

Wantrup

SCANNED

AS

FOUND

~~About FA~~
~~Being Right~~
~~after 5 at 12? No.~~

~~Manness watch flitting, J.~~
~~Burhardt case at lunch - talking for~~
~~granted.~~

Wentrop, 20 April.

If market for assets more perfect, internal i.r. world = mkt.
3 groups of assets:

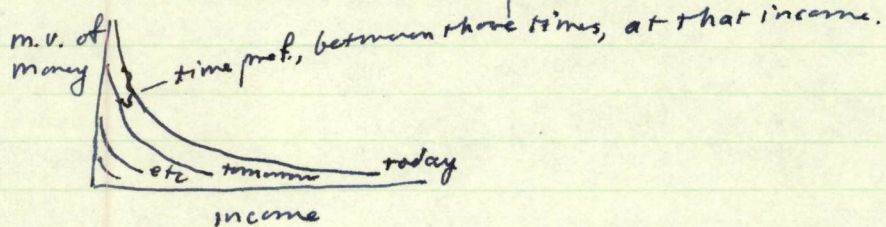
Physical assets
Money-claim assets
Individuals' skills

Markets for flow resources generally imperfect. Stock resources usually used by big scale co.s with fungible stocks on stock mkt, easy accessibility for loans, etc. So they use mkt rates for internal rates. — encourages consumption. Farmer, who cannot borrow or sell at mkt rates, if his time preference exceeds mkt, shifts revenues to present.

(Is it not just as possible he will have lower internal rate than mkt, or value assets lower than mkt?)

(Academic people are most mobile, have national, not local, interests, hence turn to fed. govt etc)

Different incomes have different time preferences.



As income increases, time pref. becomes smaller & smaller, lines getting closer, becoming asymptotic.

We can change time pref. rates, & resource utilization, by changing income. Changes of income affect utilization. Depression, causes depletion — mkt's being less perfect than. I wonder. Empirically true?

Farm Extension Agents suggest farmers figure at 5%, which is what fed. banks charge. because it lowers income, they raise it. But it might lower i.r. in other effects

2 types of ec. forces: a) regressive. Any income tax tends toward depletion. Any income increasing force can be regressive too — & increase income of lower income groups more

b) Fixity. Fixed charges important because of depression. Do not go down as income falls in depression. Cause depletion.

With these concepts he would analyze taxation & subsidies, etc.

If we tax farmer's land his income is lower, his time pref. higher, he is less likely to invest in farm? No, for we'll forgive old improvements taxes, income not lower; & incentive to invest greater

If depression does cause depl, as W. says, my arguments about resource tax as anti-cyclical are kaput. But in depl. i.r. lower, this discourages depletion. & lower income won't affect mining cos so much. W. is not here - if his argument were whole story, i.r. would rise in depl.

Apply to new countries. Cap. & asset mkt's very imperfect
there, incomes relatively low & volatile. High i.r.
? not wages. But low rent & int. incomes to resource owners.

Hence depletion.

fed hand Bork's etc

~~FCA~~ has done more than SCS in stopping depletion.

Wantrup. JFE, Feb 42, Private Ent. & Conserv.

I. Meaning of conserv.

'Planning pt'. Would take its midpoint, add up changes on either side, with or without weighting by distance from midpt, thus define cons., by 'comparing' D. different from class def.

Cons. has no connection with 'ultimate' cumulative use. (by his def. above it does. In fact, midpoint is irrelevant unless used as datum line for weighting). Well, it's relevant, for changes before it are in direction of ^{depletion} ~~conservation~~ & after it in direction of conserv. By this, effect on cumulative use is irrelevant, so def. of conserv.

But why define it at all? Silly. Just say what you mean.

Cons. & Depl. not syn. with inv & disinv. (certainly not as W. defines them!)

II Conservation in relation to maximizing net rev. over time.

Goal of use: to max. ~~net~~ present value of expected net revenues. Mentions some of considerations, like natural deterioration or growth, future use of present ~~the~~ extracting tools, etc etc.

Theory of joint production one way: rates of use in different instants are joint products. Can be compl, compet, indep, in revenue & cost.

I would put it differently: you produce as much as is worth the difference of production costs, value of both raw & product being det. by anticipations.

3 theoretical approaches in joint prod: mang prod, mc, & indiff. Indiff no good in time problems, for must analyze more than 2 instants simul. (? mang) & gets cumbersome.

Conservation becomes ec. as soon as costs of depletion appear.

III Factors affecting cons.

Decreased uncertainty of future causes conservation, & v. v.

Because if you are uncertain of future you postpone decisions about it, make flexible plans, & this costs something. When you become certain you dispense with this cost, (thus increasing present value of not expected revenues), so you comply to produce more in future. This is conserv. by his def. (even tho you may be producing more in present)

Very imperfect mkt for futures, & of resource securities, & it undervalues futures, so owners don't sell.

Fall of r causes cons. Each indiv. has a different r, & owners grow, due to imperfect mkt.

Uses time preference.

(W. is notable for using a very cumbersome apparatus to think &

concentrating on apparatus too much, rather than problems, & failing to communicate with anyone who doesn't use his apparatus.)

Credit rationing, monop. by money lenders, mean no one i.r. affects all. Indiv. resource owner may have higher time pref. than mkt, yet be unable to borrow, (hence depletion where 'unec'.)

But instead of depleting why can't he sell? (I say he could) He could, but if costs are high, so small divergences of his time pref. from mkt he takes up by depletion or conservation (or inv. in land)

Decreases in expected rate of inc. decrease individ time pref., (i.e. make people more willing to save. sounds wrong) (he evidently means opposite - cf. class notes)

Explains a paradox in resource utilization: Lower revenues, or higher costs, may cause more, rather than less, production, if changes in indiv. time preference are great enough to offset changes that would occur if mkt is more perfect (??) Fixed changes may cause 'uneconomic' depletion, when revenues fall. The future is drawn on, more, due to a lower time pref. Different from the present elasticity due to drawing on future. 94

So he thinks in Dep. i.r. falls, for individuals. I'm dubious. In depression they put off producing because they think resource will grow in value in future. Or because of fixed costs. - etc.

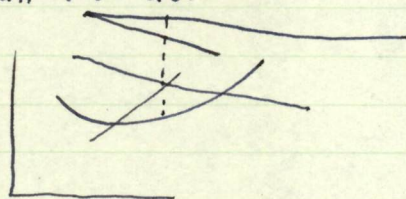
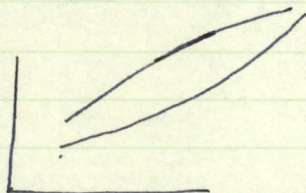
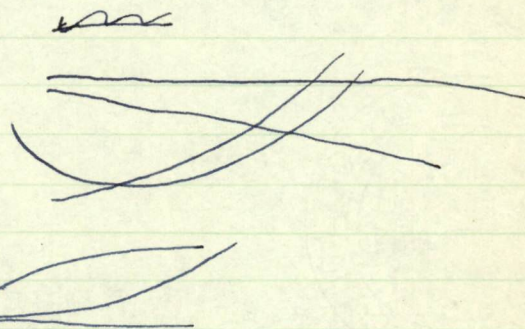
Wantsup, March 23. 2

He is ~~saying~~ ^{asking if} something use compl. to another instant in marg revenue, not total revenue.

If we have a discernible tendency, & can determine how representative it is, have a 'representative firm', & this dispenses of irrationality argument, Wantsup admires Marshall.

3. Discontinuities - he says no problem.

4. Indefiniteness of expectations. He really goes for this one. You don't know what future values will be. But he admits it might be (In 'Boom in Agric' or something, he predicts future.) just matter of det.



Likes to distinguish extra-market from market values, rather than pecuniary vs. non-pec., or tang. vs. intangible, because sometimes they do come on market & get objective values.

He doesn't understand what I ask him, therefore concludes I am dumb, & reacts accordingly. My questions are too difficult for him, he of course doesn't recognize it, they sound like confusions on a lower level to him, he casts them off - in his most arrogant manner.

Would amend max. with habit patterns, market patterns, etc.

Mr & mc not enough. By 'complementarity in revenue' does he mean some as he did before by 'compl. in demand'? If so, why not say so. If not, then mr isn't appropriate, for changes in quantity of output must be considered. - tr will change, tho mr doesn't. He may subsume this thru cost considerations, but if so it must be on a.c. basis, & that is insufficient, for we are interested in tc & tr, to maximize total profits.

~~Pay drive \$2.00~~
~~Wash sweater~~

Wantrup, 23 March.

~~The books~~

"It's seeping down"....

How are ~~different~~ uses of resource in different times related? As to comp & subst. Thru costs & revenues, in other times.

He always means marginal revenue. - or thinks he does.

He feels you must plan for future - I think often present use is only thought.

When you see some little flaw in his interpretation, or, more commonly, when he says his way is the only way when it isn't, forget it.

Relationships of uses in different times change as amounts of use change - in quantity & sometimes in sign.

Under pure comp., all ^{marginal} revenues are independent, in different times, since you don't flood the market. (so when he says revenue he means price. & all changes of product, gross, he calls changes of cost. - he probably shouldn't, but it doesn't matter)

'Market form', e.g. monop. or comp., affects opt. state of conservation to individual firm. (world monop. offset itself, because it values resource higher in future, also higher now? Hardly.)

In pure comp. you don't affect your marg. revenues, by output. So one instant can only affect another thru costs, not revenues. / question: we are interested in total revenue, not marginal. Or if we are interested in marginal, it is due to the change in quantity, not price.

So 2 instants may be related only thru costs, in ^{pure} comp. (he means cost per unit output, probly - in this way can ignore the change in revenue, by subsuming it in costs)

Costs for durable capital are complementary in time. Costs for taking out stock resource are competitive. (in a sense it is just barbackwards)

Textbook def. of opt. state of conservation: Maximize profits. Translate into 'our time ec.', must discount future net revenues by i.r.

Weaknesses of maximization of profits: 1. We don't necessarily mean pecuniary.

2. Don't know how to max. profits. - but subjectively he is maximizing.
~~for~~ Irrationality. But W. says is irrel.

Let's be sensible. Don't get mad at the old bastard. Object is to get a grade. So stop picking flaws in his arguments. Say what you think he wants said. — & nothing else. You don't learn anything by showing him things he doesn't understand, because he doesn't follow, & just sounds off. & you don't gain in prestige. So turn sycophant — that's what he wants.

↗ dubious MM Idle stock resources are ec. waste too because compl. to flow resources. — like labor. But labor could be used elsewhere — less effectively.

Never ask him a question unless you know the answer.

Pindhot, How consrv. began in U.S.

Cons. developed from forestry, is application of forester's attitude. bs
Indians used conservation, not killing more game than annual growth.
Colonists came with consrv. ideas from Eng, changed quickly, forests a
menace.

Has attitude that it was bad to destroy forests, profit motive to blame, &
present improvements due to reduction of profit motive bs.

