COMPARISON OF MARKET PRICING AND OTHER MEANS OF ALLOCATING WATER RESOURCES*

by

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Gentlemen, there now appears before you a college professor, a man who makes a living casting imitation pearls---before real swine. I feel a little out of place here. The pearls are the same, but when I see how many lawyers are in the audience, I feel more like a man waving a red flag at a pen of champing bulls. Our M.C. and my other detractors accuse me of a peculiar penchant for irritating members of the bar. That's not really so. I make no discrimination in favor of lawyers, and the irony is when I irritate lawyers it is really in an effort to butter them up. If I attack certain cherished concepts, that is evidence of my confidence that lawyers are big enough to give me a fair hearing, really an outrageously ingratiating complement to any profession. If I appear to be practicing law without a license, remember, please, that imitation is the sincerest form of flattery. If I suggest that change in established institutions is in order, that implies my confidence that lawyers are sufficiently masters of their profession to bring it about. If I insinuate that some laws comprise a W.P.A. for lawyers, it is only because I would like to see that terrible legal talent now neutralized in fruitless conflict released for higher ... on which I suspect you will agree there would be many in a scheme ... will profess this morning, and because I have confidence that most lawyers

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[illegible] creative and constructive lawgiving a more gratifying pastime than [illegible] pugilism conducted under obsolescent rules.

I also feel a little out of place regionally. My experience with water [illegible] largely Western. This is the first time I have spoken from the same platform with the Stars and Bars, and, if there were danger of my for[illegible] the importance of regional differences, that banner looking at me from the corner should serve as a constant reminder. I will, however, draw on Western experience with no apologies, for it should have high predictive value in the Southeast today. Professor Greenman has hit the key note: "Look ahead." Dr. Young has quoted scripture: "Where there is no vision the people perish." I suggest you may see a vision of your own water future by studying the history of the arid West.

And that future may come sooner than we think. There is a faint note of complacency in some of the reports of a comfortable water surplus in this, the second most humid region of the country. It is worth noting that western Oregon, in the most humid region, by 1954 had managed to work itself into a situation where new industries could not be assured of usable water rights on many rivers because a loosely administered appropriative system had let paper claims accumulate to freeze up the 99% of the [illegible] not being used. Complacency at this stage is to be viewed with [illegible]. The best time to solve water problems is before you make costly [illegible]sible errors. The time to introduce needed flexibility into a system [illegible] before a shortage panics water claimants, as it will, into clinging with [illegible] of fear to every far-fetched water claim their fevered imagina[illegible] can conjure up. As one anxious region or industry reaches out for [illegible] arouses anxieties in others, lest they lose out. [illegible] begins to look up fifty years hence, such anxieties [illegible] [illegible] problems that can very quickly [illegible]

[illegible]

I am warned that problems are different here than in the country I know best. No doubt they are, and it wouldn't be a very interesting world if all regions were identical. But there are important similarities as well. Mr. Agnor asked yesterday if there were any precedent on acquiring rights to pollute water. Let me observe that every Western right to divert water for irrigation is also a right to pollute water, for some of the water returns to the stream, significantly deteriorated in quality. It leaches soluble salts from the soil. In the San Joaquin Valley, boron is usually the first to rise to toxic levels, and in some areas the injury to downstream interests is measured more in additions of boron than subtractions of water.

I am warned that the Southeast is more provincial and traditional than the West. Gentlemen, as a younger man I moved West seeking a brave new world, but I think I can report objectively that provincialism and traditionalism are found from coast to coast. Today I note Florida walking off with the citrus industry, not to speak of Atlanta's taking California's aircraft contracts. I note Mississippi suddenly breaking more rapidly from the riparian doctrine than California has in a century. I am not convinced that one region has a monopoly on enterprise and the other on inertors.

So let me proceed to cough up a few imitation pearls, synthesized though they may be from Western materials, in the confident expectation that some of them may find a proper setting in this hospitable Southeastern clime.

I propose first to describe three general means of allocating waters [illegible] a fourth, my concept of how market pricing might be harnessed [illegible] the job. Second, I propose to compare the different methods [illegible] several criteria: economy of the initial allocation; conservation [illegible] maximum use; flexibility of allocations to meet changing needs [illegible] of certain areas with economic benefits and [illegible]

ALTERNATIVE MEANS FOR ALLOCATING WATER

The first general class of allocative systems I will designate as traditionary pre-commercial systems. If you sense a faint breath of humor in that name it is probably because it is intended. This class includes the riparian, the appropriative, the correlative, and minor ancillary doctrines, all of which share the quaintly archaic innocence of simple business arithmetic that we associate with the dark ages preceding the rule against perpetuities and the commercial and rational revolutions of the last few centuries. I assume that everyone in this room is conversant with these vestigial relics which, however obsolescent in spirit, are still the prevailing water law in 49 states -- 50 if Alaska proceeds, as it seems bent, to adorn its new statehood with the antique doctrine of prior appropriation.

