358, 401. Also another possible resv. upstream. Now here is complete travesty of rationale for pr. system. U.S. builds, still KCLC et al. file on wtrs.!!

312. Where is the wtr shortage? Get south to Kern, KCLC has plenty wtr, esp. so. of river. BR will soon saturate mkt

313. Levelling costs evidently are highly exaggerated by big fellows. Presumably to make it appear land values are low. Others testify $100/a is hi. 5912 hrgs, p. 351, Lehlmeyer. v. also Mattoon testimony.

314. KCLC & 2 other large interests filed on all wtr behind Isabella. Large Lake interests filed on Tule, Success, Resv. May be right.

315. 5 SJV, 20 m at "within economic pump lift". Est. of Cal. Eng. cited p. 364, hrgs 5912.

316. Engr Kerr of BR figures wtr demand c. 260,000 a, @ 2½ afy. = 600,000 afy. Importing 1m afy. Large safety factor. Also extra capacity mentioned in D-M canal. p. 384

317. p. 390, Mr. Kerr of BR Court held LS cd not ∆ diversion or area irrd to LS limited acreage that cd be irrd to 10,000 a, about what was being irrd at the time. Was c. 21,000 a. in 10. No ∆ in irrd places, 1916-35. Again, like TB, seems convincg, but occurred in depression (1935) so maybe other limits than wtr were paramount.

Mr. S.A. Kerr "Now, much of the land along the FK Canal, particularly above the canal, is of that same type (as LS)."

Tucson

Sen. Downey: "Mr. Kerr, I do not think you need to belabor that. That is the very reason for this project."

318. The proper mode of performance of wtr mkt is sr as well as long. To rescue citrus in place, imp wtr = Δ gross produce, sr. This is what was denied by wtr law.

But it is true, court did let them rescue most planted acres, just stopped them from planting more. However they did have many other fixed costs in — ID aqueduct & distrn system.
In 1935, TID mostly alfalfa. So it was alf. vs. citrus.

319. S 912 trgs p. 398. BR vs. supplying Lake area from FK, waste elevn. Serve from Mdta pool, life 70' only. SA Kern testimony. (So moving Kwk wtr to Lake is great waste, of elevation as well as other things) (And of course Kings R wtr)

✓ 320. Citrus is less boron-tolerant than most other crops, hence needs pene surface wtr more, can't rely so well on deep well wtr, p. 402

311 (resumed)
p. 401-02. KCLC filed on Isabella largely to formalize their existing claims (pre-1913). Not really a new ~~filing~~ wtr rt. (But note how their old wtr rts. tied up flood wtrs; & when U.S. finally developed, was entirely for their benefit. Same on Kwk & Kings & Tule)

321. Now if KCLC ~~[illegible]~~ sold this undeveloped rt., wd. be great outcry. Public outrage can be aroused by "traffic" in wtr rts, be hoodwinked by devmt by ancient claimant. Thus this wtr rt. was not really tradable. Considering risk, worth more to KCLC if kept than sold.

Tucson

322. 218,000 a. KCLC land irrigable from FK canal; of which 168,000 a. now have service from Kern R.

323. Part of BR's trouble on 160 a. law. are bringg in so much wtr, are irrg land whose best uses are low.
If were just servg horticulture, 50 acres plenty. On ctn & alf., becomes questionable unit.
Testimony of Mr. Locke, $1,000/a net from tomatoes in bed yr.; $4,000 net in good yr. "Net" not defined.
Also other very hi per acre net outputs, vines, ~~etc~~ truck, horticulture. Good living from few acres.

324. p. 634, David Stoner.
almost every ID tried to contract for more wtr than BR thought they shd have.

325. p. 635 Delano-Earlimart, 250' pump lift.
One well for 150 acres. 7 lows 1-2 sf,
(but that means constant pumpg, hence no control of wtr timing. Thus economy of big wells overstated).