(Man should manage land, for pleasure as well as profit. The fetish of
keeping things virgin is only partly applicable, - a few museums are nice.)

A confused, emotional man. But correctly criticizes mangness of
giving to big interests. Thinks he started cons. movement by
uniting other conservationists to foresters.

~~Soltes - Forest Service?~~

Wentrop had Rochester travelling fellowship. That would be nice
~~Bring typewriter home.~~

Multiple & optimum use of wild land under different ec. conditions - Wentrop, 1938

Multiple use to some means multiple administration on different areas by a single agency. But should mean the obvious.

Grazing & lumbering admitted in nat forests from start.

Eur. grazing etc use of forests prevented lumber (& hunting) use. Lands for lumber & hunting vs peasants was thru Eur. hist. Today timber dominant use. In parts of Eur hunting use causes damage by animals who are stocked, or would, if govt didn't prevent, & they charge hunters for this. Watershed protection emphasized.

4 uses: lumber, grazing, watershed, recreation.

Beef consumption in U.S. has fallen from 67 lbs/cap in 1914 - to 50 in 1935.
~~Range~~ Grazing declining because of competing uses & cambelt competition. & it persists in part by getting near-free use of public land that would probably be better used for something else. Mining of leased & deeded (where owner is eq. is small) land another way.

'Marketing costs' stay fixed in depression.

The Nat. Forest Service income from grazing is 1.6 m \$/yr, 1925-9, while costs of reg. grazing were 1.4. Price charged is way below competitive, is a subsidy. Range is also being mined, has lost c. $\frac{1}{2}$ its potentiality in last 50 yrs.

Privately owned range units are valued by owners not just for m. income, but residential, & labor commitments. This raises land values.

(Principle that you should bid for grazing permits is just another example of general principle you should bid for scarce unproduced items. Like water, sites, licenses (where restriction required - drivers licenses a good idea :), stock in nation monops. Only This is more perfect than sites, for perfect mkt. exists, & no imprudent complications.

Watershed & recreation uses, ~~and~~ & agric., are restricting grazing.

Grazing will go, ultimately, other uses better.

1925-9, annual timber drain = 2 x growth. But abnormal construction period. Lumber cons. at peak, 1900-10, decreased rapidly, is now (1938?) $\frac{1}{4}$ peak. (means nothing, cycle involved). Construction the most important decline, rural esp. Use of veneers & cellulose economizes lumber.

We have plenty annual growth, for antic. needs, balance will come soon. 350 m acres, of which only 50 m need be intensively managed in Eur. sense, will do.

Multiphe & apt wildland use, 2

But expects a temporary shortage when present virgin supplies gone in 15-20 yrs & before present young growth, which is in critical need, is ready. Suggests timing nat. forest cutting to fill this gap. Must nat. forest trees overmature, tho.

Young vigorously growing forests can be recreational too, & are better for wildlife.

Management is not economic here yet.

? — Thinks oil gas & coal will be exhausted 'in not too far distant future'. b.s.
To get city political support for conservation would put more roads in woods.

Many Eur. resorts are under govt management, most under regul., people satisfied.

Get G.I. list books.

Womtrup, 16 Feb

1st 2 months, develop concepts.

What are goals of individual resource owners.

What are social goals. What conflicts, with private goals.

Wants to apply to water in Calif.

No exam. Discussion & paper give grade. 612-70

Ch. 17, Conservation of Land Resources, in Renne, Land Ec. 1 copy in Gi.
1 copy on RSR

& Soil Conserv. in Eur Farm Management

vol 20, #1, Feb 1938, Journal of farm Ec., p 86-101

& QJE Feb '44, Taxation & the conserv. of resources, 1st 3 sections,
p. 157-170

Have questions on contradictions in Renne, etc.

In Giannini Lib, 2 reprints & orig.

Gen. info, nothing for article

Renne, Land Ec.

Ch. 17, Conservation of land resources.

Lag of education prime cause of waste.

Southern Appalachians, China, N Africa, Asia Minor, great erosion.

Eng. exhausted cu, pb, sn & coal & Fe in 19th.

Fund, flow, & biologic resources.

Recommends monop. control to conserve fund resources. v. Hotelling, JPE. Apr '31.

Biologic, conservation means maintenance of present rate of productivity. (Wantrup would bridle)

TR withdrew 234 acres in admin.

1920, govt passed leasing Act, coal, oil, gas, shale, phosphorus, sodium on public domain leased, not sold.

Renne has attitude that conservation is desirable per se & ec. motives to contrary are pernicious. Doesn't see that they determine best rate of utilization.

What one can spend to conserve det. by present value of anticipated return. i.r. therefore involved.

Land utilization is governed by "Principle of optimum intensity": where value of marginal unit of input into land equals marginal output. (considering interest & everything I presume).

Well, he does say that conservation would not be socially desirable if the factors required for it were more productive in alternative uses. But he has some confused doubts on it, 622.

Gunnar Lange stresses cases where private motives not compatible with social. Bunce & Wilcox reply weakly. Renne doesn't think ec. considerations cover it.

& social time preference differs from individual, since society exists forever. (but today society consists of today's individuals. & if we leave our descendants more capital than we got, they can't complain) And agrees with Lange that differences of individual preferences are not reconciled by ec. But is vague about all.

Thinks society can predict future better than individuals. Doesn't say who society is.

Society's ~~ex/ps~~ values differ from individuals because: benefits differ; capital losses & gains not all considered by individual; costs differ.

Putting unemployed to work he represents as something of no social cost. (doesn't consider leisure's value) (But is a good point - they might as well invest in land conservation as do nothing)

Corporations live forever, gives different attitude. (hardly). Except it does, because property rights more easily transferable. (so old person can sell stock & consume something else, not the particular land he owns). Corp. borrows cheaper. Monopolizes. Mange better.

Emphasizes that sticky prices, spec. land prices, etc, prevent calculations according to ec. theory, but I can't see it.

Fertility depletion is reducing fertility ec-ly; deterioration is miscalculation & ignorance, losing potentialities. (letting land go to those who bid most for it prevents this) ^{erosion more, as vs. use.}

Thinks society in past could have foreseen that land practices then miscalculated the future. (I'm not sure they did)

"Just because something doesn't pay doesn't mean it shouldn't be done if society wants it." doesn't consider that if society wanted it it would pay. Except there is a difference between society as govt & society as the mkt, & the eternal battle is, which should direct production.

(There is a strange system in society whereby those who want to tell people how they should run their lives go into teaching & social work etc & make less than they could elsewhere in return for this pleasure.

While the others go out and make money and run things to suit themselves, fighting govt when it represents teachers etc at every step.

Social action for conservation desirable when it is social ec. to conserve but individuals don't. But doesn't say when this is. Gives list of things that people would have if they would pay for them, like roadside parks, calls them non-ec. objectives, wants society to furnish them. Billboards I wonder about. If people really preferred scenery to billboards wouldn't they refuse to buy the products advertised thus? *Not nec. It would be legit. to limit this use of roadside, for it blocks scenery, & is driving hazard.*

— Tax reverted lands often without any management, are overgrazed etc.

Wants public ownership where private motives do not cause conservation. Or subsidies for conservation. No analysis of why.

Ag. land is fund, flow, & biological.

✓ Grasses like wheat are better for land than forest plants. When man changes forest to crop he often improves soil, forests are so bad for it. (yet dolts would have had us leave all the east under forests!)

Erosion & crop removal cause greatest losses. Leaching & volatilization less. (forgets salting, dehydrating, overhydrating, etc)

Phosphorus, calcium, nitrogen, potassium, the keys, esp. phosphorus because most lost in erosion, most limited in nature, needed for legumes.

? Erosion each year removes 60 times as much plant food as is returned by commercial fertilizer.

I should like to hear Wantrup's explanation of why this unchecked erosion is ec'ly advantageous to individuals.

✓ Many say, in view of prospective markets for Am. agr, conservation would be a waste of resources.

Finally gets around to mentioning only argument in his bag that really is any good, but it doesn't carry the weight he gives it: prevent erosion to stop floods, preserve wildlife, scenery.

| Causes of poor conservation: farms too small; owner-tenant relations; inadequate farm income; farm debt (farmer with mortgaged land knowing he will lose it will natch mine it as much as possible, before bank gets it); taxation.

He would subsidize; stabilize farm income; shift pop & farm size.

| SCS, est 1935: demonstrates & educates; buys & manages submarg. land; protects watersheds; constructs water storage facilities for ranchers (how nice for the ranchers); gives tree seedlings to farmers, & advises them on them; helps irrigation.

✓ Nearly all states have passed soil cons. district laws, these cooperate locally & have law making power. 25 "land occupiers" must petition. Have authority to engage in coop. action vs erosion, & voting land use regulations for district. Have power to levy taxes & issue bonds, save in Colo, where they make special assessments on lands. They may make erosion control projects, lend or give to farmers, buy land to retire it, etc.

Grazing districts in west under Taylor Act. Sec Int creates districts on public land, in 11 western states & N & SDak. Permit system for grazing. Preference to adjacent landowners & customary users. Nontransferable revocable 10 year permits. Non-fed lands can also be organized into grazing districts, & some have been.

State Grazing Districts too, legisl. enables people to form coop ventures to administer land in common. "Collective tenure devices" (like IDs & water) These thrive where private ownerships checkerboarded around; Taylor districts where public lands dominate.

Renne, 3

Voluntary membership, restricted to livestock operators, characterizes all state Grazing District laws. Differs from SCD, where all have to become members.

Weed control districts. If 51% owners file consent. Then can invade land of non-compliers, destroy his weeds, charge him for it.

(Good idea. They have same deal in erosion districts. Why? Does erosion from one man's farm hurt his neighbor? Evidently so.)

655

Investors turning in back to themselves, develop this concept. Give this illustration, & wear band illustrations.
Depletion & inv., & gross inv., etc. Depleting a resource is consumption, employs people.

Womtrp, March 4

ass. Private enterprise & cons, JFE, vol 24 #1, Feb '42, Womtrp.

Come & see him on research projects.

Resource is measured in physical units, but appraised by planning agent in other terms.

we identify ourselves with appraiser, his appraisal, not of how much its market value will be, but what physical quantity will be.
Ex ante & ex post appraisals. how much physical quantity actually was there.

Cumulative use is stream of use over time. a function of time. From it, get average rate of use, & instantaneous rate (i.e. in one year, or day)

The very small time interval will be one over which rate of use doesn't change, or only changes in regular cycle (as diurnal)

General ec. is instantaneous, how to distribute resources among various uses at one time; conservation studies distribution over time.

Relations of different resources, instantaneously:

A 'secondary' resource is one that feeds on or depends on a 'primary' resource, as beef depends on grass, stream flow on watershed. But a poor distinction, for all resources depend on something else.

Herb's — Might write thesis under Womtrp. on inv. & match resources.

Complementarity & competitiveness of resources, & of rates of use of resources. In demand, & in supply. e.g., an acre used for lumber does not compete with demand for grazing, but does compete with supply. (is joint product an adequate def of compl. in supply?) except as all demands are competitive over

Times, too, may be competitive or compl.