The second general class of allocative systems is the internal mechanism of a public utility or municipality (a term that includes water districts) or other local distributive organism. Water may be allocated by price, by area of land, by use of land, or various arbitrary criteria. Where price is the allocative agent, and the price is an economic one, this form of [illegible] approximates a rational market save for the important feature that internal transport is generally supplied free: that is, rates and quality of service are made uniform within the perimeter of the local distributive organism, regardless of differential costs of service.

A third general class of allocative system I shall, for want of a better name, describe as "empire-building." The term is partly opprobrious [illegible] merely just descriptive. This system, or lack of system, characterizes the large distributive agencies that preside over grand interregional transfers [illegible] such as the San Francisco Water Department, the Metropolitan Water [illegible] California, the Bureau of Reclamation [illegible]

[illegible] Feather River Project [illegible]

[illegible]

utility or power companies in the 1920's. They may originate as customers seeking water, or surplus water seeking customers, but either way their distinctive feature is the poorly consolidated, and often haphazardly fragmented service area. Their aqueduct lines shoot out here and yon like ice cracks in thaw time. Allocation is by contract and individual bargaining with local distributive agencies. Contracting principles vary widely, but priority of contract is the transcendent allocative principle, one that closely resembles prior appropriation. It is characteristic of these interregional transfer agencies to hold their water rights from the state without charge, an advantage which they either pass on to their customers in lower rates or, in the case of San Francisco, exploit to help finance the sponsoring entity.

Fourth, let us see what a system of market pricing might look like if we called on the principles of a free economy to do the job of allocating water. Here the overriding principle of allocation is willingness to pay for water. It is not a simple matter, however, to build such a system. The law does not yet provide us with simple negotiable instruments wherewith to buy and sell clearly defined quantities of water, and as water floweth whither it listeth there is more involved in creating such negotiable instruments than simple application of concepts developed for stationary property forming developed negotiable instruments, there remains a further problem of conveying and distributing water, an operation that does not lend itself to the regulation of competition, being a natural monopoly. Economic analysis is of particular service here, for it can advise readily how to set prices by conscious public control. That does presuppose some intelligent thought by the public and its representatives, which some may insist foredooms the effort to failure, but I'm not ready to abandon hope that when concerned professional people reach a working

consensus, even on intricate questions, they can sell much of their expert advice to the public.

The contribution of the price system in reconciling rival claimants is to take many heterogeneous values and resources and make them commensurable, reducing decisions to one common measure, the dollar. You have heard it said, I am sure, that "you can't put a dollar value on a song sparrow." Perhaps not, but I know of a certain duck pond maintained by a hunting club in Ventura County, in southern California where water is scarce, where it is possible to compute about how many acres of lima beans are sacrificed to keep water in that pond. It is also possible to put a dollar value on lima beans, and by this not-very-devious process a friend of mine computed that every duck taken from that pond in 1949 used $560 worth of water. If there were a water market, so that duck hunters were paying for that water, either explicitly or in foregone gain, we could say that the water to support a duck was worth $560 at that time and place. If the hunters were willing to pay that much then society could reasonably say that duck-hunting had been weighed in the balance with lima beans and not found wanting. Thus the dollar serves as arbitrator. In that nice legal phrase we heard yesterday, it "[illegible] does the convenience of the parties."

A Quaker, so the story goes, was driving his mule to town, when the Missourian balked and ignored all blandishments to continue. Whereupon the Quaker addressed him in this fashion: "Mule," said he, "Thee knowest that my religion bids me to forebear from striking thee, or cursing thee, or [illegible] thee in any way. But Mule: Thee dost not know that I could sell thee to a Methodist." Thus the price system offers solutions and alternatives to troubled relationships. Again, it seems that an employer advertised in the Wall Street Journal for a Harvard man with an M.A. or the equivalent. A Princetonian answered the ad and offered to work half time. "I won't vouch for

the true rate of exchange or substitution between Harvard men and Yale men, but there is a rate of exchange between most resources, and most products, by which the price system lets us make reasonable decisions.

We must choose between uses A and B for certain waters. The uses differ in the nature and weight of produce per acre-foot; in the nature and amount of associated inputs per acre-foot; in distance from the source; in elevation; in roughness of the intervening terrain; in the anticipated time-distribution of future benefits and costs; and so on. The only practical way to reduce these variegated factors to a common measure, to weigh them against each other, to apply the logic of man's ability to manipulate numbers, is through the price system. Measurement is science, and measurement is economics. Our measure is the dollar, and it is too useful a social invention not to apply to the problem of allocating scarce waters among competing demands.

The problem divides itself naturally in two parts: the division of waters among rival demands at some central point or node; and pricing the use of aqueducts carrying water thence to areas of demand. Let us begin with the first.