✓ 326. Citrus area, pump costs very hi, not bec hi lifts, but each well yields so little wtr. p. 636
So deep lifts on W. side mean nothing.

321. Orange Cove I.D. p. 638. Mr. Stoner. Good land, only one problem — not located over ground wtr. 27,000 acres gross, 26,000 irrigable, but 15,000 dry.

328. p. 654-55, Stoner. Ests. wtr will jump l.v. from $100/a to $1,000 or so, w. wtr costing $5/af.

This in 1947. Probly shows BR proclivity to overest.

Sen. Watkins immediately takes this Δ as mine of value of wtr.

329. Exposition. Effect on l.v. best way — up to ~~apt~~ a point

Lakeside Ditch, remove wtr, lower value a little — they wd now pump or dry-farm, lower value maybe from $200 to $100, or much less.

Put wtr on citrus, Δ l.v. $1,000/a. (free wtr, remember, or nearly so, as vs. priced FK wtr)

330. p. 656 Stone Corral is frost-free, like Orange Cove. Same soil.

Citrus now where wtr.

331. Ivanhoe not in desperate need of wtr. (yet it got wtr while some areas still dry). p. 658

Was a proposed Woodlake ID too. (probly excess land problems stopped formation. Thus many good lands still dry

332. p. 660 LS, some areas, pay $25-$30 per af pumped. Stoner. (jibes w. older info. from study by T. Adams & someone.)

333. 1944 Flood Control Act is what put A.E. into upstream recs. So present cycle of overexpansion of irrn. has this new instl. wrinkle.

In 1920s, irrn. managed to over expand all by itself – local fncg.

But now:

BR adds equivalent of 4 Kern Rivers in FK

A.E. contribute P7, Terminus, Success, Isabella

State & Fed. subsidize I.D. distr. systems

(Grunsky) Small Projects Act

Devin- Inc. tax subsidizes ID bonds, & land speculation

State fncs FRP

Yet in '20s, problem was capital flowed easier into p.w. than impvig lands. Now, much worse. W. all this new wtr, is no proportionate Δ in pvt. improvement of land.

It lags. As it comes on, mkt cannot absorb at present prices.

~~Lagg~~. Land w. good wtr supply will be no rarity. Develop < ½ new lands, glut mkts.

Lagg stage for greater collapse than 1929.

333. Supplement.

As of 10-60, wtr devmt projects "proposed" by districts for ag. now total $833m. These are the ones in Cal. DSC. Excludes many in prelim. plng stages. Excludes Trval.; EBMUD; & SMUD, which wd. add $377m.

Tucson

337 (more).

Cf. value Calif. fm r.e.; & net or gross inc. of same.

334. J. C. Youngberg, cites factors restoring investor confidence in I.D.s

#1. "the Δ in l.v. & the increased appreciation of the value of w.t.

#2. DSC. (but if all they know is revealed by gloop in Bulls 29 etc — & they claim to have nothing more on file — this is as bad a fraud as Δ l.v. Also, DSC had predecessor in Bond Certification Commission, on which investor also relied.

Bond buyers look for approval, rely on it.

(Write young lawyer new member ....

335. Growing area gets geared to growth. Invmts are made w. expectation growth will continue.

Thus growing area when first need for cutback appears, keeps growing to avoid shrinking — & worsens problem for later.

Thus taken desperation measures like C.W.P.

See Banks' quote

336. FK emerges from dam in very rough area — Boke, p. 661. Remains rough to Kings R. Then smooths out. So costliest part of canal is the needless part. Also siphon under Kings R.

Muting elevation is very costly — big canal, very level, rough area. Shd drop faster, swap.

337. LS is xtion area. p. 663, Stoner. North is "cove" type land. South becomes flatter plain.

DISTRICT

Oct-Nov., 1960

Water Program Will Meet Critical Needs

By Harvey O. Banks, Director, Dept. of Water Resources

California's future — whether it will continue to grow and prosper — is entirely dependent upon continued development of the State's ample water resources.