Says demand curve is m.r. curve, so supply & a supply curve is a marg. social cost curve.

Must measure compl. & competitiveness for the marginal unit only. So comp & compet. are defined in terms of mr & mc. Because we must measure these concepts at definite stages.

We will assume this

What I think of as demand compem. is compl. indemand, ~~in a~~
as iron ore & coal are compl. indemand.

Defines conservation in terms of distrib. of use rates, over time. In movement
of use rates.

We have ex ante & ex post cons. & depl, - what planner intended, & what he did.

? If we increase rates past t_4 , leaving t_0-3 untouched, this is
a movement toward conservation.

Then we must have quantitative measurement of how much we
plan to change rate, & also use time from present as a lever arm. But
how?

x means rate of use.

x_0	x_1	x_n	x_2	x_4
t_0	t_1	t_2	t_3	t_4

We multiply proposed changes in x by number of years.

$$\Delta x + 2\Delta x_2 + 3\Delta x_3 + \dots + n\Delta x_n$$

If it is +, we have conserr. & - if depletion.

I say current rates are unduly neglected, distant ones unduly
weighted.

It is a greater effort to keep resources unused for 2 years than
1, & this why he weights.

Should we weight with the i.r.? $1.05\Delta x_1, 1.07\Delta x_2, \text{ etc?}$

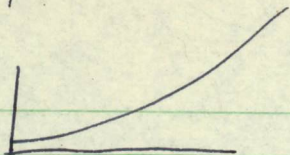
He chooses this system for lack of any other. But agrees that
importance doesn't grow as fast as first power of time.

It really isn't 'just arbitrary numbers'. It implies a very
definite relationship of relative importance of t_s - in fact what is
its whole purpose.

I think there should be no weighting. We want to know if the
net effect of the change in plans is conservationist or depletionist. This just
means, over the period, will the cumulative use be more or less. Then we might
analyze further, & declare one change more ~~conserr.~~ than another if, while
having same net cumulative effect, it delayed ~~production~~ longer.

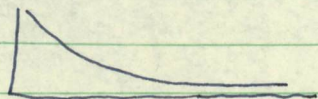
Wamong, March 4, p. 2

t.e. This



is a more conservationist policy than

this:



altho cumulative use is same.

We could take the length of time 1 was more conserv. than 2, & multiply time by amount, & get a meaningful index. But I see little use for it.

Wantrup

248 next time.

~~Census, 1940, long. of Ag Lands, HA~~

201
1940
78

Long time shifts in human & natural resources, Brandt, Karl, 3 copies in G.

G. Pinchot, How Conserv. Began in U.S., Ag Hist v. 11 #4 Oct '77, pp. 255-265

Wantrup, Multiple & Opt. Use of Wild Land Under different ec. conditions, Jnl of Forestry, July '38, pp. 665-674, & reprints in G.

To speak of resources must imply person who appraises them. Call him 'planning agent' - the market, or entrepreneurs, etc. Also imply knowledge & institutions of planning agent, & objectives.
(Why then talk of conserv. in terms of physical, not value terms?)

Natural, human, & cultural resources, usually distinguished. (so they distinguish land here)

Exhaustible vs. inexhaustible only has meaning in ec. terms. Inex. is when ec. conditions are such that use continues indefinitely; & v.v. But the terms are tinged with connotations of mineral vs biological, & this is wrong, so drop terms, use stock or non renewable vs flow or renewable. Not parallel, for many renewable resources have been exhausted, & all are exhaustible. But ^{forest e.g.} is a flow resource. Flow refers to potentiality, not actuality.

Some stock resources change without use. Natch gas. Oxidizing metals.

Military stockpiling, great problems of deterioration.

Great Plains, ~~the~~ high % pumping comes from wind.

Flow resource not nec. living, but many think it is.

Sometimes use affects flow, sometimes not. Of those affected, some are led to a 'critical zone' i.e. a point at which the effect on the flow is not reversible. - as when last passenger pigeon dies, or when you get down to where the few left will die out, or are in danger of it.

Sites are flow resource, which is affected by use, but not ever in danger of extinction, harm done is ~~irreversible~~.

Flow resources $\left\{ \begin{array}{l} \text{affected by use} \\ \text{not} \end{array} \right. \rightarrow \left\{ \begin{array}{l} \text{critical zone} \\ \text{no critical zone} \end{array} \right.$

Capital is a flow resource, affected by use, no critical zone.

Subgroup resources on physical basis; distinguish them from non-match resources on ec. or value basis.

Many economists make the mistake of considering land a constant. Wm. Vogt, 2.4 acres per person, bad example, but he's not an economist. 'neo-Malthusians. says we must have this much.

Ash W. to put something on Gl list.

~~E. to Ashy Sat.~~

Wamtrap, March 10.

Renne is one textbook that sees there is some ec. issue involved, at all.

He has changed def. since article on private int. & cons. With present def., sustained yield changes are conservation changes, with old they wouldn't be. & which level of sustained yield you pick should be considered.

Math. app. to taxation article explains weighting.

His 'instants' are periods in which rate can be considered constant, such as a year for farming, because there is only one rate over that time. A 'production period', or 'planning interval'. Not planning period, that's forever, or as long as person looks forward.

Hicks uses 'week' for this. Deals with time ec. some, W. recommends.

Planning period is not infinite, is limited by end of ~~expectations~~ certainty. (Note my old error in thinking deathless corps should handle forests. Individuals want to keep up values, can sell & consume any time.)

(seems to me you could define ~~cons~~ depletion as just net inv. situation, rather than in terms of ~~rate~~ ~~of~~ change of plans. & now he has taken our name for this, ~~but~~ we must have a new name for, say, draining an oil well. - He calls it utilization.

Conservation ex ante, refers to trying to influence plans of private people to determine cons. Ex post, just study what happens in past. - still, presumably, working on ~~rate of~~ change of plans.

??
If sum of changes in use rates is plus, he calls it conservation, I would have said depletion. Maybe this explains weighting. Changed pattern of use rates. If so, he would be trying to abstract from absolute change, just get change of pattern.

? -
If we change rates, for 10 yrs, + 10 each year, ~~would~~ he would call it conservation, I say depletion. Maybe we have to figure in implied changes in future uses.

You weight future because by cons. you mean shifting rates of use into future.

Wantrup's definition of conservation, or rather of a shift towards or away from conservation in plans.

It can't apply to flow resources meaningfully, I say, but only to resources that are reduced by use.

Now I agree that to put uses more into future is shift toward conservation. But I disagree that a shift toward future between two years 100 yrs in future is 100 times more important than a shift right now.

I would further say that the important question is what you do right now, not what your plans are, for they are vague anyway. Faster use now is depletion, slower use conservation.

W. says any faster use now implies slower use in future, is therefore depletion. If his weighted changes add up to more than zero, this shows use has shifted to future, is conservation; & v.v. Is this precise? It is only correct at all if cumulative use is same.--otherwise they might be all plus, & he would call it conservation.

How should a shift to future be expressed? He's getting it mixed up somehow with changes in total cumulative use. But he shouldn't if he wants to ~~def~~ justify his formula, as he must, with argument that increases now imply decreases later, for then he is talking of situation where no cumulative change is possible.

So now we have a given resource, and a variable number of years over which to exhaust it. I should say that all changes were conservationist in the planning period if you have more left over at the end than ~~at the end of the original plan~~ original plan called for. -- at end of planning period. End of original planning period, that is. In fact, let's say changes are conservationist which increase length of planning period as defined -- it being defined as period in which it is economic to extract resource. -- the elaborations would be nice, to express use pattern in intervening years, too.

He says of flow resources that change in use is conservationist if it increases, right along the line. I don't think term should be applied to such resources but if it is, certainly not this way.

It works out better with a limited resource to say a plus sum means conservation, for in this case a plus sum means a shifting of use to the future. -- not a greater cumulative use, nec, might even be smaller. Due to weighting.

But I think the weighting is clumsily done. ~~Suppose~~ So it gives no precise answer ever, and wrong ones sometimes. Suppose all production of year 1 is shifted to year 2; and all year 10 to year 9. All being equal to start with. Make that 2 to 1, & 9 to 10, to prevent shortening period. Common sense tells us that, ~~the depletionist~~ the depletionist shift of 2 to 1 is offset by the conservationist shift of 9 to 10, so net time pattern is neutral change. Wantrup would have plus one minus two, or minus one; offset by minus nine plus 10, or plus one. Which works. Hmm.

Def. makes sense when is not possible to change cumulative use within planning pd. Then it applies only to changes in time distribution of using extracting a limited stock. But once relax this assumption, & def. works backwards in part, for increases do not imply subsequent decreases.

Go back to doc. room.

Wantrup. 16 March

Suggests Math appendix to 'Taxation & conservation', QJ Feb '44, & comments in G.L.
Ec. of joint costs in ag, JFE, v 23 # 4, Nov '41. Time ec. can
be treated with same tools as joint production

Measurement of cons. & depl. not affected by changes in price. (how about changes in real appraisal of resource by planning agent?) So if price changes in process of utilizing, doesn't affect def.

Importance of this: money veil keeps govt. from realizing that physical output is falling, if price rises as physical output falls. With resources with critical zone, may prevent action.

Farms in U.S., because of rising food prices & lower costs, etc, people unaware of depletion, & that mentality deeply ingrained. Mine land, then still sell it for more than paid for it, because of rising price of food. (did food price rise? Generally I suppose, esp. in m terms)

(I don't think people are so dumb, they probably made best adjustments to their situations)

2d adv.: def. applies to indiv. resources, not to composites. Soil is composite. We have had Δ yields from soil by improving many elements of production, despite depletion of many elements. & our stat. are misleading because we get ~~increase~~ drop soil from lists when no longer used.

Inv. & disinv. refer to values; & refer to complexes of resources. Not same as cons. & depl. (esp. as he defines them!)

~~But~~ If lumber co. invests in equipment, this may result in depl. Or if new operator 'invests in timber', has nothing to do with cons & depl. (how childish. He avoids question, which is relation of depl. & cons. & themselves to inv.) Changes in cap. value irrelevant too. (using coal is disinv., I say)
Inv & disinv. 'aren't nec.' cons & depl.

'Opt. state of cons.' (his def. here fails to focus on determinants of present use rate, which is what my relative value considerations determine)

Shifting use between time instants may involve an effort, but may not. But nec. a loss of present revenue for future.

Wentrop, 2, 16 March.

'Perfect knowledge' is nec. assumption. Means planning agent uses best knowledge available to the "social group" at the time. But he doesn't - we
'def?

have educational lags. Then it is possible to bring about conservation without costs, by education, (if it has that effect)
I doubt it.

In theory, cons. involves either inputs, or revenues foregone; but in practice, education does it too. (He neglects its cost, says not for entrepreneurial)
(How can educated man conserve without input or revenue foregone? Using techn. knowledge, increasing cumulative yield I guess.)