Up to now I have been guilty of plying you with little more than economists' platitudes. Now I want to throw out a new proposal. A new idea, so they say, runs through three stages. In Stage One it is too ridiculous even to consider; in Stage Two it threatens the foundations of the Republic; in Stage Three, why, we've always known it. I do not expect that my proposal will reach Stage Three for some time, but if I can push it under the foundations of the Republic this morning I will feel a great sense of achievement.

Let us assume that the state has asserted its ultimate ownership of waters, following the sentiment of Oregon's former Chief Justice McBride who wrote in the Hood River case "It does not seem to me that water use in this country ever rose above the dignity of a mere privilege over which the state

not complete control." Let us assume we have solved our second problem, that of pricing transport, so the demand that filters back to our central water market is F.O.B., not of transport costs. There we have a supply, and competing demands. The water master need only set a price to balance supply with demand, and clear the market. The monies he collects serve not only to ration water but to help finance the state, whereby the annual net value of the resource goes for the common benefit of all citizens and taxpayers, rather than the minority who happen to use lots of water.

The water master's administrative and operational task is not essentially different from that of water masters today, on the few streams that have them, or in the many irrigation districts that have them. It is only necessary that the master have a predetermined schedule telling him who gets water when the rate of natural flow rises to each possible level. Today such schedules are predetermined, and iron bound, by long histories of litigation. In an economical system they would be predetermined by advance bids from water users.

If the water master had surplus storage at his disposal he could sell off water daily at his estimate of a market-clearing price. If he lacked storage he could receive advance commitments from buyers in the form of demand schedules, stating the quantities they desire at a range of prices. Placing such bids orders is, again, actually practiced in some irrigation districts, for example the Madera, which are tight on water and ration it carefully. The main difference between my proposal and their present practice is flexibility of price. By taking advance orders in the form of demand schedules it is possible to achieve the ultimate in day-to-day price flexibility and that without introducing any very drastic change from the most advanced present practice.

It might at first be thought that such flexibility is a boon we cannot avail on us by lack of storage, but if you stop to think, price flexibility [illegible] substitute for some storage. Storage is always [illegible]

price flexibility can reduce storage needs appreciably. The proposed flexible price system is worth introducing, therefore, even where storage is economical. For there is always a margin beyond which it is costlier to increase storage than to reduce the need of it by flexing prices.

Now the second part of the problem is that of transporting water from its source, our central market place, to areas of demand, and pricing the use of aqueducts. Economists generally recommend that prices be set equal to what they call marginal costs, or what engineers call incremental costs, that is the last small increment of cost necessary to add the last increment of service. With aqueducts, as with most utility lines, the marginal-cost pricing principle poses the interesting problem that marginal cost falls short of average cost, since average cost includes heavy fixed initial outlays, so that marginal-cost pricing fails to cover all costs, and so necessitates resort to the tax power, or price discrimination, or some other device to meet deficits.

In their recent stimulating and influential book, WATER SUPPLY, Hirshleifer, De Haven, and Milliman have sought to resolve that issue by declaring that water supply operations generally meet increasing costs, that is, that marginal costs equal or exceed average costs. Their argument is that to increase water supply you must lengthen aqueducts. I have great respect for the authors and their book, but I believe in this particular they are only half right. The argument that there are decreasing costs in distributing water, or any other utility, refers to the cost of distribution within a fixed perimeter; or the cost of transport between two fixed points. When you increase the flow of water between two fixed points you get increasing costs. When you lengthen the aqueduct of course you get higher costs per gallon delivered, because each gallon is carried farther, which is an important truth but does not refute the argument of decreasing costs between two fixed points.

The pricing problem, it seems to me, is a job of reconciling these

[illegible] and the way to do that, I suggest, is by a system of graduated water rates, increasing with distance from the source. Instead of regarding the entire distributive network as a homogeneous whole, recognize that it costs more to carry water ten miles than one, and graduate rates accordingly. But at each point on the aqueduct set rates according to the marginal cost of carrying water to that point.

As we move toward the outer fringes of the distribution system it will generally make sense not only to increase rates, but to lower the standard of service.

I will not try to fill in any details of the proposed scheme of graduated rates this morning, much as it may need it. I have sketched this out in more detail in a chapter in a book called LAND ECONOMICS RESEARCH SYMPOSIUM, edited by Marion Clawson, Joe Ackerman, and Marshall Harris, to be published by Resources for the Future next summer.

This still leaves us with a problem of meeting the deficit which marginal cost pricing entails. I suggest the best way to meet that is through a fixed charge on the lands which receive the benefit of water service at low marginal-cost rates. So advantageous is this policy that if we didn't have a deficit we might want to invent one. Let me explain.