HARVEY O. BANKS

California's well-being is geared to continuing growth and economic expansion. Business, industrial and agricultural investments in California are made with the expectation that growth will continue. Should anything interfere with this growth, the economy of the entire State faces a withering stagnation.

One sure way to interfere with this growth would be to permit our need for water to exceed our developed supply.

Fortunately, we have a soundly engineered program to prevent such interference. A first step toward launching this program is **Proposition One,** the Water Bond Issue, which will be before the voters on the November 8 election ballot. Proposition One will make available the financing necessary for construction of facilities to meet the State's most critical water needs over the next 25 years.

Beneficial Effect

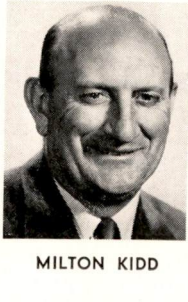
Passage of Proposition One will have the following beneficial effect on California's economy by 1985:

New investments totaling 34 billion dollars in the project service area alone; additional income of 12 billion dollars to 5.2 million Californians supported by two million new jobs; a resulting great increase in purchasing power to spur business activity throughout the State.

We must launch this water program immediately if we are even to barely keep pace with the rapidly developing needs in many areas of the State. Further delay could have disastrous results. While this program will cost money, failure to implement it immediately could cost infinitely more in terms of a stunted economy.

WELCO

MILTON L. KIDD



MILTON KIDD

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THE PLACE—Bakersfield, Kern Co

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(For details, see the current issue of

The Editor's

*This 50th Anniversary Issue o
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Tucson.

338. Lindmore has scattered citrus, but mostly dry-farmed grain. With wtr, no one wd grow grain, not bec wtr costly, but bec land is. If grew grain wd take Class II wtr at $1.50/a-f, bec it comes at right time for grain. p. 664, Stoner

Citrus, grapes. ("winter vegetables" are high uses for Lindmore. Maybe dairying too.

339. Class II wtr indicates FK canal has more capac. than Millerton res can handle. If res bigger & canal smaller, steady flow. Shd have done so. Res. area has already large wasted flood wtrs. Need summer supplement — more storage, less xptn.

340. p. 668, Stoner, TID has "fairly good" ground wtr, but wants FK wtr for expansion.

Expanded TID will be 43,000 a, of which 13,600 now "dry".

341. p. 670 Stoner admits in TID he does not expect much d.v. on lands presently irrd from S wtr supply? No, ambiguous, n.g.

342. Do not emphasize hi value of citrus today. Rather, that slow wtr law has made Calif. miss the boat, develop citrus too late.

"Too much, too late."

But maybe one is ID! p. 674 BR represented it as an excess owner!

343. TBID, 2 owners have 5100 acres. Grain farms. Top citrus land. No groundwtr. Even soil absorbs & releases wtr slowly. Clay loam; very heavy, fertile.

Tucson

344. Belano-Earlimart. Di Giorgio has 4,000 a. His pumping is more vigorous, he has created cone of depression under him.
250' deep to static wtr level, 300' lift maybe, w. drawdown.
D-E I.D. planning to ring him w. wells.
But BR planning to rely on surface deliveries, too, not recharge.
pp. 686-90

345. Discr. of larger pump — deeper drawdown.

346. p. 701 winter flows from rain average less than spring flows from melt. But winter flows more susceptible to flood. (Recall Dec. 25, 1955; and Oct, 1950)
Snow melt steadier. Also predictable, plan crops accordingly.
— Stone.

347. SJR mean an. flow = 1.85 m afy. Class I wtr from this = .9 m afy, or 50%.
Capac: Millerton L., 428,000 above canal, 520,000 total
4 upstream resrs, 334,000 af

348. Winter vegetables take winter wtr. (shd.: be encouraged)

349. BR at one pt. very eager to sign up I.D.s. Hence publicized idea of big latent demand for wtr. And made contracts w. some dubious urgent customers like T.I.D. To panic I.D.s into signing. pp. 710 etc.
Contracted much for recharge, same motive probly.
So now big surplus impending.