SCS forgets that better education doesn't nec. mean conservation, may mean depletion.

he doesn't count the farmer's education as an increased input. Has examples of contour plowing that doesn't cost any more, cover crops that bring same net revenue & build soil besides.

Conservation needn't mean having less now, just more in future. So with flow resources, anything that increases production at any time means conservation.

It would have been wasteful not to deplete virgin soils: wasteful of fertilizer, labor & cap. 'Waste' then means of all resources, as measured by value.

Is not concerned that stock resources will be depleted. Techn. development will take care. But flow resources with critical zones he worries about - wildlife, recreation, soil, forests, etc. Techn. development doesn't help them.

Oil co.s don't explore more than a few years ahead, for they must pay higher taxes once they have proven reserves. Just prove reserves far enough ahead for planning. (a form of land speculation, possible because prospecting is not part of assessment, is privately done. You could allow private prospecting too ----?).

Engineering mind ok for stock resources, not for flow, which are too complex.

Bennett, Brandt, represent eng. minds who think flow resources can be solved, too, that way. Need ec. & social solutions, too. (I say so do stock)

Wantap Taxation & conservation.

Investment & disinvestment are in value terms, ^{& refer to individual's property} depl. & conserv. in physical.

Conservation & depletion refer to changes in time pattern of use.

Goal: That distrib. of rate of use over time that maximizes present value of net revenues. (but only present rate is involved.) (& this depends on what planning authority itself does, e.g. taxes)

Δ taxes changes opt. state of conservation. (so he means just what is optimum given the present laws)



Petticoat Fever—These washable peppermint striped seer-sucker petticoats, available in red, green and blue stripes are being sold at South Hadley, Mass., by the Mount Holyoke college student MINT (Millions in No Time), for the college's \$2,000,000 fund drive. The slogan is "Profits from Petticoats." Modeling them are, left to right, Gina Merriam, Mountain Lakes, N. J.; Kristine Stevens Chicago, and Elizabeth Flager, Stroudsburg, Pa.

HERE ARE SOME PERTINENT PETTICOAT POINTERS:

Two on a match—With the leftover scraps of fabric, after you've



made your checked, plain or plaid taffeta petticoat, make a long narrow Gibson Girl scarf and tie it under your blouse collar or around your hair in a big back bow.

It goes to show — The newest jewelry gadget is a Pet-

ticoat Clip and it's intended for petticoats that are too pretty to blush unseen. You slap the clip on your skirt, lifting it just a few inches from the hem at one point—

scenes like this. They are what make flying what it is. It's impossible to describe, but one seems to have hold of the pulse of the country. Those things make the uneconomical proposition that aircraft ownership is truly worthwhile. They are more than ample repayment for the hours and dollars spent in learning to fly.

Keep Wondering

In flying over the industrial east, you wonder how much land has been cleared; why some enterprising chap should have selected what appears to be an impenetrable woods to hack out a space for an humble home. The lanes, and even highways, must zig-zag about for some reason. In most cases, it's usually a matter of circumventing an obstacle nature placed in the way. Often, however, a road will just seem to meander across the countryside in graceful curves for no reason at all.

Looking down at the terrain spread out under you, resembling nothing as much as a gigantic map, gives a feeling of escape. You can't help but admire the industry of the people. Yet, you can't help but wonder where anyone is heading in the mad scramble for a soft buck.

Flying is wonderful stuff. It might not be a bad idea to get some of aviation's pessimists, and

Adopting a foster child through the foster parents' plan for war children is now one of the most popular projects in high schools throughout the country—also one of the most worthwhile. The usual custom is for an entire class to adopt the child and to collect clothing and food for the monthly packages which are sent out through the foster parents' plan. Writing letters to the foster child is an important part of the activity—and such a rewarding one, too. It's thrilling to receive letters in return, telling you how much your benefits are appreciated and needed.

If you belong to a club or sorority — why not adopt a foster child as a group? For full particulars, write to Foster Parents' Plan for War Children, Inc., 55 West 42nd St., New York 18, N. Y. Become foster parents to teenagers less fortunate than you are; teenagers who now bear the brunt of a war through which they lost their parents and their homes. It's up to you to see that they don't also lose their hope.

FAT and the New Look DON'T MIX!



Now you can lose those extra pounds and get that wanted "new look." Simply take

AYDS

as directed. Under the AYDS Plan you actually enjoy reducing. You eat plenty — never go hungry. No drugs, laxatives, exercise or massage.

GET AYDS Today! Learn about our guaranteed plan for reducing—how some lose up to 5 lbs. or more weekly. Only \$2.89 for a full 35-day supply—possibly more than you will need. Money back if you don't lose weight on the very first box. Come in, phone or write.

Pay Less Drug, 928 Broadway; Crown Drug Store, 11th and Pacific; Riser Drug Co., 2156 S. K St.; Fisher Dept. Store; Peoples Store, and leading Dept. Drug

My angle being to prevent monopolies or speculation from reducing output.

When he thinks of conservation, he thinks of investment & Keynes. I think of complementarity. But we have common ground, in that investment is a matter of improving land, etc.

Shipped much good general info, which will be my main benefit from him - production econ.

I'm not sure he has focussed on core of conservation: what is socially most desirable rate of utilization.

He thinks of 'demand' as the ~~independent~~ independent vble, production must adjust. I think of production as causing demand. - we can find common ground here, for he would think of payments to factors as creating demand.

QJE, Feb 44, Taxation & conservation.

Stock & Flow resources. Exhaustible & inexhaustible resources.
Changing & Fixed resources.

~~Investment~~ Disinvestment. $\neq$ depletion. Is confused.

Goal: "That distribution of rates of use over time which maximizes the present value of net revenues." ?
If i.r. fell to 0, what would happen to depletion? | But it changes with tax rates.
Whatever this means, it is not independent.

Recognizes that prop. taxes do force into use, doesn't object to increasing use, but thinks future yield tax better, I don't see why, & direct regulation. Good references. General subject is certainly my main interest, tho I disagree with his attitudes. Taxing & rate of use, practically & theoretically. He is excessively theoretical, but could lead to practical work. Sold.

Wantrup says I might take special research in Water, if his seminar is on something else. But seminar might also be on land tenure forms in conservation, which would be excellent. At any rate he & his subjects are what I'm after. This is excellent, solves problem of my 5th field. Which reminds me, "water" might be too narrow for that, "conservation" better. ~~Fix~~

See Ellis, find out just what Wantrup's obligations will be. Submit formal request, etc. & see Wantrup before next semester, plan on taking something from him then.

Did he write for Am Jnl? I have seen name, Chuck Reader's Guide.
Find out if any extra work for him in having me.

QJE May '46, resource conservation & ec. stability. Wentrup.
Read, & come back.

Seminar, next semester - each spring sem, not fall, his only
course core research. No requirements, must specialize & write
paper, sounds terrific.

QJE Feb '44, Taxation & consumption of resources.

→ In der wirtschaftlichen entwicklung, Berlin, '36 has studied changing
rates of resource use as cause of fluctuation.

1. Commodity agreements as conservation measures.
2. Contribution of conservation expenditures as anticyclicals, to full empl.

Time of use is conservation - depletion question.

Conserv. not syn. nor parallel with investment.

Long elaboration of ^{pretty good observations - shape of cost curves, etc.} ~~subsidies~~ in Farm ec, Then 'Control of short-sighted
expansion & assistance to orderly contraction --- (unicycle) --- recess. to avert
wasteful soil depletion which results from free play of ec. forces'.

In mining, improvements must be maintained to be good later, one washed when
operation stops.

His attitude is generally ~~not~~ to not produce too much. But mild, & informative, &
stimulating. Emphasizes waste due to cycles. Distrusts market.

But regardless of disagreements, here is the core of economics:
rate of resource use. He is economist & natural resource man. Good deal.
Recognizes socially undesirable conservation

I should say conservation meant getting it out cheapest (which includes with
least waste of it) regardless of time. Time being another issue.

Generally thinks of his subject as effect, demand changes being cause.
(a mineral resource is a min. guaranteed to rise in value as others depleted - hence
spec.)

Generally seems primarily interested in curbing waste, not in slowing
use.

Conservation Public Works, anticyclical, ~~Keynesian~~, would 'affect balance
of saving & inv.' with conservation etc.

Farmers Would Like "Single-Tax"

As Tom L. Johnson had just finished speaking at a political meeting in Independence, Ohio, an elderly gentleman arose and said:

"Mr. Chairman, I have a suspicion, from what I have read in the papers, that mayor Johnson desires to place all taxes on land. Will Mr. Johnson please tell us about that?"

Someone then called out: "Tell us about the Single-Tax."

Replying to the elderly man the Mayor answered: "Most emphatically, No!" He paused and then said: "But if you mean that I desire to place all taxes on land *values*, I answer most decidedly, Yes! If you want to hear about the Single-Tax, I will stay with you a little while longer and let my tent meeting in the city wait, while I say to you that if it were not for this idea, called single tax I would not be here to-night. This is the reason I am what I am, and that I am making the fight which we are now in.

"A tax on land would be an unjust and iniquitous system of taxation, but a tax on land *values* would be the most just and blessed system that the world has ever known. It would be of more service to humanity than any other legislation ever known.

"Farmers are great owners of land, but not of land values. We have land in our cities that sells at the rate of \$5,000,000 per acre—any of you farmers got land as valuable as that? In New York City there is land that sells for \$15,000,000 per acre*—got any land in this neighborhood at that price?

"To answer my friend's question, I will tell of a little talk I had one day with Congressman Pierson of Tuscarawas County, when we were in Washington together.

"Pierson was a farmer, and he said to me one day: 'Tom I cannot go your single tax, as it would be a hardship on the farmers, and they already have more than their share of the burden of taxation.'

"I said: 'Look here, Pierson, if I thought the single tax would increase the farmers' burden, I would not stand for it one minute. In fact, if I did not know it would be the greatest blessing

to the farmers, and the working men in the city, I never would advocate it again. I can show you that the single tax will lighten the farmers' burden as compared with the present method. Let me ask you some questions—to see if we can't get at the facts of the matter.'

"How much, Mr. Pierson, of the present tax burden do you think the farmer bears?'

"Well,' he answered, 'the farmers constitute over half the population of the United States, and I should say that they pay at least 60 per cent of all taxes.'

"Very well, let's call it 50 per cent to be safe.'

"No, no,' said Mr. Pierson, 'that is too low; they pay more than 60 per cent, rather than less.'

"All right, but to be safe, let's call it 50 per cent. Now, Mr. Pierson, I want you to tell me how much of the value of land the farmers of the United States have? Please take into consideration all the valuable coal lands, the iron, silver, gold, copper and other valuable mines—the water power privileges, the railroads, and their terminals, including street railroads, telephones and telegraphs, for these are built on the most valuable lands; all the gas and electric lighting rights of way, built on land of great value; all the city lots, some of which are worth more than a county of farming land. I want you to take all these into consideration and then tell me how much of the land value the farmers of the United States have.'