Economy in water distribution, and all public services, depends on the rapid and compact development of private lands served. It is hardly necessary to remind anyone these days that America suffers from acute urban sprawl, or scatter, which triples and quadruples the costs of supplying public utilities to a given population. A stiff fixed charge on lands benefited from aqueducts, and from other utility distribution networks [illegible] as a sort of mandatory injunction, a positive stimulus to develop [illegible] actively and rapidly. The fixed charge should be higher [illegible] from the sources of water, where water rates are highest, and [illegible] enable these lands be developed quickly and intensively. [illegible] outer lands the fixed charge may be lower, and the rate [illegible]

In the outer fringes it makes sense to discourage customers from consuming much water, which is costly to transport, and it does not make sense to stimulate intensive development.

The heavy fixed land tax also serves an important role in the scheme, as an equipoise to meet the protests of peripheral landholders who will object to paying higher water rates than are required of those located centrally, or near the source of water. In the scheme here proposed, central landholders receive the benefit of very low water rates and bear the burden of heavy ad valorem land taxes; peripheral landholders suffer high water rates, but escape with light ad valorem land taxes. The land tax thus serves doubly, to promote efficient land use, and to satisfy the ethical and political demands of distributive equity.

The land tax also serves to spare us from some of the frightful schemes of price discrimination that are its alternative. Part of the rationale of charging a price below average cost, I might say, is that the inframarginal value of water to consumers is much higher than the marginal value. The excess of inframarginal values over price is called by economists "consumer surplus," and it is the effort of every utility manager to tap some of this. Some of the resulting rate structures are among the worst horrors of American enterprise. Some of the schemes of demand-pricing and consumer psychic analysis that economists have proposed are nightmares.

With the land tax proposal, the consumer who senses a surplus for him at certain water rates steps forth and identifies himself, and quantifies his surplus for us, by his bidding for land served by our water system. Land tenure is the mechanism through which consumer surplus is rationed, and it is necessary to hold land within the service perimeter in order to enjoy the surplus. [illegible] a means whereby [illegible] surplus [illegible] and to recapture [illegible] we wish to keep [illegible] that creates it.

There are many more aspects to an optimal scheme for [illegible]

market pricing to allocate water resources. Of these I'll briefly mention just one more. There should be a price on withdrawing groundwater as soon as we reach the point where that ceases to be a net social benefit. Pumping of groundwater has actually turned out to be of great value in many areas by improving drainage, but when the table gets down 50 or 100 feet it is time to discourage withdrawals. Please don't tell me people will never stand for it: Orange County, south of Los Angeles, is already doing it, at $3.50 per acre-foot, and if those wild and rugged individualists out west can abide it [illegible] settled Easterners can too, in their time.

COMPARISON OF THE SYSTEMS

Having sketched out four general systems of water allocation, let me now compare them in respect to several points: the basis of initial allocation; constraint imposed on waste; flexibility of allocations; economic containment of service areas; and distributive equity.

A. Basis of initial allocation

1. The rudimentary pre-commercial systems

a. The riparian doctrine

Under the riparian system, water is reserved exclusively for riparian lands, inside the watershed and inside the smallest unsubdivided ownership in the chain of title. These limitations are obviously grossly uneconomic, since the water may be more productive elsewhere. If water turns scarce it is simply prorated, again an uneconomical kind of division, common though it may be in many walks of life, because one riparian may miss 15 percent of his water [illegible] while another is desperately injured.

Priority of claim or use is not a factor in allocation. The right is reserved indefinitely for the riparian, whenever he gets around to using it. [illegible] right if he takes [illegible] obtaining a declaratory judgment of his intent to assert his right in the future, anytime, in such amount as a court finds reasonable at that future time

b. The correlative rights doctrine

Here water is reserved exclusively for lands overlying an aquifer or [illegible] water basin insofar as those are meaningful and determinable concepts. [illegible] it resembles the riparian [illegible] but it differs in this, that stored underground waters are not reserved for the delectation of the overlying owner at his leisure. On the contrary he must get while the getting is good, in competition with all his neighbors. Thus he lacks any incentive to conserve underground water for future use.

There is even a trace of prior appropriation in the correlative rights doctrine, for in those few cases where underground basins have been adjudicated pumping rights have been allocated on a basis of historical use. Thus the basis of initial allocation is such as to make a positive virtue of wasting margin underground waters.

c. The appropriative doctrine

Here the basis of right is priority of use, or claim of use. When water becomes scarce, tribunals generally fall back on histories of use, sometimes on the highest use ever recorded, rarely on anything as mean as the average use. Capacity of diversion works is taken into account also, and [illegible] is a primary reason why on many streams the aggregate diversion capacity [illegible] the maximum recorded flow, and is several times the normal seasonal [illegible].

The doctrine posits that water shall be put to "beneficial" use, with "due diligence." Actually only the crudest distinctions are observed among [illegible] of intensity of use. Only the most patently absurd and ludicrously [illegible] "uses" fail to qualify as "beneficial." No distinction is made [illegible] dreaming rice with 12 acre-feet per acre per year, and swamping [illegible] [illegible] alive with 1/4. Each is a beneficial use. The essential requirement [illegible] [illegible] is unrest on the land.