350. Scattered settlement meant had to recharge wtr under wider area. Big capac. for that. And big surplus when recharge finished.

351. "Laches" – rhymes w. Natchez – undue delay in asserting a rt. Is what they all fear. Hence litigious.

352. Before 1928, LSID bought stock in most ditch cos. on Kwk. Also some Foothill Ditch, including rt to use rt. of way. Began to Δ capac. Wanted to change pt. of diversion to Foothill D. Wd. divert there only the amts they bought downstream — i.e. less than they bought, really, bcs they are savg channel losses. So they are not hurtg ground recharge, save from downstream use.

Court held a stockholder can only sell rt. to wtr via MWC facilities, i.e. cannot change pt. of diversion. (Maybe cd. if bought 100% stock, acquired wtr rt.)

353. MWC are corps, not coops. One share, one vote. But resemble coops in ownership by customers.

354. Tom says in CPD vs Foothill they refer to Evans, Watson & TIC etc. as rips, but not so to others.

352 (resumed)

Tom says ct. advised LS they cd. tap each little source at its pt. of diversion. is getting quote. [Couple this w. later counsel to line ditches of all wastrels] [Sounds like hazing]

Sic transit transferability via MWC. Is worse than none. Only certain lands can avail selves, usually downhill. Bes some do, however, ancient system is expanded from old diversion pts, made more sacred & harder to change.

353. It is wasteful to serve surface wtr to areas w. good ground wtr. BR. shd have concentrated on recharge over entire Kuh delta. 160a less probly inhibited.

But gnrly. lands near river beds shd have no surface wtr. Esp in dry season, but gnrly all the time. Reserve surface supply & cost of surface dists., for lands w/o aquifers. Foothills & inter-cone areas.

354. p. 791, Barnes. "Very ~~rough~~ expensive" levelling of "rolling, rough" land, cost $50-$100/acre. Last 10 yrs, improvements, land levelling costs way down. Re "Sharon Tract", higher part of Madera. Now dry grain.

Barnes didn't expect much spec. profit that area, bcs hi levelling cost. Land now very cheap.

(But Reiss, F. J., of Ill. U., points out highest % gains hv. been in poorer lands. Ill. fertilizer, etc., helps more there)

[to spec. presume highest from lands now cheapest & driest]

355. p 192 Barnes doesn't think 1 wtr will 1 l.v. in Madera for 25 yrs. Based on fuzzy reasoning, but calls into question whether MID needed much wtr.

356. Madera had spreading grounds, fully used, thus concerned local sources. Best no extra capacity for BR Cl. II wtr. Hence planned to have furs into in winter, use that means of percolation. Antic. problem of getting them to do it.

Have sandy soils, so it will work. p. 793

357. Putting wtr underground is a productive use, to reduce pump lifts. Wtr is not sterile-ecly, is holding up wtr above it.

Say a pump serves 100 acres, needs 300 afy. Put 100 af underground, reduce lift by 10'. At 5¢ per af-ft, saves 50¢/af lifted, not just this yr but in perp. — and in addition can serve as emergency storage. Saving is ∴ $150/yr, a $1.50/af deposited.

Capitalized at 5% that is $30/af.

So it competes on fairly even terms w. surface use, now ahead, now behind? No, it is much more productive!

Interesting wrinkle, since pump costs are $ lifts, a slight change moves you from recharge to discharge, all the way. But that is fitting for a storage res. Dry yrs, surface value rises, discharge; wet yrs, v.v.

358. p. 872, Paul Johnstone cites 1944 study made by BAE for a E of SJV. That wd. seem to make it public property. Is a document "well known to all students out there"

From BAE study Johnstone concludes irrigators cd. not pay for much wtr at $14/af

359. Johnstone's reasoning surprisingly crude. Values wtr by present diff. of dry & irrd land. + improvements. p. 853. Several compensating errors.