"Mr. Pierson said: 'Well, I should say less than 5 per cent. I said: call it 10 per cent, to be safe.'

"Oh, no, no; that's entirely too high; that's double.'

"Well, we will call it 10 per cent, anyway. Now don't you see that if all the taxes were raised by a single tax on land values, since the farmers have only 10 per cent of those values (you say 5), their taxes would be reduced to only one-fifth of what they now are?—that instead of paying one-half the taxes as now, they would under that plan pay but one-tenth.'

"I declare, Tom, I never looked at it in that light, and I guess you have got me.'

"So I say to you farmers here tonight, that this single-tax, of which I am proud to be an advocate, would be to the overburdened farmers and workingmen the greatest boon, the greatest blessing, the greatest Godsend that any country ever knew. I wish you good night.'

(*)Some New York City land is now worth \$40,000,000 per acre.

For the solution of the Labor Question, and other Social Problems read the books written by Henry George, which may be obtained from the Robert Schalkenbach Foundation, 11 Park Place, New York City.

Our income tax encourages implicit income taking,
like residential farm use.

Fresno Bee, Jan 30 '49

USDA , bae, Current developments in the farm real estate mkt,
8% rise in farm land values since last year. This same
as last period, both less than any since 1942. 12% the
previous average.

Cal values declined 5% last year.

80th congress passed long range farm support law, giving
lower support price in years of big production. They would
range from 60 - 90% parity-. In war 90% parity was used.
Those who advocate returning to 90 want to limit production
to go with it. Both agree that 90% without limits would
result in large govt losses and accumulations that would
discredit thing. 90 %ers would return to acreage allotments
and market quotas that Wallace used.

Allan Kline, Pres- of Am- Farm Bureau Federation, and
Albert Goss, master of Nat- Grange, lead fight against
controls.

Farm wage rates continued to increase in 1948. are \$ 3 & 1/2
times 1940

Under Sugar Act of 1948 you get some govt payments, in re-
turn must pay minimum wage of 60¢ plus customary perquisites
of house, garden plot, etc.

Farmers share of retail food price is highest now. Is alwa
ays higher when prices rise. Is 53 now, ave 43 last ~~year~~
30 yrs. Rest goes to retailer largest, and processor, whole
saler, xport

Emperor Grape Growers pact coming up for vote by growers
involved, voting in proportion to their volume. Paper says
quality is to be regulated, not quantity. I wonder. ^Drannan
approved it.

~~Bart - map - your dope. Bring some gifts, too. Or come in with file, took it when she asked.~~
~~handing book.~~

Wantrup, March 28.

Optimum state of conservation. That time distrib. of use which will max. profits, discounted to ^{presentization} maximization.
(considered objections, decided A) Irrationality was irrelevant. 1) It just means they behave according to ^{own} lights, which is obvious. 2)

How can we get marginal units of vague anticipations?
A theoretical construct for us, but not an actual procedure of planning agent. Planning agent decides whether he can improve on the state of conservation he is in. So all you get is a movement toward the optimum. Now we can use coverage instead of marginal concepts. So Lester's attack on marginalism doesn't bother us.

By 'marginalism' he means actually thinking in terms of infinitesimal units, not just optimum seeking - he's fuzzy on it. Thinks his formal solution of conservation problems in terms of marginalism actually derives different solution than planning agents use. Because in more complex cases you cannot substitute maximizing profits for marginalism. - formal mathematical solution includes calculus of variations, etc.

B) Extra market values.

Individual compares them to market value for himself. Observed rates of substitution are objective evaluations. World hold them constant, thus considering them but not monkeying with them much.

c) Habit patterns.

E.g. behavior is not always from conscious comparison of alternatives. Habit patterns are a tool of maximization, not a negation - he used to think. Now he is deciding this is not useful for ec. analysis - defines problem out of window.

(But who ever said maximization decisions had to be conscious?)

He would adopt institutional & sociological approach - how do habit patterns come to exist, how develop.

In our society, few conservation decisions are made on habit grounds.

By a 'conceptual tour de force' we can say all behavior is maximizing & include habit, but then concept loses all meaning. But in our society, is ok to say you are maximizing: consciously comparing alternatives. 1/2

mm

A generalization to be tested:
is one reason agric. has less
holdout power that movement to
shift taxes to improvements
hasn't gotten as far there?
Or has it?

December

4 motive.

Mostly the motive is just plain investment.

With stock reserves, another problem.

5 Note: Manag. may figure his manag. won't last long, so future value of one is smaller, he will produce faster. Dividends.

6

December

7

8

9

November

16 Things aren't what they used to
be & is maintaining her
independence.

17

18

November

19 Sat March 25
Start: 46899
20

At 47026 put in 7.3 gal
for \$2.8 filled it.

Final: 47154

20

$$\begin{array}{r} 46899 \\ 255 \\ \hline .03 \\ \hline 7.65 \end{array}$$

Why isn't spec. in
sites same as in stock
resources? Holder anticipates
future use will be better

21 than present. & only
thing socially wrong is
calculations of individ. are
either wrong or manip.??

November

22 If we taxed l.v. wouldn't we have a pressure toward improvement, a recognition of compl., by private owners?

N

The difference, with flow

23 resource, is nothing is being saved by holding idle. Except cost of lower improvement that would have to be destroyed. & this is just the

24 waste that causes spec? Not entirely. Land will rise in value & this motivates people to hold it. As to

November

25 Improving it now,
that is optional. It is
one way of investing in - no
better than any other.
I'm not convinced.

The miscalculations

26 are not always in the
direction of holding
out too long. Sometimes
resources are exploited too
soon.

So perhaps it must come
~~down to an income argument.~~

27 No point in letting
individuals get it - &
this is only partly true.

November

28 You do get land spec.
when no question of
present improvements,
having to be soon destroyed
for higher use ones.

My lot, e.g.: I could
build there now, knowing
29 a certain type of house
would be best use. But
I'm not in this business
& I can't lease it to
anyone who is because it
would have to be long term &
I don't trust M's future &

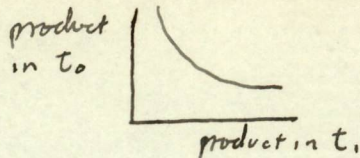
30 whoever put up improvement
would not know what was
coming at expiration of
lease. If houses
could be cheaply moved from

December

1 site to site, as by a
LeTno. house owner, then
you could lease unimproved
sites for short terms, &
everyone would, & land spec.
would lose its present character
of holding land idle.

2 The only legit. excuse
for holding land idle is
that the fixed improvements
needed to use it now
would have to be wasted then,
& the income lost now is

3 less than value of
wasted improvements. But
taxing land would not
interfere with this legit.



These 2 are joint products, i.e. alternatives, with some factors. Take combo hitting highest inc. line. Must assume different costs when drawing curve.

you are unconscious about it, ~~are~~ have no alternatives.

I say there are just the preferences of the individuals.

April 5.

How is opt. state of cons. determined, in theory & actuality.

Theoretical determination found in articles in private ent. & cons., & taxation & cons.

Why do we prefer joint production approach to others which are mathematically more elegant. The joint prod. approach is clumsy. We det. opt rates in various intervals by assuming a certain number of time intervals. 2 aspects of maximization: det. opt rates of use of assumed no. of intervals; det. opt. no. of intervals. Joint prod. approach assumes given no. of intervals, the joint products. & you have to decide what is opt. no. of joint products i.e. intervals.

Get discontinuous solution, select optimum optimum. Discontinuity comes in selecting no. of intervals. - here is clumsiness. Calculus of variations solves both problems at once, in other approach.

Why choose jt. prod. approach then? Just because it is discontinuous it is better for practical approximations.

The planning pd. is not given.

We have a max. pd. given which is shorter than opt. - he should plan further, but can't. He must maximize within the period given. e.g. a tenant with short lease, no compensation for improvements. Or when farmer plans to retire, or sell - when he sells he probably won't get it back, people can't appraise that well. When there is a max. pd., joint prod. approach works well.

Also, we have a limited number of planning intervals anyway, continuity is deceptive. e.g. 4yr crop rotation. Or, in forestry, assume one monument & then a stationary state. Most planning agents assume stationary prices & costs after a certain time. But stationary states define ~~past~~ time ec. out of window.

Some other simplifications go a step further: Thinking in terms of 'conservation practices.' Certain standard practices fixed in terms of time. - i.e. we must maintain terraces after we build them.

Suggests there is a certain minimum below which we cannot get, because below that things may get out of control. This will be below optimum. But definitely is a necessary

4809 E. Montgomery Apr 7, Richmond, Bill Tove

minimum, as in fire protection, national defense, etc.

3 necessary conditions for setting a minimum for public ^{or private} policy.

1. Cannot determine optimum - if you could, that would be it.
 2. Difficult to appraise collective benefits, extra market.
 - 2_B Below minimum, things get out of hand, or situation becomes intolerable.
 3. Costs of providing more than minimum would increase.
- 1 & 3 are almost universal, so 2 is the crux

(Bans vs. prefab. houses are use of safety regulations by unions etc to stop competition. (is this booting LTU?))

Flaw resources with critical zone. Wiping out species. Erosion reaches gullying state. Cut over forests in N. Michigan do not reseed selves. - more repeatedly burned over. Hydraulic mining.

Ground water storage areas, once dried up, are compressed, are no good for further storage. Santa Clara valley has sunk 5 ft. lost that much underground storage capacity. Man starts irreversible processes. A broad

A broad objective of policy should be avoid irreversible situations.

Flexibility is necessary characteristic of successful species. Avoid cul-de-sacs, like destroying species, underground storage, etc. This is not an optimum, but a safe minimum.

Society should enforce on individuals the minimum. It is easy to determine. e.g. in farming, minimum is avoid gullies, in humid areas. Certain amt of leaching & sheet erosion & A PH ok, are all reversible. Of course so is gully, at great expense.

He would stop gullying even when not economic, by law. I wonder. Is it not better to change tax laws? There is problem: soil can be mined, gullying allowed, etc, so tax on any quality of soil besides location encourages this. & when you consume you avoid tax, & tax on income from it.

Tax structure should be changed I say to avoid.

Wentworth - April 13

See previous page.

Suggests if farmer doesn't fix his gullies, state do it & send you the bill. Just like weeds in Berkeley.

Soil conservation districts widespread. Must have no power to require farmer to do such things, nor bill them for it. SCS doesn't want them to, for psychological reason, SCS fears that if old districts could adopt regulations, other areas would not adopt districts. Because districts tax.

W. would rather have a smaller number of more effective districts. Says IDs have been very effective because they have tax power. Flood control District in LA also taxes & has effects.

Soil Conserv. Districts are all over the map, but they don't do anything but distribute free advice. What an instrument for let!

CCC worked largely on govt owned lands, & was a drop in bucket. Combining land & labor to give empl - only organization & capital lacking, were supplied by govt.

He has no concept of an optimum state of taxation. I must work this out.