[illegible] that Harry Truman as President was history-conscious [illegible] [illegible] which history would have to say about him. In the [illegible]

a water-user under the appropriative doctrine. The appropriator wants history to note, to borrow a Brumbaugh style, that he used just one heck of a lot of water. That is the basis of his claim to use water in all future years.

In time of shortage, there is no prorating under the appropriative system, save in the Mormon states where rights are expressed as fractions of the flow. Elsewhere, all shortages are suffered by junior appropriators, while seniors take as much as ever. All the variability of flow is absorbed by the juniors, none by the seniors.

The doctrine of prior appropriation was a reaction to the riparian system, under which many valuable waters were let run to waste for long periods. Like so many reactions, it went too far, and made a positive virtue of withdrawing water by putting a premium on use, or the appearance of use. Even a statement of intent to use has a considerable nuisance value to discourage later claimants. It costs virtually nothing to file an application to appropriate water, which filing gives you priority as of date of filing so long as you proceed at that loosely defined gait called "due diligence". But when the pressure of competition mixes, a dry paper claim is jeopardized, and the appropriator is moved to nail down his claim by "use", however contrived.

In a growing region, excessive taking is generally rationalized by citing the needs of the future, which are much easier to exaggerate than the bare facts of today. Of course it is desirable to build a little ahead of demand, but the appropriative doctrine contains a systematic bias prompting appropriators to overdo it in order to keep those other fellows' greedy hands off their water. The result is neatly summarized in Diana Barrymore's autobiography: too much, too soon.

Thus the appropriative doctrine carries with it the seeds of premature overexpansion, which in turn carries the seeds of collapse. That is a more [illegible] than the simple [illegible] under the riparian doctrine, but it is a little rich for my blood. In the [illegible] figured prominently in the overexpansion of irrigated agriculture

...the ensuing collapse which some would like to impute entirely to the ...nal depression, regarding that as an inexorable outside factor but which ...fect was not unrelated to bringing water supply to more acres than markets ...ld conceivably have absorbed the produce of.

I have emphasized the polar opposition of riparian and appropriative ...ctrine. Let me temper that interpretation. Life is not that simple. As ...e gentleman observed yesterday, it is not enough to be against sin and for ...otherhood: sometimes one is necessary to achieve the other. Some appropriators ...ave come to resemble riparians, in that they have learned to play the system ...o hold valuable waters in reserve for their future convenience. There are ...numerous gimmicks now available to help prolong the "development" period ...between when you first say dibs and you actually use the water. The client ...groups of the California Department of Water Resources, for example, now benefit ...from that organization's having filed on much of the unappropriated water of the ...state, and having these filings exempted by statute from the requirement of ..."due diligence." Municipalities and irrigation districts are customarily held ...only to nominal diligence requirements, and some of them hold rights to more ...water than they should need for a century, if ever. Some are formed expressly to ...hold water rights.

2. Internal allocation in public utilities and municipalities.

Here we have the principle of free transportation applied. The ...municipality has its water right, under one of the rudimentary systems, which ...right is then regarded as in some sense the common property of all within the ...municipality, who can claim equal treatment, regardless of location.

Sometimes water is rationed by acreage, there being no price on or ...charging of water as such, and the system financed entirely by other means, ...as property taxes, or power sales. This system is not very economical ...of water, since users differ in needs not to mention [illegible] ...rates.

Often this kind of allocation characterizes an entity with surplus

...ter, which entity wishes its members to use as much water as possible in order to maintain the history of use. Rationing here is necessary not so much to constrain economy of water, save in unusual dry spells, as to economize on an undersized storage and distribution system, which is usually the limiting factor.

Sometimes, again, municipalities (including districts) ration water by price, and private utilities nearly always do. This is an important step in the direction of using market pricing as the allocating agent. Merely to charge a price, however, is not enough: it needs to be a reasonable approximation to an economic price, and that is rarely found.

As intimated before, uniform area-wide postage-stamp pricing is the norm, giving no recognition to differential cost of service, a serious and basic diseconomy. Even if we accept the uniform price idea, it still may be too high or too low. Where the rudimentary water right is quite secure, so there is no premium on use, the tendency is often for water rates to be set too high covering not merely the cost of the water system but the municipal deficit as well. The distribution of water, and of most other utilities, are decreasing cost operations. They have proven convenient tax-collecting apparatuses, but from the standpoint of economic efficiency they should rather be subsidized from flat *ad valorem* charges on landholders.

3. Allocation by "empire-building"

Here the basis of allocation is priority of contract between the interregional transfer agency and the local distributive agency. In that, it resembles prior appropriation, and shows the same tendency to produce segmented service areas. It differs from prior appropriation in that the allocating agency imposes contract terms in addition to, or other than, the standard performance required to perfect an appropriative license, and has no [illegible] of mere paper applications such as clutter [illegible] appropriative system.