But future irrd. land probly worth much more than present, so maybe they understated. Included improvements, then overstating. but thought this compensated by spec. element in dry land. Diff. = $300/a.

360. p. 877 Johnstone repeats Harding that Tulare L.B. WSD wants 7K wtr.
And it has filed on Kings R, Applns 4434 & 4449, for 199,000 acres.
on Kuch R 10942 } 172,000 a.
Tule R 10940 }
showing they want wtr supply from "flood control" dams.
p 878, KCLC appl. 4946 on Kern, w. map of 41,500 a. on which they propose to put it.

361. p. 887 ~~p. 878.~~ D-M canal ~~King~~ being built for ~~11,000 sf.~~ 4600 sf. Includes Extra capacity for future W. Side project, ~~to~~ of 1,100 sf. Only 3500 sf used in first stage of CVP.
p. 888 The 1100 sf cannot be used until future storage available — I suppose Sen Luis.

362. N. Kern WSD (e. of Shafter-W) has "nearly an adequate supply" w/o CVP — p. 889, citing Etch, pamphlet, "Progress Rpt on Wtr Supply from CVP Proj. required for lands in Kern Cty." Dec. 31, 1938. p. 19.

363. p. 892. Downey establishes KCLC will water most of its land from Kern R. BR has said KCLC has over 200,000 a. "in project area", but only a little of it may get CVP wtr. Unless Isabella regarded as part of CVP.
Land survey was made by Bill Alexander, "our man in Visalia".

~~360~~ 364. It is costlier to pump from a well than to boost on the surface, bcs pump must be confined in well. Kerr, S.A., est 1½ – 1¾ times more. p. 967.

Besides, is lower pur rate on big ~~lift~~ volume.

Small fms pays one maybe 10 mills/Kwh

Large fms, continuous use, 7 " "

BR project rate 2½ " "

[to wd. make Tracy opn less than ½ of well pumpg, e.g.]

365. BR figured all lands under 750' as irrigable. (so elevation is no problem **in Kern area. Can go way** up above 600'.) p. 973

Also find good lands higher. Limiting factor is liftg wtr, not land or climate. Wheeler Ridge area, above 750', thermal belt for citrus & winter veg. SA Kerr

366. p. 973, SA Kern. KCLC has 181,320 acres irrigable land below 750' contour cd be served CVP? + ~~[illegible]~~ 61,480 acres poor quality, but some of kind that cd be reclaimed.

367. Krug, pp. 1004 ff., falls back on Lvt. Cannot stop excess owners benefiting, but can tax them. Forces Downey to reverse self & claim benefits cannot be established!!

368. Evidence that import wtr improves allocn of local wtr. LSID vs. TID settled on assn wtr contg.

Lower Tule R, pumpg wells to export wtr. (Being at bottom, probly cd say weren't hurtg anyone) settlement based on antic. CVP wtr. p. 1054

369. p. 1275. Clifford E. Fix, Chief Counsel, BR.

Cites ltr of April 30, 1947 to H. Barnes. BR oks recharging ground wtr from which excess owner may benefit. This jikes w. Krug statements earlier. Krug said they wd not bother w. offset wells, rely on assessments. This conflicted w. Kerr & Gardner testimony however, they wd use offset wells.

My criticism of BR re ground wtr falls if they do not try to enforce limitation on it. But their policy seems vacillating.

370. a. ~~Cite~~. Cite claims wtr rts of sale

b. Establish they aren't

c. ~~Find~~ Specify obstacles.

371. To sell is to admit you have surplus?

This didn't stop MWC shares from moving. But individuals did sell whole thing, i.e. dried up their complete acreages. So this may still be an obstacle.

372. "Correlative rts" suggests all subject to same standard. Viva!

But LS not applied; more in jr vs sr quality.

373. If wtr cost more, farms wd. use less per acre., but irrig oftener — & more at critical times, i.e. w. more careful timing. They wd. spend more time irrtg.