What is optimum in protecting watersheds? ^{- S.C. problem} Minimum is fire protection & exclusion of competing uses. In proposals, The costs of these 2 is very much less than structural proposals, for flood control. Recreation the only competing use - ~~not~~ grazing. Doesn't want to stabilize young streams near there, which created floodplains on which LA, Glendale, Pasadena now rest.

Purpose of watershed: storage, clearing water. (prevent silting)

Army engineers have very complex system on LA river, because they haven't fixed watershed.

Thinks foresters claim too much, would have floods even with perfect watersheds, had floods before white man.

'Slipping', when thin soil is saturated with water, slips down along bed rock, a small way. Common in Tilden Pk, Menix. Watershed. This type of erosion would decrease with less plant cover, because would hold less water. But this not a problem.

Sometimes you can allow grazing on watershed, 'judiciously', as around here. Because cattle do not set fires.

Contribution of western ranges & forests to national beef &

sheep production is negligible. A very few farms are affected.

In the east, pollution is a bigger problem than watershed control. Eastern floods are not due to watershed erosion. They come before.

Now we have levees, as land becomes more & more valuable near river, so floods that always existed, become a problem. People build homes on expensive areas, which should have been zoned for flood spillway, then cry for protection vs. floods, we all pay.

We have by passes. Reservoirs. Debris basins. We collect debris in basins, at great expense, move them out of them at great expense, buy land at great expense, dump stuff there. W. would let debris go, build natural flood plain. - even would be much cheaper to buy land at speculative prices, for flood plain.

Now water is rushed to ocean in concrete channels. We should allow infiltration, to replenish ground water. It costs \$20-30/a-ft there.

Now Fed. flood control program, 100s of millions of \$, only a stop gap.

To get by passes around Sacramento, paid speculative prices for land. In L.A. can't even do that, i.e. interests won't allow anyone to raise his voice, only those 'reasonably protected in universities' can peep.

Some social groups develop standards, in stable agriculture, that safeguard minimum standard of conservation. W. Eur., Japan, Some parts of Africa & China. These have survival value, others do not.

Norajo pushed onto small area, sheep meant prestige, they do not want to give them up, are depleting their area.

The economic forces that impinge on conservation. I.e., tenure conditions, taxes, etc.

To individual planning agent, A.I.R. means future incomes are discounted more. Can shift revenues to the present, or costs to the future. Both amount to a shifting of use rates to the present. A.I.R. always leads to depletion. (with possible exception that you could reduce storage first)

What I.R. should planning agent use? What he uses is his 'internal' I.R. An 'asset' he calls capitalized value of expected net revenues. His internal rate can be no higher than market, for then what would

value asset more than he, he would sell. If his rate more lower, he would lend money.

If his market for assets is imperfect, then his own rate may be higher or lower than mkt.

Since attached time preference concept, W. defended, no one has attacked since, article relevant to this.

Land Use, the Basis of Western Economy^{1/}

by

S. V. Ciriacy-Wantrup^{2/}
University of California

It may be assumed that your Executive Committee, when assigning the title of my paper, was interested in the major changes and problems of western land use created by the Westward Migration. The "West," for our purpose, includes the three Pacific Coast states (Washington, Oregon, California) and the eight Mountain states (Idaho, Nevada, Arizona, Utah, Montana, Wyoming, Colorado, New Mexico).

Changes in Relative Importance of Agricultural Employment

First, let me caution you about the semantics of the word "basis." The term may mean merely that land use is highly important for the western economy. This is certainly true; but it is also true for transportation, manufacturing or the service industries. If the term connotes a kind of economic pyramid of which land use is thought of as the broadest segment, we may easily be led astray. Farm population and agricultural employment was possibly the broadest segment of the western occupational pyramid until the beginning of this century. Today, the farm population comprises only sixteen per cent of the total western population. The corresponding figure for the United States as a whole is twenty six per cent. Likewise, workers in agriculture are now only sixteen per cent of all western gainfully employed against nineteen per cent in the United States as a whole. The original occupational pyramid with land use at the base is now completely inverted (table 1).^{3/} This inversion is more extreme in the West than in the United States as a whole.

^{1/} Paper presented at the Divisional Symposium, "The Westward Migration and Its Consequences," Annual Meeting, Pacific Division, American Association for the Advancement of Science, Salt Lake City, June 19-24, 1950.

^{2/} Professor of Agricultural Economics, Economist in the Agricultural Experiment Station and on the Giannini Foundation.

^{3/} Tables appear on page 12.

In this change, allowance must be made for employment in agricultural processing and distribution industries, which is considerable in the West--somewhere between 15 and 20 per cent of total manufacturing employment. On the other hand, in terms of national income, per-capita productivity in agriculture is less than in other industries. Furthermore, my data refer to the Census of 1940. If data from this year's Census were available, they would show an acceleration of the trend toward urbanization and industrialization of the West.

Changes in the Relative Importance of California

The second change under the impact of the Westward Migration is mentioned with some reluctance by one who comes from California: Boosters for California are not a very likable species. Still, it is a cold fact of great importance for the whole western economy that the economic weight of California has increased greatly.

In absolute numbers, population growth in the West was most rapid in California; at present more than half of all western people live in California (table 2). As will be shown presently, an almost identical situation prevails in the growth and the relative weight of California's agricultural production.

In spite of this growth, California's farm population and farm employment has actually declined since 1930. In 1940 the California farm population was only nine per cent of the total population, and agricultural employment only ten per cent of all gainfully employed.

The relative importance of natural increase and migration has been studied more thoroughly for California than for the other western states. Natural increase was relatively unimportant compared with the net effect of migration (table 3).^{1/} This fact does not necessarily indicate that all westward migrants went directly to the cities; some of them did and some of them replaced native-born workers who left agriculture. But there is no doubt that the Westward Migration has been and is the

^{1/} Adapted from page 107, Statistical Memorandum No. 6 (Migration) Population Committee for the Central Valley Project Studies, Bureau of Agricultural Economics, Berkeley, 1944, 264p. Processed.

most important factor in the urbanization of California and its increased economic weight among western states.

Changes Within Western Agriculture

The third change in the western economy under the impact of the Westward Migration concerns shifts in agricultural production. Measured in terms of an appropriate common denominator, over-all agricultural production has kept pace with population growth. However, the composition of total agricultural production has changed significantly (table 4).^{1/} Emphasis has shifted from field crops toward fruits and nuts and from meat animals toward dairy and poultry production. In this shift, as well as in total increase of production, California has taken the lead to an extent similar to that in the increase of population (tables 2 and 4). The result is that about half of western agricultural production originates in the most highly industrialized western state.

The expansion of agricultural production was due partly to an expansion of acreage and partly to an expansion of inputs and outputs per acre, that is, to an increase of land-use intensity. Up to about 1930 expansion of acreage predominated; after 1930 land-use intensity was the more important factor. This tendency toward stability of acreage in farms and in cropland and toward increases in agricultural intensity is also more pronounced in California than in the other ten western states.^{2/}

The most important aspect of increased intensity of land use is greater importance of irrigation. The shifts in production from field crops to fruits and vegetables and from meat animals to dairying reflect largely the increased importance of irrigation farming. In the West as a whole approximately half of the cash farm income is produced on irrigated land. Of crops nearly three fourths is so produced,

^{1/} Adapted from pages 5 and 60 of Marion Clawson and Wendell Calhoun: Longterm Outlook for Western Agriculture. Bureau of Agricultural Economics, Berkeley, 1946, 127p. Processed.

^{2/} Ciriacy-Wantrup, S. V. Major Economic Forces Affecting Agriculture, Hilgardia. vol. 18, no. 1, Berkeley, California, December 1947, 76p.

but of livestock less than one third. These percentages vary greatly between different western states. In Arizona, Idaho, California, Utah, Colorado, and Nevada more than two thirds of total cash farm income is produced on irrigated land. In Oregon and Washington less than one third; the other western states maintain a middle position.

In view of the large public irrigation developments which are being built or authorized in most western states, the shift towards irrigation agriculture and toward those types of production based on it can be expected to continue.

Let me summarize the changes in the western economy under the impact of the Westward Migration.

First, the West now displays the signs of a maturing industrial economy; that means the relative importance of agricultural employment is decreasing, and increases of agricultural production are based more on greater intensity of land use than on acreage expansion.

Second, the greater intensity of land use finds expression mainly in an absolute and relative increase in the importance of irrigation and in shifts towards production patterns associated with irrigation farming.

Third, the greatest absolute growth in population and agricultural production took place in California. About half of western people and of western agricultural production are now concentrated in California. Simultaneously, the economic maturing process--that is, urbanization, industrialization, and the intensification of agricultural production--has gone furthest in California.

Land Use Problems Related to the Westward Migration

Even in an industrial economy, problems of land use may still be basic in the sense of highly important. For the West this is true for a particular reason, namely, the scarcity of water. In the West, land use means water use and vice versa. Urbanization and industrialization has not eased the West's water problems. On the contrary, in many respects these problems have become more acute. We may

as, therefore, how are western problems of land use and issues of land use policy related to the Westward Migration? The answer to this question contains the central theme of my discussion today:

When people migrate, they take with them their collective experience, their customs, their laws--in short, their social institutions. Social institutions I have especially in mind are the customs with respect to "good husbandry," the laws relating to property in land and water, the traditions regarding tenancy, the systems of credit and taxation, the experience with and the legal framework for cooperation and for the formation of self-governing districts in the field of irrigation, flood control and conservation. The importance of this "institutional baggage" of the Westward Migration is frequently underestimated. True, some resources, particularly water, are scarce in relation to population over many areas of the West. However, if the social institutions influencing land use were well adapted to this scarcity, most of the problems which are now faced in conserving western water, soil, forests, and grasslands could be solved without difficulty. Social institutions well adapted to the humid and fairly consistent climates of England and of the eastern United States, but ill suited to the arid and highly variable climates of the West, are more significant for western land use problems than scarcity of resources, or negligence and antisocial attitudes of resource users. In short, the institutional baggage of the Westward Migration has long been and still is an important cause for resource depletion in all western states.

Social institutions are created by man and can be changed by man. Social institutions may be either obstacles or tools of land-use policy. In order to clarify this important issue, I should like to give you a few illustrations of the institutional adaptations which became necessary as a consequence of the Westward Migration. Let us start with the laws relating to land and water use.

Adaptation of Land and Water Laws to the Western Environment

Several laws carried with the Westward Migration were so unsuited for the new environment that adaptation started almost immediately. Modification of the

homestead laws, particularly the upward revision of the maximum farm size (Enlarged Homestead Act, Timber Culture Act, Desert Land Acts, etc.) is an example. In the 1890's and early 1900's there followed withdrawal of large portions of the public domain for watershed protection. Later the free-for-all competitive grazing of the remaining public domain was changed to more orderly ^{but less equal} use through the Taylor Grazing Act (1934). Another important illustration is the replacement of the English and "eastern" riparian doctrine in surface water law by the appropriation doctrine under the governing principle of "reasonable beneficial use." No western state restricts rights in surface streams to riparians; some western states, like California, recognize a combination of riparian and appropriation rights. With respect to ground water, the English and "eastern" doctrine of ownership of the "corpus" of ground water by the overlying landowner is still in the process of adaptation. A majority of western states--New Mexico, Oregon, Utah, Nevada, Washington, Wyoming, and Arizona in that order--have passed laws declaring outright that ground waters are public and that private rights must be acquired through appropriation procedures subject to existing rights. California applies the doctrine of "correlative rights" to ground water.^{1/} This doctrine may be regarded as a western adaptation of the riparian doctrine; there are indications, however, that California also moves in the same direction as the majority of the western states.