One contract term is price, and in this respect, empire-building represents an approach toward an economical market-price system. It may be a postage-stamp price -- the Bureau of Reclamation does that -- but it may also increase with distance -- the California Department of Water Resources is proposing to do that in the Feather River Project. In neither case, however is the contractee paying a price for water as such, only for storing and transporting water, and those operations are heavily subsidized (exogenously subsidized, that is, and not in the good sense which I endorsed previously).

Other contract terms vary with the agency. The Bureau of Reclamation administers the 160-acre limitation of the Reclamation Act, and in some areas priority of contract has represented priority of willingness to accept that stipulation, as well as to accept the Bureau's judgment (which is fortunately pretty good) of how much water a district ought to apply.

Another factor affecting allocations is the need to drum up political support from several constituencies, which accounts for branches and twigs shooting out in all manner of unlikely directions, most notably in the California water plan.

There is generally inadequate effort to contain the service area to achieve economies of compactness in distribution. The contracting agency needs bargaining power, and naturally wants to bargain over a wider area than it has the water to serve. This also constitutes a lever to demand more water, to fill in the gaps at some future time. The landholders also want bargaining power, and encourage rivalry among empire-builders to that end. That leads to overlapping service areas, duplication of facilities, cross-hauling, and in general what the old man had in mind who defined the "status quo" as "the hell of a mess we are in today."

4. Allocation by market price

Now and we have painted our heavies in all their villainy. Let's take a look at Prince Charming and his manner of coping with the problems. We

sketched out earlier, a price system would allocate water by willingness to pay. The consumer would pay first of all for raw water at its source, something none of the other systems require. He would pay a flexible price varying with supply and demand: more in dry seasons and years, less in wet. He would also pay the cost of having water transported from its source to his land: he would pay the marginal cost as a water user, and the rest of it as a landholder. He would also pay for storage service, where that was provided, again on the marginal cost principle.

Water would move to those uses wherein its productivity was highest, net of transport and storage costs. The price system would be enlisted to establish commensurability among competing uses, and the different complementary costs associated with each, and so to arbitrate among them. The service area would be compact, and extended only so far as the value of water on the land exceeded the costs of (a) keeping it from other uses; (b) storing it until the desired time; and (c) transporting it.

B. Constraints on use

Next let us contrast the different systems more specifically, and very summarily, in respect to the constraints they impose against waste of scarce waters.

1. The rudimentary pre-commercial systems

a. The riparian doctrine

Here the prime constraint on use is the lethargy of the riparian, which is often a real factor, but of little value to anyone else since the riparian may come to life at any time. The prohibitions on consumptive use and pollution are largely honored in the breach. Proration among riparians is also a possibility, but this constraint bears no relation to the needs of non-riparians who may become desperate without riparians' suffering any shortage at all.

b. The correlative doctrine

This imposes no constraint on withdrawals. As noted before, the prospect

[illegible] based on [illegible] [illegible] [illegible]

[illegible]

[illegible] appropriative doctrine

[illegible] there is no constraint on use but the opposite [illegible] [illegible] [illegible] to make a claim on the future.

There is in the appropriative doctrine a concept of beneficial use which [illegible] serve as a constraint if vigorously applied, but it rarely is. It [illegible] to keep pace with the times. Early appropriative rights were for [illegible] [illegible] quantities even for their times, and today they are [illegible]. [illegible] passage of time should have weakened them through raising the standard of [illegible] "beneficial" use; instead it has strengthened them through custom. [illegible] [illegible] San Joaquin Valley, water is imported from several hundred miles [illegible] great cost, and economized closely; yet local waters in the same area [illegible] [illegible] in keeping with local customs originating 75 years ago. The [illegible] [illegible] to be that since local waters cost nothing to [illegible] [illegible] [illegible] [illegible] right to treat them as though they were free. The concept of [illegible] [illegible] attaching to scarce waters of high natural [illegible] value has not [illegible] [illegible] into the appropriative doctrine.

2. Internal allocation in public utilities

Here a price is charged, but it is not always to be construed as [illegible] [illegible] on water use. For the utility or municipality usually holds its [illegible] rights under one of the rudimentary doctrines, which impose no constraint [illegible] [illegible] utility holds abundant waters, the utility's price [illegible] [illegible] [illegible] storage-distribution system, and to [illegible] [illegible] [illegible] [illegible] of the sponsoring [illegible] and only [illegible] [illegible] [illegible] [illegible] water-poor utilities, however, and [illegible] [illegible] [illegible] strong [illegible] [illegible] efficiency of [illegible]

[illegible]

[illegible]

continuously adjusted to clear the market. It is not changed every minute although in cities it would probably pay to follow the recommendation of Hirshleifer, De Haven, and Milliman to practice diurnal peak-load pricing It is changed as often as the gains warrant the trouble of making the change

A price system would not base water price on cost of production, that is of storage and transport. Rather, it would recognize that an economic rent attaches to waters located by nature in arid areas, or any areas where demand exceeds supply, and that the function of a price system is to express that rent accurately and use it as a constraint on water use.