A frequency wd. reduce peak demands on system. This wd tend to offset A peaking requirements of demand system.

Tucson, 91 - 92

374. Wm H. Hall says newly ind. lands need more wtr in first yrs. than later. If so, adds to cycle.

375. As early as 1880, Hall stressed damage of applyg wtr to lowlands w. drainage problems, bcs easier to get wtr there. Preferred hi canals, areas of good drainage. p. 122, 101, etc. Gurly, excoriated early wasteful practices in this area, which TID vs. LSID upheld.

376. Comg of wtr forces or induces many districts to go into debt — to claim wtr. Go ahead sooner than wd. otherwise. Effect of FK canal? Effect on whole State, re C.W.P.

In '20s, SSJID overexpanded to nail down wtr. Oakdale formed to claim its share. Bell 2 p. 69-71

377. Bell 2, Adams, p. 88. Tulare I.D. "... the use of wtr is very uniform & gnrly wasteful."

p. 89, Local landowners not much interest in system.

It wd be hard to find a more stirkg contrast than this vs. LSID.

378. Davis - Grunsky Act is new, 1959.

379. Sloppy instns. devd when wtr not worth much. Now it is, ancient sloppiness is hallowed.

380. Those under greater pressure to get wtr, go to greater expense, forced tax land heavily, get intensive devmt. LS. Hence demand of high mtn develops farther from source.

381. Sec. 22259, WCode, authorizes sale of wtr -- the corpus. But 22260 says by I.D.s. not for over 3 yrs. And 22261: "Nothing in this article authorizes the sale of any wtr rt." By I.D.s. Pretty potent! Ties up all wtr held by I.D.s.

~~384~~.

381 (cont)

22262 "No right in any wtr or wtr rt owned by the dist. shall be acquired by use permitted under this article."

"This article" is Art. 2, Wtr Distribution, of Chap. 2, Powers, of Part 5, Powers & Purposes, of Division 11, W.D.s, of Wtr Code. It is the controlling article on this subject.

Chap. 3, Property, Art. 4, Disposition of Propty. See 22500, let ID sell surplus property.

But Wtr rts are not mentioned as property in 22425 of Art. 1, Acquisition of Property. Other hand, is no separate authority to acquire wtr rts.

20529, definitions: "'Property'" except in Part 10 (assessments) ~~includes~~ embraces all real & personal property, including water, water rights, works, franchises, concessions, & rights."

Leaving ambiguity.

Fred Mann checking on it.

382. Restrictions to wtr export needn't worry about establishment of vested rts to return flows. No riparian rts can be est. in them. And appro. rts are subject to breakage whenever importer chooses to change use. Stevens v. Oakdale ID, 13 Cal 2d 349 (1939)

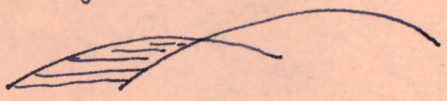
383. Jim Lugg says Tulare L. very good soil. (But their wtr table is higher than many other areas. Why not pump them more than they do?)

384. Law evolves. One never knows when court may fall back on prorate principle. Pasadena vs. Alhambra, 1949. So regardless of what law appears to be today, WASTE!

385. Rather than show how system Δs Σ variability, one ed. show how it Δs storage required to regulate. Etch did this on Kings, PD, LCO, Lemoore.

How wd or might this Δ storage required? Cdn't release wtr when demanded sometimes bcs no one had a right? But wd have to change that or have no storage anyway.

Still, w. some jrs., wd Δ uncertainty. bcs if natural right came late, & wanted early, wdn't know if cd. have it or not. Thus early releases wd have to be held back in March-May, thus Δg storage required.



Srs. get steady supply. Storage is only for jrs. But some jrs. have rts. only once in 3-4 yrs. Just have to leave them out, no benefits.

Can this be strengthened?

386. Law makes of every ~~little~~ individ a potential little Gromyko w. full veto power. Liberum veto. Requires unanimity.