In some cases western conditions required entirely new laws. Examples are the Federal Reclamation Act of 1902 with its many amendments and the Caminetti Act (1893) in hydraulic gold mining. State laws governing the formation of irrigation districts had to go through a considerable period of trial and error before they became adapted to the western environment. In most states, legislation on flood control and soil and water conservation is still in the experimental stage.

^{1/} Ground water in California; the present state of our knowledge, by Patricia McBride Bartz, with a foreword by S. V. Ciriacy-Wantrup. Second ed. Berkeley, University of California, College of Agriculture, Agricultural experiment station, 1950. 67p. Processed. (Giannini foundation ground water studies 1).

Adaptation of Customs of "Good Husbandry" to the Western Environment

With respect to customs of good husbandry I may mention three examples of adaptation to the western environment:

The first is adaptation of field boundaries and of land-use practices to the contours. The justified pride with which a good farmer in western Europe or the eastern United States may look upon a "straight furrow" is misplaced under topographic and climatic conditions prevailing in the West. The system of rectangular survey, regardless of topography, which originated in the eastern United States, is an important institutional factor retarding adaptation of land use to contours.

Second, in humid areas farmers have acquired the custom of fighting weeds by clean cultivation and plowing. When first applied in the West in the form of clean-cultivated fallow, the beneficial consequences in conserving moisture tended to strengthen this custom. However, serious wind and water erosion followed. Farmers are learning that under western conditions mulching, shallow cultivation and spraying for weed control are better suited to conserve moisture and to prevent wind and water erosion.

The third example of adapting customs of good husbandry to western conditions relates to proper quantities and timing in applying irrigation water. After the migrants learned how productive western soils can be with irrigation, they tended to do too much of a good thing. Overirrigation is not only wasteful of the most important western resource; it may, in addition, create serious problems of ground water pollution, alkali accumulation, and leaching. Sometimes customs with respect to modes of payment for surface delivery of irrigation water strengthen the tendency to overirrigate. If such payments are not related to the quantity of water consumed per acre or per farm, the user has less incentive to apply water economically. In ground water use, high fixed costs of modern pumping plants, and electric power rates strongly graduated in relation to amount of power consumed per unit of time, are institutional factors which favor overirrigation after the pumping equipment has been installed.

Adaptation of Land Tenancy, Credit, and Taxation to the Western Environment

Next, let me mention some illustrations of my thesis from the fields of land tenancy, credit, and taxation. All three institutions frequently give rise to fixed charges. Fixed charges may induce resource depletion when incomes of resource users go down, and there are no other economic alternatives. The major difference between western and eastern conditions--next to the absolute scarcity of water--is the great variability of precipitation in the West. In dry farming and grazing, particularly, variability of precipitation is directly related to variability of income. Furthermore, dry farming and grazing are one-crop enterprises with a limited range of economic alternatives. For these reasons fixed charges tend more toward resource depletion in the West than in the East. There are many possibilities for making rent, interest, amortization and tax payments more flexible with income: All these charges can be directly related to gross or net income.^{1/} Such adaptation is proceeding slowly.

There are many other directions in which land tenancy, credit, and taxation require adaptation to the western environment in the interest of better land use. In land tenancy, for example, the relations between public landlords and livestock operators as tenants, is of particular importance for western land use. The various tenure problems of Indian lands are likewise of special interest in the West. In the field of land credit, until very recently, the West has had higher interest rates and less adequate banking facilities than the Middle West and East. This has been a force tending toward depletion of western soil, forest, and grazing resources. Using livestock as collateral is fairly harmless for land use in the East. In the West this custom has induced overgrazing when the creditor objected

^{1/} The relations between fixed charges and resource depletion are discussed with more detail in Ciriacy-Wantrup, S. V. "Taxation and the Conservation of Resources," Quarterly Journal of Economics, February 1944, pp. 157-195.

Ciriacy-Wantrup, S. V. "Resource Conservation and Economic Stability," Quarterly Journal of Economics, May 1946, pp. 412-452.

to a reduction of the herd desired by the debtor in the interest of range conservation. In the field of taxation one may mention as a peculiarly western problem the reimbursing of local governments for taxes lost on publicly ^{purchased} owned land. Local groups would less often oppose expansion of federal landholdings for conservation purposes if this problem received more attention in economic analysis, public information, and federal legislation.

Many Problems of Institutional Adaptation to the Western Environment Remain

When we now take a look toward the future, as was implied in several of my illustrations, the adaptation of social institutions to the western environment is in progress but is by no means completed.

Among problems which remain one may mention the relation between federal laws and state laws in the development of western water resources, financing and allocating costs for such developments, and safeguarding of the great recreational resources of the West against uses with more tangible but not necessarily greater economic significance.^{1/}

California is behind other western states in adapting existing legislation to the needs of ground water conservation, but through recent acts has made considerable headway in attacking the problem of water pollution.^{2/}

In western flood control zoning is often the economically most desirable tool of land use policy. This tool is seldom used because of the influence of partisan groups and insufficient information of the public.

The western states have successfully developed the legal framework for employing self-governing districts in the field of irrigation and water conservation.

^{1/} Ciriacy-Wantrup, S. V. "Multiple and Optimum Use of Wild Land Under Different Economic Conditions." Journal of Forestry, vol. 36, no. 7, July 1938, pp. 665-674.

^{2/} These acts were well discussed in: California, Legislature. Assembly. Interim fact-finding committee on water pollution. Report. Sacramento, Calif. State print. off., 1949. 172p.

In the field of soil conservation such a development has been spotty. Since the 1930's soil conservation districts have multiplied rapidly in the West. However, only two state soil conservation district laws--in California and Colorado--give limited taxing power to soil conservation districts. Such power is the most important instrument for cooperative action by irrigation and water conservation districts. The significance of soil conservation districts for regulating land use practices has been very small. Regulations have been adopted only by a few districts. Enforcement has not been tested before the courts. In the past, the influence of soil conservation districts upon land use has been largely in the field of education. Eventually, however, soil conservation districts may become an important institutional tool for cooperation and self-regulation by land users.

Time does not permit me to give you more examples of institutional adaptations still needed in western land use. I would rather like to touch upon some factors which tend to retard such adaptation. Probably the most important factor is public misinformation. I say intentionally "public" because information of farmers and other resource users is not enough to obtain proper legislation. As indicated in the beginning of my paper, the voting strength in the West has shifted to the cities. It is essential, therefore, that the general public understands our land use and water problems. Such an understanding is not aided by the great emphasis which recently has been placed on population pressure as a cause of resource depletion. Thus, in conclusion, I should like to say a few words about the relation of my thesis to the Neo-Malthusian doctrine.

Conclusion: Our Thesis in Relation to Neo-Malthusian Doctrine

My thesis was that the major problem in western land and water use is not to alleviate population pressure and to overcome negligence or antisocial attitudes of farmers and other resource users, but to adapt the institutional baggage of the Westward Migration to new environmental conditions. This is the essential problem of human ecology in the West. By contrast, in the view of the modern

Neo-Malthusians, depletion of soil, forests, and grasslands is largely caused by the pressure of people upon the land. They propose, therefore, checks on population increase as a condition and as a tool of resource conservation. With respect to foreign countries some of them go even so far as to suggest that medical and nutritional assistance be withheld in order to keep the famous Malthusian checks operative, or to force people to practice birth control.

I am not concerned here with the ethics and the practicability of these proposals. I am interested in their relation to resource conservation. With respect to this relation two observations are pertinent: First, depletion of soil, forests, and grasslands can be observed on a large scale in areas of the world where population pressure relative to that in other areas is very slight. This is true whether population pressure is measured by some kind of man/land ratio, or in terms of death rates, life span, or income level. Examples are not only the area we are concerned with here--the western United States--but also Australia and the Union of South Africa. On the other hand, in many areas of the world resource conservation has been practiced in spite of a high population pressure. Examples are the Inca Empire of ancient Peru, medieval Europe, present-day Japan, and parts of China. All these areas are characterized by highly developed institutional patterns regarding land and water use. It is apparent, therefore, that a high population pressure is neither a necessary nor a sufficient condition for resource depletion. Too much emphasis on population pressure has confused the social and economic issues involved and tends to retard public awareness and acceptance of those institutional adaptations which are needed in western land use.

Tables

Table 1. Relative Importance of Agricultural Employment (1940)

	United States	Eleven western states	California
	per cent of gainfully employed		
Services	28	32	35
Distribution	23	28	30
Manufacturing	28	21	23
Agriculture	19	16	10
Other extractive industries	2	3	2
Total gainfully employed	100	100	100

Table 2. Population Growth

	Eleven western states	California
	millions	
1900	4.1	1.2
1910	6.8	2.4
1920	8.9	3.4
1930	11.9	5.7
1940	13.9	6.9
1950 (est.)	(17.5)	(9.8)

Table 3. Natural Increase and Net Effective Migration, California

	Natural increase	Net effective migration
	thousands	
1900-1910	115	775
1910-1920	170	880
1920-1930	370	1,882
1930-1940	177	1,050

Table 4. Shifts in Agricultural Production

	Average annual deflated cash farm income in million dollars		Percentage increase
	1910-1914	1929-1943	
	Eleven western states		
Fruits and nuts	170.2	423.5	149
Vegetables	71.2	264.5	271
Other crops	310.2	533.0	72
Meat animals	319.3	512.7	61
Other livestock	173.3	516.5	198
Total	1,044.2	2,250.2	115
	California		
Fruits and nuts	121.1	329.8	172
Vegetables	38.0	161.3	324
Other crops	74.4	185.6	149
Meat animals	72.5	124.9	72
Other livestock	77.5	219.9	184
Total	383.5	1,021.5	166

Wautrup. Soil Conserv. in Eur. Farm Management. JFE, Feb '38

Eur. more results from less rain because humid, cf. to U.S. Better distrib. of rain, fewer heavy torrents. Reduces erosion.

3 Eur. climate zones, Vistula boundary.

He leaves out Medit., 'Eur' is n. of it.

Soil conservation better practiced in Eur. than anywhere.

& this value is too high to do it as long as labor & c. can be used more profitably extractively, or extensively.

reconcile this with my statement of it.

Optimum: marg. unit human effort (includes cap) put into land = value of marg. unit output from land use. So conservation may not be ec.

this value is too low, while some stuff freely available from nature.

Extensive crops exhaust soil less; but fertilization is harder.

Relative scarcity of land det. this when conserv. is ec.