In the planning of public works, the proposed price system has the enormous advantage of throwing a wet blanket on most unreasonable demands for uneconomic extension of facilities on the Great American log-rolling principle of public works for private profit. Perhaps you remember Lincoln Steffens' little parable about the Garden of Eden, in which it is disclosed that the troublemaker there was not Eve, nor yet the serpent --- but the apple! Charging the full economic rent for water, and the full price for public works would pretty well dehydrate the apples sought in the Edens of our state capitals by local interests, and wondrously subdue the clamor for uneconomic extensions.

C. Contrasts in respect to flexibility of allocations

Now even more specifically, and more briefly, let us contrast our four allocative systems in respect to flexibility. This is important because however, foresighted the forefathers of the native sons and daughters, demand conditions evolve continuously and an economical system must adapt with them

1. The rudimentary pre-commercial systems

a. The riparian doctrine

Flexibility is often claimed as a virtue of the riparian doctrine. It does permit a limited sort of flexibility among riparians so long as [illegible] [illegible] [illegible] riparian rights are part of [illegible] [illegible] [illegible] irrevocable give by forfeiture or [illegible]

which binds other riparians. As to transfers to non-riparian land, they are virtually impossible, and the area of certified riparian land can never grow larger, only smaller through subdivision.

b. The correlative doctrine

Here, again, there is great flexibility among overlying landholders, who may pump fast or slow, as they wish. But that flexibility is lost when you need it, that is when water becomes scarce, and pumping rights are prorated according to histories of use. As to "exports" from overlying land, they are generally verboten, and the proscription applies to stored waters as well as natural ones, thereby restricting the use of underground storage capacity, in a most inflexible way, to the overlying landholders.

c. The appropriative doctrine

Advocates of this doctrine, or some of them, count among its virtues the transferability of water rights from field to field; critics accuse it, on the other hand, of inflexibility. On this question, my observations tend to confirm the critics. Although statutes generally postulate transferability through sale, the postulate is hedged about with so many conditions as in practice to constitute non-transferability, at least within the area of my most intensive observation, the San Joaquin Valley. I have yet to confirm a single instance of significant interlocational transfer of water by sale of an appropriative license. I have even tried, in the clumsy eager manner of the guard-house lawyer, to pinpoint the legal principles that block transfers, but I will not presume to air them before this learned body. Rather I will suggest a couple of meta-legal principles that seem to come into play.

One I will call the drowning-man principle. As we learn in our life-saving courses, the drowning man becomes possessed of superhuman strength and subhuman judgment, with which combination he puts a death-lock on whatever comes to view first. The desiccated landholder, faced with the bewildering uncertainties of water law, reacts much the same way toward appropriative

[illegible]nses, and there goes the flexibility of the system.

A second non-legal principle might be called the lion-pens effect. On most streams there are many claimants, and a suit against one entails [illegible]. It may be that the lions are all in the wrong cages, but where is the tamer who wants to reallocate them, all in one gory adjudication? Let sleeping lions lie is rather the philosophy that prevails. From the individual viewpoint it is quite rational, but the result is almost perfect rigidity of water allocation, down to the last jot and tittle.

2. Flexibility inside the public utility

Here, flexibility is fairly high, at least in the short run, and within the limits of aqueduct capacity. Even where water is allocated by acreage there is often provision for exchanges among individuals, even to the extent of having multilateral clearing provided in the irrigation district office.

In the long run, flexibility is much more limited. It is virtually impossible to get judicial approval of withdrawing water service from lands once they are included, and that limits the use that may be made of price as a rationing device. That is, it is hard to require a good stiff price of water-users who, when the chips are down, cannot be cut off for non-payment. That same factor makes some districts, with surplus water rights, unwilling to admit new lands, even where that would be economically desirable, for fear of possible future water shortages. Some of those fears seem ridiculously exaggerated, but naturally one proceeds with utmost caution to contract an obligation that the law will make binding in perpetuity.

3. Flexibility within built empires

Like utilities, the large interregional transfer agencies are not [illegible] to withdraw service. In the courtship period, the [illegible] [illegible]

[illegible]

[illegible]

[illegible]

[illegible] for [illegible], the Bureau of Reclamation dispenses water under forty-year contracts [illegible] an eye to economical reallocations in the future. But never underestimate the [illegible] influence. Already the courts have shown their propensity to treat man-made aqueducts as natural watercourses, on which landholders establish irrevocable rights on the old rudimentary pattern.