387. S.F. & L.A. showed ~~if~~ a city can buy wtr rts & ~~[illegible]~~ "export" wtr. Did they have to throw around munic. pref.? Cd. they do it today?

Today, export from Trib. wd. mean suit by all downstream interests claiming impairment from Δ salinity. Cty & watshed of origin wd. block --- laws passed after S.F. went to Trial.

388. Can't buy w'r's b'cs don't know what you're buy'g. ~~All streams~~ Few or no streams fully adjudicated.

When adjudication came, sale wd. be a very weakening argument.

389. ID becomes owner all, state w'r's in it. Meaning what? That wd be hard to x'fer.

390. Buy'g & sell'g w'r's in early days ok, b'cs w'r cheap, no pressure. And probly sold all.

But today, if sold part of a r't., as surplus, others on stream wd protest, they had first crack at it, is open to approp'n, is surplus. Also washed of origin law, custom, & prejudice. Esp. since all streams over-approp.

LS wd have run into this diff if had bought whole w'r's.

391. Cycle. Full devm't of Kwh apex wd. have met demand. But as was, LS, TB, Buros, Vandalia came on,

Lindsay was orig'ly "close-in". Xptn was a factor. Now, fancy hiways all over, & w'r supply. Opens up enormous area.

392. LS not only ave. small acreages, but very low concn. File f 4c

Moral of LS: Cheap w'r doesn't mean intensive devm't, nor convers'n.

Spur of heavy charges nec. for full devm't.

393. W'r's so hard to define, has made it impossible for Kwh people come together to form Kwh ID, rationalize.

394. 1958 BR crop rpt shows 40 a citrus in Rag Gulch WD, just south-east of Delano-Earlimart in Kern Cty, & just s. from Ducor. Moral: all of southeast Tulare Cty bench is irrigable. BLE map shows proposed highline canal serving it.

395. Gross output per irrd acre, from line 48, BR Crop Prodn rpt

TB	$743
Exeter	649
LS	624
Ivanho	572
Rag Gulch	517
Lindmore	453
Orange Cove	409
Porville	292
S. Conall	271
Madera	267
TID	233
LTRID	216
LC DCo.	170
THBWSD	117

1958

For one yr. only, ~~detailed~~ close from questionable

But why is Exeter so good, vs. LS? Pressure from deep pumping?

It is more in grapes. they may have had an esp good price. Also, LS had much underd. land bec had no wtr for it 'til '52, Exeter had wells.

Exeter, Lindsay -- call it the "South shoulder" area. Clearly needed wtr. Costly pumping. Higher gross. Homes. Fixed improvements.

396. overdrafts by areas. BAE p. 113

397. alf. pays $7.50 – 10.50/af for wtr in Antelope V. — Bechtel Rpt on FRP, 1955, p. 7

398. Anti-BR & FRP people wrong in one respect, they take costs of wtr to existing cos. and reason as tho this typical of area. Fool selves w. their propensity to assume perfect mkts.

Willingness & ability of many firms to pay hi prices for wtr clearly shown by ~~the~~ deep pump lifts.

The low costs simply show poor wtr mkt, ec. rent not included.

398 (cont.)

And in a highly localized "mkt", e.g. PDCo, wtr can't be exported to areas of really hi demand, x/brs occur at lower prices.

So is wide potential demand for BR wtr. They are coming in way below mkt.

But by coming in at such low price they are not nec'ly hastening demand.

Benefit capd into l.v. spec'n.

399. Nonsense in BR idea of spec'n shown. 160 a. law doesn't hasten settlement. Cheap wtr retards it.

398 (resumed)

Some well depths:

Maricopa - Wheeler Ridge — 400' lifts } Bechtel p. 27 etc. 1955

W. side Fresno Cty ——— 423'

Semitropic ——— 200'

Dr Giorgio (s322)

So can sell dear wtr all right.