Neolithic age, 7,000 - 2,000 B.C., Eur. ag began. Cude tools: planting stick, hoe, woodplow. Confined ag. to alluvium & loess - stabilized it there. Took iron plow for steppes, coniferous, & light exhaustible soils which required migratory agric.

First they shifted fields irregularly when exhausted. Soon changed to

2 field grass fallow rotation, 6-7 yrs between changes, grazing on fallow.

Kept animals at night on fallow field, by day they grazed a few, so manure from all over concentrated here. Sheep still handled so many parts of

Eur. Cornerstone of farming systems & main cause of soil conserv. in Eur.

Under Barne & Franks, 3 field system, to economize land. Fallow not enough this way, applied stable manure, & lime & ash. ^{a little} But basically rested on taking from common land & thus manuring fallow. Not a stable 'closed system.'

In 3 field system, fallowed only one year (why?), not time for much grass to grow, increased dependence on other grasses.

Common stayed unsettled because early iron plows poor; common needed by others, resistance to change; & common not common, but non-common

? Land's owned by King, in feudal law ^{so what?} which was Franks modified by Romans. System est. an institutional scarcity of land which encouraged conservation. -- but not of the folk-land

Feudal system common world over, when complicated admin. system needed in local agric. ec. Fields given, to support King's administrators. Temporary & conditional, became permanent private. These smaller owners used it on

92

Their vassals same way, same results in part.

The unused land was owned, by some feudal lord or other. He charged settlers. This discouraged settlement, caused more intensive use of other land. (my other sources say lords encouraged settlement. See, e.g. Bring to class, discuss)

(Note That these 'land taxes' are not what I think of as land taxes, but taxes on production: for you only paid them if you used the land. They were also taxes on depletion, which isn't nec. ^{entirely} ~~production~~. The important thing about a tax is not what it is on, but that it doesn't hit marginal efforts)

Forests protected in interests of hunting. 'Communal forests' so protected, too, this brought them under dominance of lords.

10-14th, manorialism dominated Eur. Existed in 'parts of France, & in central & Eastern Eur.' until 18-19th. (evidently less in France. Which goes with what Knight said). Manor in Eng, court or manoir in France, Grundherrschaft later Gutsherrschaft in Gy, Krepostniches two in Russia.

No sudden change from Germanic equality to feudal servitude. Gms. had slaves & dependents, who became serfs. & many Gms. traded freedom for security of feudal protection. Ec-ists & historians still dispute causes of change. Feudalism strengthened caste, made pioneering tougher.

Peasants became glebe adscripti; family unit ("Hufe") $7\frac{1}{2}$ or 15 hectares, 'open field' system, lived in villages, had right to use common pasture & forests 'as in the earliest times'. (See disagrees)

Lord, to keep labor available for demesne (in Gy & Eng), served peasants to consume own land, & his pasture & forest & his land, so they wouldn't move on. Stocking pastures, cutting, restricted. Had to keep land & bldgs in good condition. Peasant rent fixed, so interested to improve his land, only chance of getting ahead. (See describes ravaging)

Lipson, Tanney, nekind v.

— Feudalism Created a psycho. pattern for conservation long before ec. pressures would have. This attitude outlasted it.

— Until 18th, no change in 3 field system. But fallow field used more intensively as commons disappeared. c.c. 1775, great change, farm management became popular. Ec. analysis came to fore. At first, land destruction, as wars of rev. era raised food price, & land commercialized more. Livestock reduced by war, & forced sales to pay lords for land & freedom. Forests divided up, rapidly depleted, esp. in France. China went thru same when Feudalism broke down (did it ever?) Thun.

Then modern farm management quickly developed, & ec. forces assured conservation. Technical leadership of Eng. agr. a relatively short episode (so? Bring my figures on that). Eur. consumed more. (That might be why Eng. 'produced' more, aye)

Fertility cons, not mechanical, needed in Eur. "Doctrine of statics": put in what you take out. Dominated management until later 19th. Good rotation emphasized. Manuring. - this by-product increased prod. of livestock.

Later, competition from zones where depletion ec. changed things. Xport etc. brought them in.

Liebig analyzed chemistry, statics become chemical, not just general. 1870 et seq, non static possibilities seen: put in more, or less, than take out, when ec.

Cheap farming from depletion of U.S. lands brought agric. depression. Ec. relativity of statics now generally realized - main advance in management since Thünen.

After 1896, upswing of prices, conserv. became ec. again, agric. prosperous. Chem. fertilizers now key in Eur. - with organic etc. considerations thrown in.

Soil fertility tends to granitate where most valuable: pop. centers. Is ec. sound. Statics wrong.

In U.S., tenants often required to grow cash crops; in Eur., often required not to.

100

Liming takes nutrients out of soil quickly.

Eur. manure rental maybe fixed, but other conditions vble, & in contract.

('Capital, & aspects of land like it, have to be privately owned to get proper care without supervision' - my principle. & proper incentives need applying, to keep cap. up.)

(Society can decide by vote what incentives it wants to give. Some things have value to society greater than to individuals, & society can support them by shifting tax created & destroyed incentives so. In war, when wanting to increase incentives, probly would want to increase non marginal taxes more. For scientists, might reduce nonmarg. taxes to give leisure. etc etc.)

Tenantry not nec. bad, increases mobility & flexibility so ownership unit needn't be operation unit.

Gy, 18yr leases frequent. Tenants often do best conserving.

(Where compl. benefits from certain land use, the org. representing the compl. interests, be it govt or etc, should pay landowners whatever bargaining establishes to do this. Then tax the site more to take it away again, at least the differential between what

Wantrup 4

you get for it & what it costs to do it, as a site advantage. This keeps acting straight.)

Things he doesn't deal with:

Incentives as created by govt

Interest rate & incentive.

Differential price ^{of land & product} & incentive

Taxation

Speculative motive

Complementarity

This JFE is good. - very

Wantrup, May 5

'Uncertainty' - a statement of the future which are not single valued. Are multi-valued. We are dealing with a probability distribution of expectations.

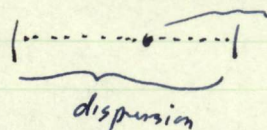
What are 'parameters' of probability distrib.: i.e. 'characteristics' of it.

~~Some~~ Some probab. distrib. we can measure accurately. Can measure probable variations of weather. Coefficients of variation. Add up deviations.

Dispersion. Additionally, could measure skewness. Or moments of prob. distrib.

Some probabilities cannot be measured - future of bus. cycle maybe, tho that is partly measurable. Future technology utterly unpredictable.

He would interpret uncertainty largely in terms of dispersion.

 most probable future price.

Forget about skewness & higher moments, for planning agents really think only about dispersion. Range, at least. & maybe even coefficient of variation.

Not a valid generalization. Some prefer risk.

Planning agents have preferences toward smaller dispersion. Calls this 'safety preference'. They would prefer, of 2 equal probable values, that with smaller dispersion. (how about that whose range went up over that whose range went down?) Safety preference rate, parallel to time preference rate. In insurance mkt, & futures mkt, ~~uncertain~~ personal safety preferences are coordinated on the mkt., establish risk premiums. - is coord. of personal safety preferences, adds risk premium to int. rate.

All expectations are discounted for dispersion. This raises it I'd say.

Uncertainty is δ (time), i.e. As with t .

Uncertainty discount is also δt , because dispersion is δt . (so ~~so~~ ^{distant} future yields will be discounted to nothing) - discounting becomes ~~difficult~~ a difficult $\delta(t)$; maybe t^2 , Lange says so, Wantrup only says is higher than 1st power.

Possible changes: safety preference; uncertainty.

Increased safety preference causes depletion. Increased certainty causes conservation. & v.v.

- not nec., for alternate investments are just as bad.

Changes of uncertainty. Can adjust by making utilization plan more flexible

Long suggested take most probable values, ^{discount} for uncertainty, go ahead as before.

Womrup says we don't behave that way.

To get more flexible, lease assets instead of buy. But is more expensive. Short time leasing costs more than long; leasing costs more than buying (cct. par, which they aren't, people prefer ownership)
Or can use less specialized assets, or shorter lived.

~~2811 Forest - Gothic~~

If you advised coming of 1st, 1 and speakers could improve, so when taxes shifted, no confusion.

My report comes week from next.

Wantrup, 14 May

Uncertainty tends to depletion.

But Δ uncertainty might lead to extreme reaction, to habit patterns. Would then lead to rigidity, not flexibility.

Longe & Hicks treatment of uncertainty: it terminates utilization plan at certain time. But for us, utilization plan ends anyway, w/o uncertainty, L & H had revenues fall, costs rise, in future. ^{so? Why?}

Hedging, pooling, spreading, & shifting to ^{govt.} public, 4 ways of reducing uncertainty.

Can only hedge a ^{short time} few years in future, practically.

Pooling is insurance, for risks of same type, e.g. fire.

Spreading is ~~contingency~~ putting eggs in different baskets.

Prices. Interest & risk premia, for time pref. & safety pref. Both these prices have definite relation to time.

Change in prices of things compl. to depl. or cons. affect use rates. Lime increases yield for a while, speeds up absorption of available plant nutrients, is not a nutrient itself. Phosphate is genuine nutrient, is conserving factor.

So he just concludes you must be specific about effect of price changes on conserv. & depl.

Peas can be very depleting, if on too steep slopes, e.g. c. Ventura. So wrong just to subsidize one crop, as AAA did, it may be used depletingly.

Sugar beets have been important soil builder in Eur., with certain practices, but in U.S. usually depleting, with our practices.

~~Buy typewriter.~~

Wentup - Habib

Our timber prices are still low cf to Europe

16 m acres in Cal, commercial forest land, $\frac{1}{2}$ virgin.
We are cutting 2d growth in Cal right now.

Ownership: $\frac{1}{2}$ commercial forest publicly owned.
Of saw timber ~~and~~ 46% publicly "
" " " volume, 86% private is 'available', 16%
~~private~~ public is available. Unavailable means parks or
remote.

45% Cal. is forest, but not all is commercial: parks, small
remote etc timber, burned, cut over, brush.

Of redwoods, most is privately owned, & generally the more
valuable assets are in private hands.

No net growth in mature forests.

489 ^m cu ft drain Cal, annual.
335 growth

Of saw timber

growth 1.2 bd. ft (= $\frac{1}{12}$ cu ft)
drain 3.1

But low growth due to virgin areas.

Cal. protection good cf. to other lands.

Cutting on private lands is only 20% "good", which means
leaving proper seed trees, is getting below critical zone.

Cal. Forest service est. should be able to stabilize at growth
of 600 m cu ft.

Is a competitive industry.

4 State Forestry districts setup. Make rules, which
must be approved by state bureau of forestry.

Seed produced redwood is more valuable than ^{sprout} shoot
produced, because less competition.

Some ec. obstacles to good practices

1. Uncertainty of low future, & investments are for then.
2. Virgin timber
3. Small temporary scattered holdings by absenteees who don't watch what is done.
4. Possibility of fire. No forest insurance.