4. Flexibility under a market price system

Here we have considerable flexibility both in the long and the short run. Allocations at the central node are changeable from day to day, or as often as desired. That is flexibility of a higher order than obtainable under the rudimentary systems even if they worked as well, which they do not, as their friendliest protagonists claim, for the transfer of an appropriative license is a matter of some formality and protocol, not to mention entailing the buyer's raising enough capital to buy a perpetuity.

Under the proposed system of graduated rates, and negatively graduated quality of service, short-run flexibility would doubtless grow less toward the periphery of the system. Because one aspect of quality of service is the provision of excess capacity to permit delivery on demand. The proposed market pricing systems would supply less short-run flexibility at its fringes than do present utilities with their uniform treatment of whole areas; but it would supply more at the centers.

As to long-run flexibility, the market-price system would supply much more than any alternative, for it would permit withdrawing water from whatever lands or users got tired of paying a competitive price for it.

That last feature is easily misinterpreted. It will be objected that [illegible] with sunk investments deserve a water right fixed in perpetuity. But why? We have found that people will invest large sums in plants on the risk that they [illegible] buy their labor and raw materials in a competitive market --- why not water? There is [illegible] need to fear that those with sunk investments will [illegible] lose their water to newcomers, for they can rationally pay generously [illegible] to keep their sunk investments, while the newcomers must [illegible]

[illegible] water.

The [illegible]ity about inaccuracy whenever a flexible system is proposed is to [illegible] jumbling together the worst aspects of the flexible and the inflexible systems. The critic notes that water can be taken away from him; he fails to note that he can get it back, by outbidding others. He also fails to note that a flexible system reduces aggregate demand for water considerably since it is no longer necessary for each user to pad his demands and claims to compensate for the absence of a flexible system giving him access to the common pool.

D. Contrasts in respect to containment of service areas.

1. The rudimentary pre-commercial systems

a The riparian system

This system precludes any very wide scatter, for riparian lands are generally near the river, although the depth varies with each parcel. The river itself however, may meander about in a path that settlement would never follow unless so constrained by the riparian doctrine, and so this is by no means a model of optimal service-area containment.

b The correlative doctrine

Again the doctrine holds water users in a limited area on the overlying lands but these may not be the ones that economy would prescribe. It is fairly typical for pump-irrigators to be scattered or checkerboarded about among dry-farmers over some areas, a pattern which vastly increases the volume of water that must ultimately be sunk underground to support water tables for the irrigators.

c The appropriative doctrine

Service-area scatter is among the worst features of this doctrine. [illegible] of land is a function not just of location but of the strength of [illegible] this may be of the individual landholder or [illegible] [illegible] [illegible] scattered headgates. Later inflexibility prevents consolidation [illegible]

[illegible]

[illegible] undeveloped as future reserves, and much are preclusively for [illegible] that are more convenient to potential rivals, since in more [illegible] of being claimed earlier by others.

2. Public utilities

There is here a force for compact development, in the land tax employed by many irrigation districts to raise revenues. The force is weaker than would be optimal, however, in that there is no graduation of rates, and little corresponding inverse graduation of tax charges.

3. "Empire building"

Here is added to the priority principle a state subsidy, with scope for logrolling, leading to extremely fragmented service areas.

4. The market price system

Here, the systems of graduated rates along aqueducts, and inversely graduated *ad valorem* land taxes, is designed to promote a higher degree of compactness than any prevailing system.

E. The question of distributive equity

In conclusion let me venture a few thoughts on the relation of various allocative systems to the question of distributive equity.

The riparian doctrine seems to be part and parcel of a larger philosophy that property is an end in itself; or if it is a means, the end is not efficient resource use but perpetuation of a small privileged clique.

The appropriative doctrine appears on the stage first as rather a [illegible] revolt against the aristocratic riparian philosophy, substituting the more [illegible] priority principle. But, like so many revolts, it has ended in [illegible] [illegible] a new one [illegible] eyes, again [illegible]

[illegible]

[illegible]

[illegible]

[illegible] to water service on the same terms as the 100% location. That is a crude [illegible] levelling, reminiscent of the French philosophy of equal division of landownership. Here, the institution of property is used more as a means of promoting a sort of social equality, or at least making a gesture towards it by broadening the base of landownership, than it is used toward promoting efficient resource use. It seems to hark back to an early age before there was money, or public administration, so economic and social relations could only be expressed through privileges appurtenant to land.

The market price system seeks to harmonize distributive equity with allocative efficiency. It acknowledges and accentuates the natural advantages of central lands, by graduating rates in their favor. It compensates by graduating ad valorem land taxes the other way. As to water itself, it creates no privileged class of water licensees, but collects the rental value of water to help relieve the general taxpayer.

Is any of that scheme practicable in this society? As a layman I have observed that the law evolves with changing times. Riparians in California were originally subject to no constraint on use; then to beneficial use; then to reasonable use. Could not the next step be "economic use?" Could not economic use, in some circumstances, be the test of what is reasonable? I will leave those questions to you. Thank you.