Problem is bringg too much. Big works outstrip land devmt. Lack of settlers w. cap. to dev. lands; lack of mkts for produce of lands. If they'd built PF, Terminus, Success, Isabella first, FK need never have come. Etc. If FK lands had devd, wd. be clear limits were reached. Now look.

400. Brand new IDs may come on faster, due to hi cost of distr. works, built new. LS & TB will come on slower — but they'll come.

401. BR design to serve Valley lands, thus free wtr for foothill lands

CV Basin p.104

Evidently contracting didn't work out so. No downstream stg hv. been released to my knowledge.

402. Plate 5, p.104, CV Basin, depths to gnd wtr. Shows Kwh wtr goes where plenty gnd wtr.

403. Kings R. & SJ have better storage sites, but also more cyclical stability: ?

Data: CVB p.100

River	ave. annual runoff (wtr yr) 1928-33	1904-43	1928-33 / 1904-43
Kwh	240	420	.57
Tule	55	140	.39
Kings	1,010	1,720	.59
SJ	1,060	1820	.58
Kern	370	760	.49

No, Kwh. ranks high on this. Tule & Kern need help. Kern cd. help Kwh. seasonally; Kwh helps Kern, cyclically.

404. Lakeside D. not only could get Kings R wtr: it is inside KCWD, is getting Kings R gnd wtr.

405. FIR etc. misnamed comprehensive devmt. Is integration of peripheries.

406. Analogy: Menagerie of lions in ill-fitting cages, snarling at each other. No one dares change lower bars to change cages, wd. jump on each other.

407. Terminus capac. 145,000 af. Elev., 555' – 690'. (Streambed, 510')
Success " 115,000 af " 593' – 660'

CVB, p. 132, contemplates exchanges at Kings, Kern, & Tule. All Success wtr wd. be moved so. in hi-line canal, above 7K.

All subject to approval of vested interests.

Here is the ultimate perversity of system. Even when U.S. supplied all the capital, recrs & aqueducts, system didn't let wtr move to hi MP.

408. TID's need for surface wtr shown by her contract w. BR: mostly cl. II wtr. Foothill areas take almost all Cl. I: LS, OC, SC, TD.
TID's need for late summer wtr thus shown to be small. She has wells
Tag charts show no expansion of ird acres. Constant c. 62,000
This is no A over the 67,000 net ird acres of Bull 49-B, 1955
~~Both~~ In some over 58,000 net ird acres, Bull 49-A, 1950, but that
reps. inclusion of Packwood C.C. 5,000 a. ird in 1950, & 15,000 gross area.
1940, TID was 33,500 a gross, & 19,000 ird. I.e., annexed much land, 1940-50, & then Packwood besides.

409. Proposal to move Kern so. by hi line has good backing
Bull 4, f. p. 46. Bull 9, maintain Bull + Plan, f. p. 10
CVB
although

410. "Relieving Tulare City" was what started whole thing. Bull 9, 1925, p. 7
Set out to relieve Tulare City, inspired comprehensive plan, ended in welding peripheries. Such for flimsy results from inability to rationalize wtr in one area.

411. Irrigation Efficiencies, from Wm. Horn, background for Bull 2:

Eff ≡ Consumptive Use ÷ Diversion.

ave. of yearly figures (simple), 1944-50

	Alpaugh	.86
	Consolidated	.73
	Fresno	.76
?	Kings R. Delta	.42
	Laguna	.67
	Riverdale	.54
	Stratford	.67
	TB	.65
	Tulare	.39
	BV WSD	.59
	Empire W. Side	.51
Check these.	LS	.87 (1944, computed)

412. Tulare L. is 100% impervious, is no recharge from w to applied there. All their pumping sucks up w to applied elsewhere.

413. Lesson of Bull. 2 effic. studies.

Among their units, defined in fairly broad belts of latitude, small differences in irrn. effic.? No, large diffs, Merced-Stan.-SJ Cties are low.

But inside each belt there are big differences. So micro-shifts are potentially more productive than macro. To say nothing of lower costs.